

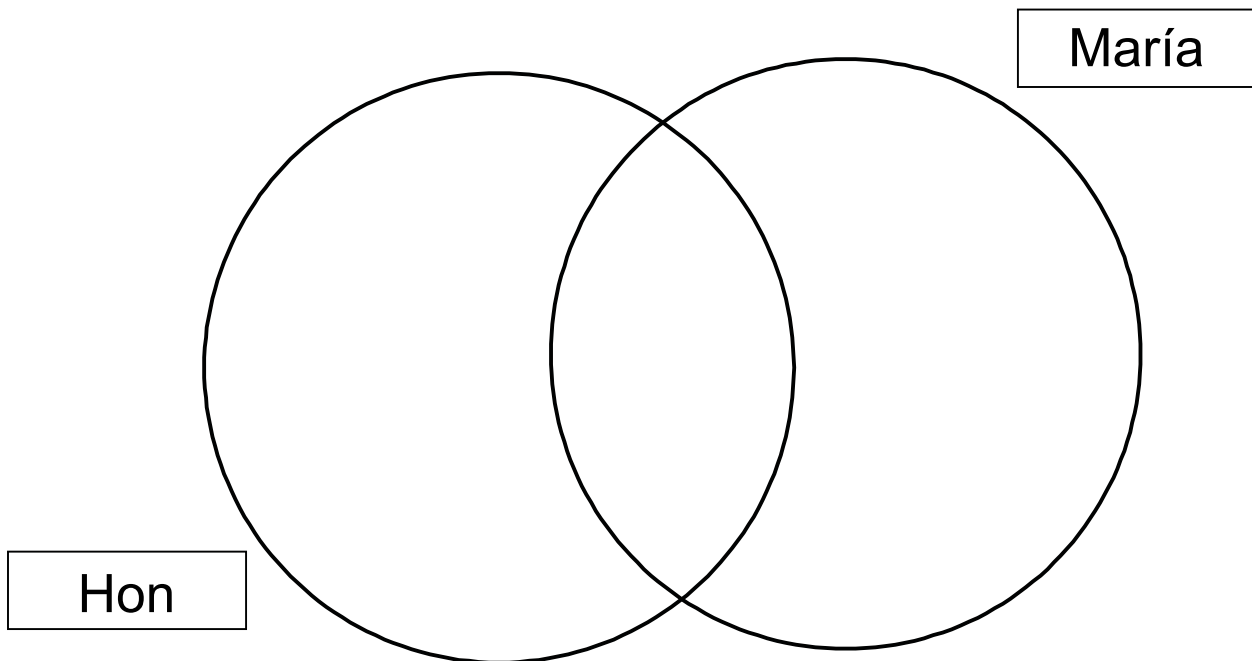
GETTING TO KNOW YOU

Ready (Summary)	Set (Goals)
We will use math skills and communication skills to learn some things about each other and to establish a cooperative environment in the classroom.	<ul style="list-style-type: none">• Learn facts about the students in the classroom.• Establish a cooperative environment in the classroom.• Use Venn diagrams to organize data.

Go (Warmup)

Use the Venn diagram below to organize this information:

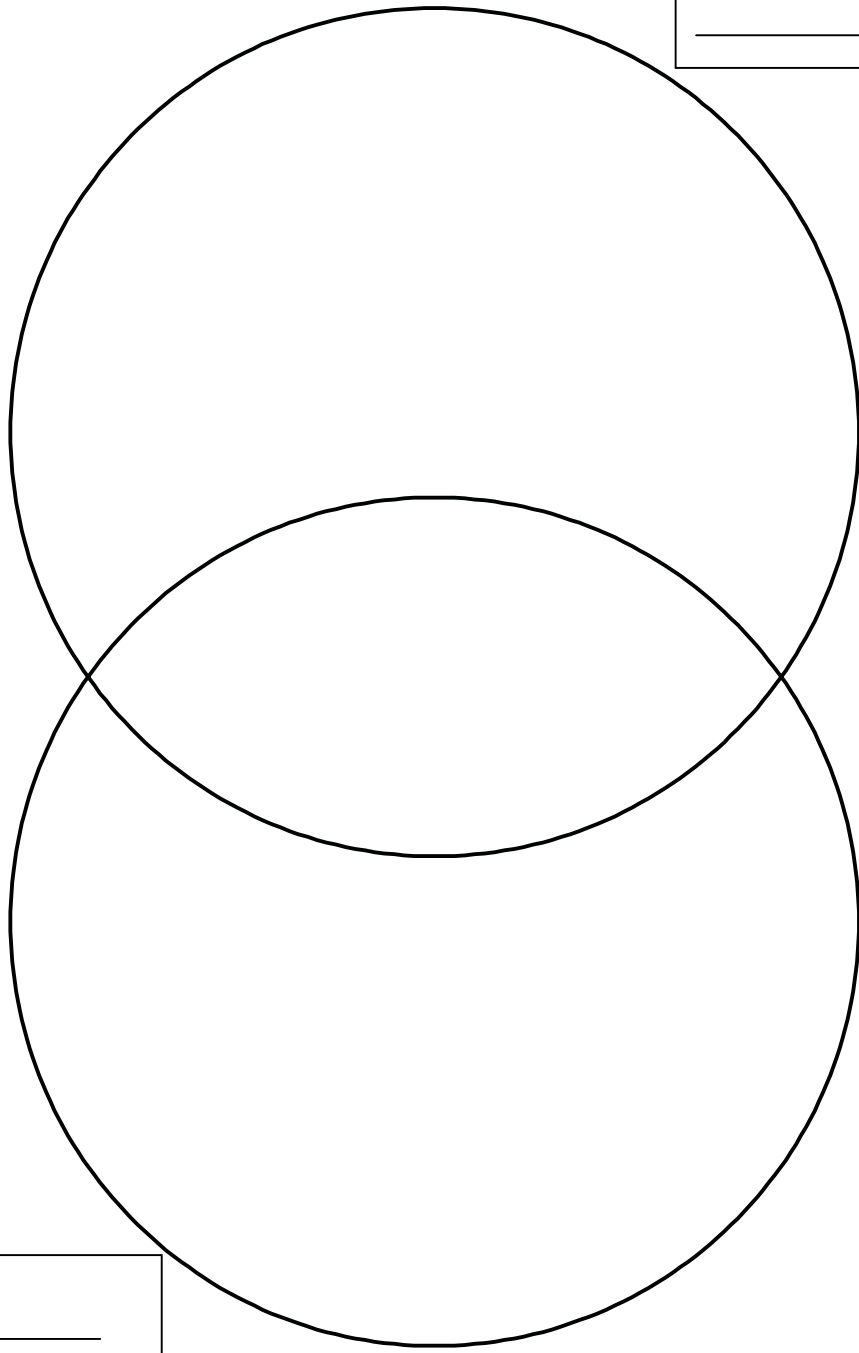
- María likes to play basketball, soccer, and softball.
- Hon likes to play soccer and run track.



VENN FRIEND (TWO PEOPLE)

Use this Venn diagram to record at least three similarities and three differences between you and your partner.

Name _____



Name _____

PRE-ASSESSMENT 1

<p style="text-align: center;">Ready (Summary)</p> <p>We will individually take a diagnostic test designed to assess our preparation for a pre-algebra course.</p>	<p style="text-align: center;">Set (Goals)</p> <ul style="list-style-type: none"> • Identify strengths and areas for growth in the mathematical preparation of students.
---	--

Go (Warmup)

Here are six topics that we will study in math this year.

- Circle the topics you think you understand very well.
- Underline the topics that you think you do not understand very well.

whole numbers	fractions, decimals, percents	algebraic expressions and equations
integers	ratios and proportions	linear functions
exponents	probability and statistics	geometry: length, area, and volume

SKILL BUILDER 1A

Circle the correct symbol(s) corresponding to each word or phrase.

1. Sum	=	+	-	×	÷	•
2. Product	=	+	-	×	÷	•
3. Difference	=	+	-	×	÷	•
4. Quotient	=	+	-	×	÷	•
5. Is equal to	=	+	-	×	÷	•
6. Parentheses	<	>	()	•	≠	≈
7. Is not equal to	<	>	()	•	≠	≈
8. Is greater than	<	>	()	•	=	≈
9. Is less than	<	>	()	•	=	≈

Fill in the blanks with the term that fits the best.

10. In $8 \times 3 = 24$, the _____ is 24.

11. In $48 \div 12 = 4$, the _____ is 12.

12. In $40 - 30 = 10$, the _____ is 10.

13. In $4 \overline{)412}$, 412 is the _____.

14. In $3 + 8 + 5 = 16$, the _____ is 16.

Terms

factor
 difference
 dividend
 divisor
 product
 sum

WHOLE NUMBERS: USING AN AREA MODEL TO EXPLAIN MULTIPLICATION

Ready (Summary)	Set (Goals)
<p>We will learn strategies for recalling multiplication facts. We will use an area model to multiply numbers. We will learn and use properties of multiplication.</p>	<ul style="list-style-type: none">• Use logical reasoning to derive multiplication facts.• Use associative and commutative properties of multiplication.• Use the distributive property.• Use expanded notation.• Compare the traditional algorithm for multiplication to an area model for multiplication.

Go (Warmup)

Write the next seven numbers in each skip counting pattern:

- 2 4 6 _____
- 3 6 9 _____
- 4 8 12 _____
- 5 10 15 _____
- 6 12 18 _____
- 7 14 21 _____
- 8 16 24 _____
- 9 18 27 _____
- 10 20 30 _____

PROPERTIES OF MULTIPLICATION

Associative property of multiplication: The identity $(ab)c = a(bc)$ holds for all numbers a , b , and c . In other words, the product does not depend on the grouping of the factors. We can multiply a and b first, and then multiply the product by c ; or we can multiply b and c first, and then multiply the product by a .

Example: $(3 \cdot 4)(5) = (12)(5) = 60$ and $(3)(4 \cdot 5) = (3)(20) = 60$

Commutative property of multiplication: The identity $ab = ba$ holds for all numbers a and b . In other words, the product does not depend on the order of the factors.

Example: $3 \cdot 5 = 5 \cdot 3 = 15$

Distributive property: The identities $a(b + c) = ab + ac$ and $(b + c)a = ba + ca$ hold for all numbers a , b , and c . This property relates two operations (multiplication and addition). It is called the “distributive property” because it “distributes” the factor outside the parentheses over the two terms within the parentheses.

Example: $3(4 + 5) = 3(9) = 27$ and $3(4) + 3(5) = 12 + 15 = 27$

For #1-3, write the property illustrated by each equation.

1. $(2 \times 5) \times 4 = 2 \times (5 \times 4)$ _____

2. $2(7 + 4) = (2 \times 7) + (2 \times 4)$ _____

3. $(4)(2) = (2)(4)$ _____

For #4-6, write a number sentence that illustrates each property.

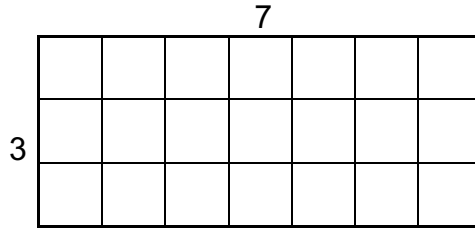
4. Commutative property of multiplication _____

5. Associative property of multiplication _____

6. Distributive property _____

MULTIPLICATION USING AN AREA MODEL

Area is the number of square units inside a figure. To find the area of a rectangle, multiply the length by the width.



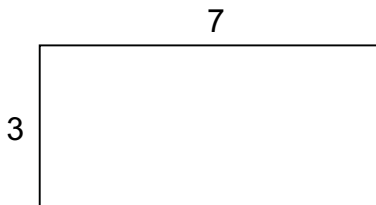
length = _____ width = _____ area = _____

Multiplication sentence: _____ \times _____ = _____ or

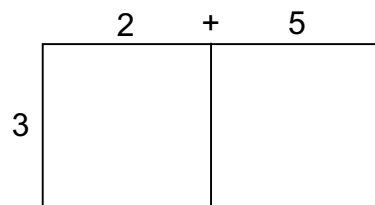
_____ \times _____ = _____

1. What property is illustrated by $3 \times 7 = 7 \times 3$? _____

2. Here are three rectangles. Write multiplication sentences suggested by the rectangles.



_____ \times _____ = _____



$3 \times (\text{_____} + \text{_____}) = \text{_____}$ $\text{_____} + \text{_____} = \text{_____}$



$(\text{_____} + \text{_____}) \times \text{_____} = \text{_____}$ $\text{_____} + \text{_____} = \text{_____}$

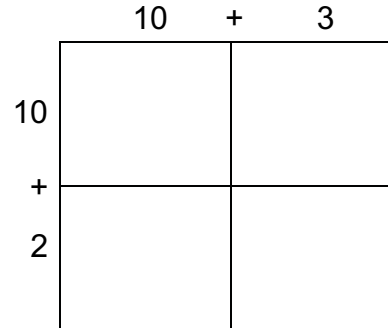
Rectangles are not drawn to scale.

1.1 Whole Numbers: Using an Area Model to Explain Multiplication

AREA PROBLEMS

1. Multiply using a traditional algorithm and an area model.

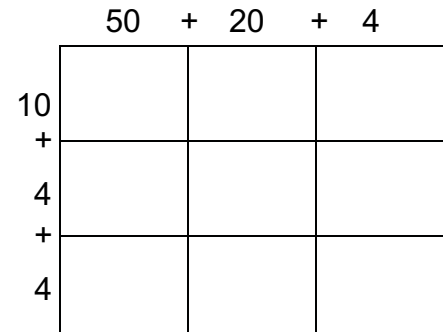
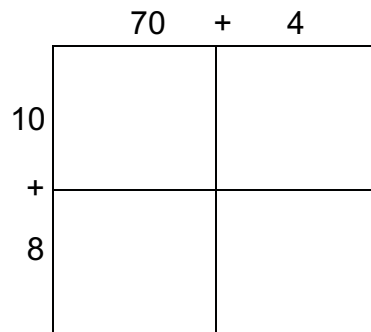
$$\begin{array}{r} 12 \\ \times 13 \\ \hline \end{array}$$



Draw arrows to show how the partial products of a traditional algorithm and rectangles inside the rectangle of an area model are related.

2. Compute 18×74 using a traditional algorithm. Multiply using an area model in two different ways.

$$\begin{array}{r} 18 \\ \times 74 \\ \hline \end{array}$$



Draw arrows to show how the partial products of the traditional algorithm and rectangles inside the rectangle of the area models are related.

Rectangles are not drawn to scale.

1.2 Whole Numbers: Estimating Quotients

1.3 Whole Numbers: Place Value and Rounding

SKILL BUILDER 1

Round to the nearest ten.

1. $96 \approx$ _____ 2. $136 \approx$ _____ 3. $201 \approx$ _____

Round to the nearest thousand.

4. $86,954 \approx$ _____ 5. $6,743 \approx$ _____ 6. $454,563 \approx$ _____

7. What does the 9 represent in 53,429? _____

8. What does the 4 represent in 53,429? _____

Round each addend to the nearest ten and find the sum.

Ex. $134 + 148 + 183$ $\begin{array}{r} 134 \\ 148 \\ + 183 \\ \hline 460 \end{array}$	9. $4,457 + 2,583 + 555$	10. $45,576 + 27 + 4,672$
---	--------------------------	---------------------------

Round each number to the nearest thousand and subtract.

11. $18,928 - 10,456$	12. $7,565 - 5,993$	13. $325,567 - 28,459$
-----------------------	---------------------	------------------------

14. This is how Ted rounded 85,562 to the nearest thousand. Is he correct? Explain.

$$85,562 \rightarrow 90,000$$

1.3 Whole Numbers: Place Value and Rounding

KNOWLEDGE CHECK 1

Show your work on a separate sheet of paper and write your answers on this page.

1.1 Whole Numbers: Using an Area Model to Explain Multiplication

1. Find 78×3 using both a traditional algorithm and an area model. Show your work.
2. State the property illustrated by the equation $4(3 + 2) = (4)(3) + (4)(2)$.
3. Is $3(2 + 5) = (3)(2) + (3)(5)$ a true equation? If true, state the property illustrated.

1.2 Whole Numbers: Place Value and Rounding

4. What does the 8 represent in 56,485,013?
5. Circle the digit in the hundreds place. 4,568,137
6. Round 2,467 to the nearest thousand.

INTEGERS: INTRODUCTION

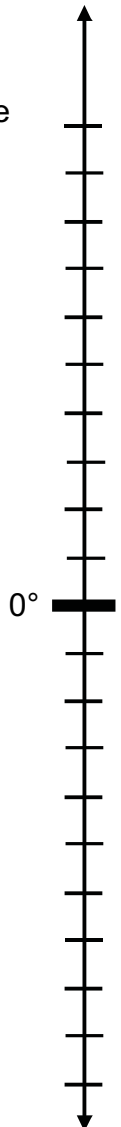
Ready (Summary)	Set (Goals)
<p>We will place integers on a number line. We will write equations and inequalities using integers.</p>	<ul style="list-style-type: none"> • Represent integers on a number line. • Explore integer addition and subtraction using a number line model. • Write equations and inequalities using integers. • Solve problems involving integers. • Understand the meaning of absolute value.

Go (Warmup)

Here are some average temperatures in Fahrenheit from various locations around the world in July.

- Label the vertical number line at right, showing temperatures from 100 degrees below zero (-100°) to 100 degrees above zero ($+100^\circ$).
- Indicate the temperature for each location with a point on the number line.

1. Point *C*: Cape Denison (a region in Antarctica) at 0° .
2. Point *M*: Moscow (a city in Russia) at 60° .
3. Point *N*: North Pole (a city in Alaska) at 40° .
4. Point *S*: The South Pole (a location in Antarctica) at -70° .
5. Point *D*: Death Valley (a region in California) at 100° .
6. Point *E*: Ellsworth Land (a region in Antarctica) at -35° .



COMPARING TEMPERATURES

- Compare the temperatures using your number line.
- Complete the word sentences. Write a number sentence using $<$, $=$, or $>$ for each word sentence.

	Word sentence	Number Sentence
1.	The temperature in Death Valley <u>is greater than</u> the temperature at the Pole.	$100 > 40$
2.	The temperature in Ellsworth Land <u>is less than</u> the temperature in Cape Denison.	
3.	The temperature in Ellsworth Land is _____ the temperature at the South Pole.	
4.	The temperature in Moscow is _____ the temperature at the South Pole.	

Fold along the dotted line to view your number line from the previous page

Use your number line to complete each number sentence with $<$, $=$, or $>$. Then, write a word sentence for each number sentence.

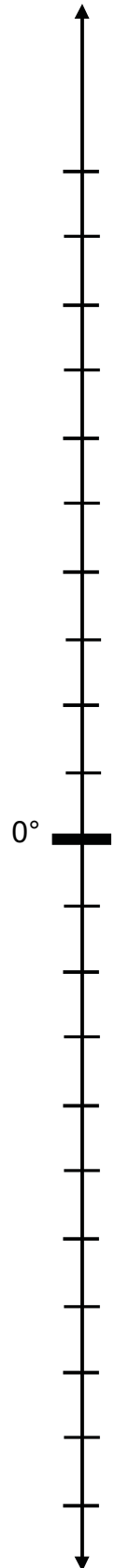
	Word Sentence	Number Sentence
5.	Forty degrees is greater than zero degrees.	$40 \square 0$
6.		$-45 \square 60$
7.		$-60 \square -35$
8.		$-95 \square -55$

2.1 Integers: Introduction

TEMPERATURE CHANGES 1

Find each afternoon temperature. Then, write a number sentence to describe the temperature change. Use the number line as needed.

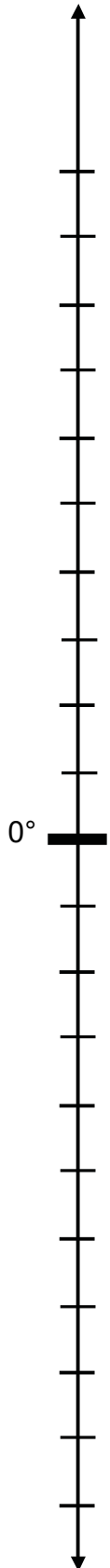
	Morning Temperature	Change	Afternoon Temperature	Number Sentence(s)
1.	0°	rises 10°	10°	$0 + 10 = 10$
2.	60°	rises 30°		
3.	40°	rises 5°		
4.	-70°	rises 85°		
5.	-15°	rises 10°		
6.	-35°	rises 35°		
7.	0°	falls 10°	-10°	or $0 + (-10) = -10$ $0 - 10 = -10$
8.	40°	falls 70°		
9.	-20°	falls 20°		
10.	15°	falls 15°		
11.	3°	falls 5°		
12.	-20°	falls 5°		



TEMPERATURE CHANGES 2

Find each morning temperature, change in temperature, or afternoon temperature. Then write a number sentence to describe the situation. Use the number line as needed.

	Morning Temperature	Change	Afternoon Temperature	Number Sentence(s)
1.		rises 10°	-20°	$\underline{\quad} + 10 = -20$
2.	60°		-10°	Or $60 + \underline{\quad} = -10$ $60 - \underline{\quad} = -10$
3.	40°		45°	
4.	-70°	rises 85°		
5.		rises 10°	-5°	
6.	-35°	rises 35°		
7.	0°		-10°	
8.		falls 70°	-30°	
9.	-20°	falls 20°		
10.		falls 15°	0°	
11.	3°		-2°	
12.	-20°	falls 5°		



WHOLE NUMBERS: DIVISION WITH REMAINDER

Ready (Summary)	Set (Goals)
<p>We will learn some procedures for finding quotients of whole numbers.</p>	<ul style="list-style-type: none">• Learn strategies for finding quotients of whole numbers.• Estimate and round numbers.• Use division vocabulary.• Use a variation of the standard division algorithm.• Interpret the meaning of remainders.

Go (Warmup)

Highlighters come in packages that hold 3 highlighters each. How many packages are needed to hold 727 highlighters?

2.3 Whole Numbers: Expanded Form and Divisibility

SKILL BUILDER 1

1. A number is divisible by 2 if the digit in the ones place is a(n) _____ number.
2. A number is divisible by 5 if the number ends in _____ or _____.
3. If the sum of the digits of a number is divisible by 3, the number is divisible by _____.
4. Circle all the numbers divisible by 5. 36 335 2,061 7,030 5,253
5. Circle all the numbers divisible by 3. 35 42 117 40 313
6. Circle all the numbers divisible by 2. 45 439 200 210 458
7. Circle the numbers that are divisible by both 2 and 3.
 102 36 416 2,000 86
8. Circle the numbers that are divisible by both 2 and 5.
 76 40 35 60 44

Write each number in place value expanded form.

Standard Form	Place Value Expanded Form
Ex. 764	700 + 60 + 4
9. 25	
10. 320	
11. 618	
12. 3,482	

13. Rudy used an area model to multiply 204 by 45. Find and explain his error.

$204 \times 45 = 10,800$

$200 + 40$

40	8,000	1,600
+	1,000	200
5		

Rectangle is not drawn to scale.

2.3 Whole Numbers: Expanded Form and Divisibility

KNOWLEDGE CHECK 2

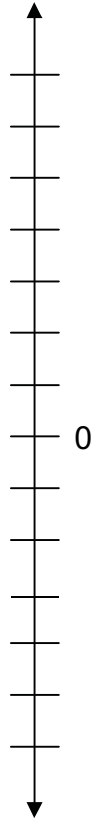
Show your work on a separate sheet of paper and write your answers on this page.

2.1 Integers: Introduction

1. Locate these integers on the vertical number line to the right. Then, write the numbers from least to greatest.

-3, 6, 2, -5

2. What is the distance between -7 and 1 on a number line?
3. Complete the number sentence with $>$, $<$, or $=$. -15 0



2.2 Whole Numbers: Division with Remainder

Find each quotient using a division algorithm or procedure.

4. $270 \div 15$ 5. $2,220 \div 15$

2.3 Whole Numbers: Expanded Form and Divisibility

6. Write three different mathematical expressions for "6 times 7."
7. A number is divisible by 5 if the digit in the ones place is _____ or _____.
8. Write 4,329 in expanded form.

Highlighted Review: Whole Numbers: Addition and Subtraction, Properties of Addition

Compute.

9.
$$\begin{array}{r} 566 \\ 784 \\ + 79 \\ \hline \end{array}$$
10. $1,222 + 3,426 - 1,572$

2.3 Whole Numbers: Expanded Form and Divisibility

HIGHLIGHTED REVIEW PRACTICE 2

Whole Numbers: Addition and Subtraction, Properties of Addition

Choose the best term from the boxes for #1-3.					
sum	quotient	product	divisor	difference	dividend
1. In $60 \div 12 = 5$, the _____ is 5.					
2. In $87 - 10 = 77$, the _____ is 77.					
3. In $15 \times 4 = 60$, the _____ is 60.					

Compute.

4. What is the quotient of 51 divided by 3?	5. $\begin{array}{r} 366 \\ + 198 \\ \hline \end{array}$	6. $\begin{array}{r} 134 \\ + 15 \\ \hline \end{array}$
7. $2,615 + 88$	8. $852 - 263$	9. $709 - 152 + 56$

10. What property is illustrated here: $16 + (2 + 3) = (2 + 3) + 16$

Choose the best answer.

11. Find the sum of 863 and 48.			
A. 911	B. 901	C. 801	D. 811

INTEGERS: ADDITION AND SUBTRACTION 1

Ready (Summary)	Set (Goals)
We will use a visual model to add and subtract integers. We will generalize rules for integer addition and subtraction.	<ul style="list-style-type: none"> Explore the meaning of integer addition and subtraction. Develop rules for integer addition and subtraction.

Go (Warmup)

In an addition sentence, the numbers being added are called the addends, and the result is called the sum.

$$\boxed{\text{addend}} + \boxed{\text{addend}} = \textcircled{\text{sum}}$$

Put a box around each addend and an oval around each sum.

1. $25 + 54 = 79$

2. $315 = 140 + 15 + 160$

In a subtraction sentence, the number being subtracted from is called the minuend, the number being subtracted is called the subtrahend, and the result is called the difference.

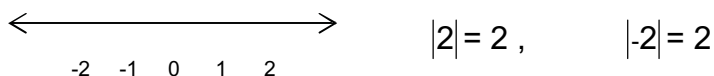
$$\boxed{\text{minuend}} - \text{cloud} \text{ subtrahend} = \textcircled{\text{difference}}$$

Put a box around each minuend, a cloud around each subtrahend, and an oval around each difference.

3. $145 = 180 - 35$

4. $59 - 13 = 46$

The absolute value of a number is its distance from zero on a number line.



Find the absolute value of each number.

5. $|7| = \underline{\hspace{2cm}}$

6. $|-8| = \underline{\hspace{2cm}}$

Use $<$ or $>$ to make each statement true.

7. $|7| \underline{\hspace{1cm}} |-8|$

8. $7 \underline{\hspace{1cm}} -8$

3.1 Integers: Addition and Subtraction 1

INTEGER ADDITION

Compute each sum. Show your work using positive symbols (+) and negative symbols (-).

1. $-3 + (-4) = \underline{-7}$ ----- -----	2. $-2 + (-3) = \underline{\hspace{2cm}}$	3. $6 + 4 = \underline{\hspace{2cm}}$
4. $-6 + (-1) = \underline{\hspace{2cm}}$	5. $2 + 4 = \underline{\hspace{2cm}}$	6. $-5 + (-2) = \underline{\hspace{2cm}}$

7. In problems #1-6 above, the addends have the _____ sign.

8. Explain how to add integers when both addends have the same sign.

Compute each sum. Show your work using positive symbols (+) and negative symbols (-).

9. $-2 + 3 = \underline{\hspace{2cm}}$ -- +++	10. $-2 + 5 = \underline{\hspace{2cm}}$	11. $6 + (-4) = \underline{\hspace{2cm}}$
12. $6 + (-1) = \underline{\hspace{2cm}}$	13. $-2 + 4 = \underline{\hspace{2cm}}$	14. $5 + (-2) = \underline{\hspace{2cm}}$

15. In problems #9-14 above, the addends have _____ signs.

16. Why is the sum always positive in these problems?

3.1 Integers: Addition and Subtraction 1

INTEGER ADDITION (continued)

Compute each sum. Show your work using positive symbols (+) and negative symbols (-).

17. $2 + (-3) = \underline{\hspace{2cm}}$ ++ ---	18. $2 + (-5) = \underline{\hspace{2cm}}$	19. $-6 + 4 = \underline{\hspace{2cm}}$
20. $-6 + 1 = \underline{\hspace{2cm}}$	21. $2 + (-4) = \underline{\hspace{2cm}}$	22. $-5 + 2 = \underline{\hspace{2cm}}$

23. In problems #17-22 above, the addends have _____ signs.

24. Why is the sum always negative in these problems?

Compute each sum. Show your work using positive symbols (+) and negative symbols (-).

25. $-2 + 5 = \underline{\hspace{2cm}}$ -- ++++	26. $4 + (-1) = \underline{\hspace{2cm}}$	27. $-2 + (-2) = \underline{\hspace{2cm}}$
28. $-2 + 2 = \underline{\hspace{2cm}}$	29. $-1 + 0 = \underline{\hspace{2cm}}$	30. $-9 + 2 = \underline{\hspace{2cm}}$

3.1 Integers: Addition and Subtraction 1

INTEGER SUBTRACTION

Here are the parts of a subtraction problem:

6	–	2	=	4
the number that is subtracted from	–	the number being subtracted	=	the result of a subtraction problem
minuend	–	subtrahend	=	difference

Compute each difference. Use positive symbols (+), negative symbols (-), and zero pairs if needed. Write an absolute value statement that compares the minuend and the subtrahend.

<p>1. $3 - 1 = \underline{2}$</p> <p style="text-align: center;">++ +</p> <p style="text-align: center;"> 3 > 1 </p>	<p>2. $5 - 4 = \underline{\quad}$</p>	<p>3. $-4 - (-2) = \underline{\quad}$</p>
<p>4. $-6 - (-1) = \underline{\quad}$</p>	<p>5. $5 - 3 = \underline{\quad}$</p>	<p>6. $-5 - (-2) = \underline{\quad}$</p>

7. In problems #1-6 above, the minuend and the subtrahend have _____ signs.
the same/different

Refer to problems #1-6 above, and use <, =, or > to make the following statements true:

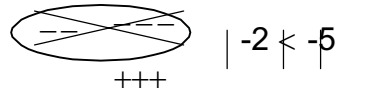
8. Absolute value of the minuend Absolute value of the subtrahend

9. | minuend | | subtrahend |

10. In problems #1-6 above, did you need to add zero pairs? Explain.

INTEGER SUBTRACTION (continued)

Compute each difference. Show your work using positive symbols (+), negative symbols (-), and zero pairs if needed. Write an absolute value statement that compares the minuend and the subtrahend.

11. $-2 - (-5) = \underline{3}$ 	12. $-2 - (-3) = \underline{\hspace{2cm}}$	13. $-4 - (-6) = \underline{\hspace{2cm}}$
14. $3 - 5 = \underline{\hspace{2cm}}$	15. $2 - 7 = \underline{\hspace{2cm}}$	16. $-3 - (-7) = \underline{\hspace{2cm}}$

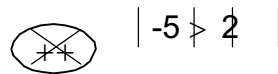
17. In problems #11-16 above, the minuend and the subtrahend have signs.
the same/different

18. Refer to problems #11-16 above, and use $<$, $=$, or $>$ to make this absolute value statement true:

$$|\text{minuend}| \quad \boxed{\hspace{1cm}} \quad |\text{subtrahend}|$$

19. In problems #11-16 above, did you need to add zero pairs? Explain.

Compute each difference. Show your work using positive symbols (+), negative symbols (-), and zero pairs if needed. Write an absolute value statement that compares the minuend and the subtrahend.

20. $-5 - 2 = \underline{\hspace{2cm}}$ _____ 	21. $2 - (-5) = \underline{\hspace{2cm}}$	22. $-6 - 4 = \underline{\hspace{2cm}}$
23. $-6 - 1 = \underline{\hspace{2cm}}$	24. $3 - (-4) = \underline{\hspace{2cm}}$	25. $-5 - 2 = \underline{\hspace{2cm}}$

26. In problems #20-25 above, the minuend and the subtrahend have signs.
the same/different

27. In problems #20-25 above, did you need to add zero pairs in these problems? Explain.

3.1 Integers: Addition and Subtraction 1

FOURFOLD WAY: NUMBERS, PICTURES, AND WORDS

Ready (Summary)	Set (Goals)
We will extend geometric “toothpick” patterns. We will use tables, graphs, and words to describe the patterns.	<ul style="list-style-type: none">• Describe numerical sequences generated by geometric patterns using tables, graphs, and words.• Plot ordered pairs that satisfy a specified condition.• Use inductive reasoning to develop recursive and explicit rules that describe sequences.

Go (Warmup)

Continue each pattern and write a rule that fits each pattern.

1. 6, 10, 14, 18, _____, _____, _____

Rule: _____

2. 3, 7, 11, 15, _____, _____, _____

Rule: _____

3. 4, 8, 12, 16, _____, _____, _____

Rule: _____

3.2 Fourfold Way: Numbers, Pictures, and Words

NUMBERS, PICTURES, AND WORDS TEMPLATE

Geometric Pattern	Table		
1. Build and draw the first several steps suggested by this pattern.	Step # (Input)	Arithmetic	# of toothpicks (Output)
Step 1	1		
Step 2	2		
Step 3	3		
Step 4	4		
Step 5	5		
	· · · 30		

NUMBERS, PICTURES, AND WORDS TEMPLATE (continued)

Table		Graph
Step # (Input)	# of toothpicks (Output)	

2. Label the horizontal and vertical axes and graph the data points.

3. Recursive Rule:
 Start with _____ toothpicks, and then
 _____ each time

4. Explicit Rule: Explain what to do to the input number at each step to get the corresponding output number.

5. How many toothpicks are in step #50?

6. In what step number are there exactly
 _____ toothpicks? _____

SKILL BUILDER 1

Compute.

1. $14 + (-14)$	2. $7 + (-2)$	3. $-10 + 7$
4. $-4 + (-4)$	5. $-10 + 12$	6. $7 + 16$
7. $4 + (-3)$	8. $-2 + (-6)$	9. $2 + (-5)$
10. The sum of two positive integers is a _____ number.		
11. The sum of two negative integers is a _____ number.		
12. The opposite of +6 is _____.		
13. The opposite of -4 is _____.		
14. Greg wrote the following equation. $7 + (-10) = 3$ Is it correct? Explain.		

3.3 Integers: Addition and Subtraction 2

KNOWLEDGE CHECK 3

Show your work on a separate sheet of paper and write your answers on this page.

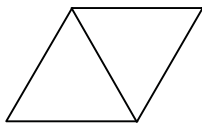
3.1 Integers: Addition and Subtraction 1

Compute each sum.

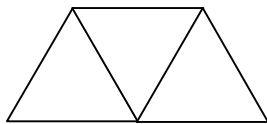
1. $14 + (-5)$
2. $-25 + (-50)$

3.2 Fourfold Way: Numbers, Pictures, and Words

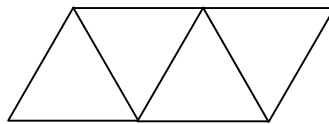
3. Sketch the next stage in the pattern.



Stage 1



Stage 2



Stage 3

Stage 4

4. Describe the pattern in words.

3.3 Integers: Addition and Subtraction 2

Compute each sum.

5. $18 + 8$
6. $-23 + (-32)$

Highlighted Review: Whole Numbers: Place Value, Rounding, and Expanded Form

7. What does the 5 represent in 65,816?
8. Write 65,816 in expanded form.
9. Round 65,816 to the nearest thousand.

HIGHLIGHTED REVIEW PRACTICE 3

Whole Numbers: Place Value, Rounding, Expanded Form

1. Name the place value of the 8 in 813,593,005.
2. Circle the digit in the ones place. 4,568,137
3. Circle the digit in the thousands place. 4,568,137
4. Round 38,765 to the nearest thousand.

Write each of the numbers below in place value expanded form.

	Standard form	Place value expanded form
5.	4,133	
6.	618	
7.	4,576	

Choose the best answer.

8. What is the standard form for $7,000 + 800 + 3 + 30$?
A. 7,383 B. 7,833 C. 786 D. 783

3.3 Integers: Addition and Subtraction 2

INTEGERS: MULTIPLICATION AND DIVISION 1

Ready (Summary)	Set (Goals)
We will use patterns and a model for multiplying and dividing integers.	<ul style="list-style-type: none"> • Explore integer multiplication using a marker model. • Develop sign rules for integer multiplication and division.

Go (Warmup)

Complete the pattern started below by filling numbers in the blank spaces.

						3	6	9		15
				-2	0	2		6	8	10
			-2	-1	0	1	2	3	4	
						0	0			
						-1				
			4							
							-8			

How would you describe the pattern formed by the numbers? _____

INTEGER MULTIPLICATION

Compute each product. Record your work below using positive (+) and negative (-) symbols.

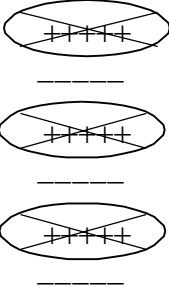
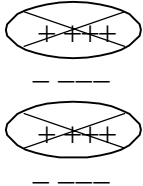
<p>1. $(3) \cdot (5) = \underline{15}$</p> <p style="text-align: center;">+++++</p> <p style="text-align: center;">+++++</p> <p style="text-align: center;">+++++</p> <p style="text-align: center;">(place 3 groups of 5)</p>	<p>2. $(2) \cdot (-4) = \underline{\quad}$</p> <p style="text-align: center;">- - - -</p> <p style="text-align: center;">- - - -</p> <p style="text-align: center;">(place 2 groups of -4)</p>	<p>3. $(2) \cdot (3) = \underline{\quad}$</p>
<p>4. $(4) \cdot (-1) = \underline{\quad}$</p>	<p>5. $(3) \cdot (-6) = \underline{\quad}$</p>	<p>6. $(5) \cdot (-2) = \underline{\quad}$</p>

7. The product of a positive number and a positive number is a _____ number.

8. The product of a positive number and a negative number is a _____ number.

INTEGER MULTIPLICATION (continued)

Compute each product. Record your work below using positive (+) and negative (-) symbols.

<p>9. $(-3) \cdot (5) = \underline{-15}$</p>  <p style="text-align: center;">(take away 3 groups of 5)</p>	<p>10. $(-2) \cdot (-4) = \underline{\quad}$</p>  <p style="text-align: center;">(take away 2 groups of -4)</p>	<p>11. $(-3) \cdot (-3) = \underline{\quad}$</p>
<p>12. $(-2) \cdot (5) = \underline{\quad}$</p>	<p>13. $(-4) \cdot (3) = \underline{\quad}$</p>	<p>14. $(-1) \cdot (-6) = \underline{\quad}$</p>

15. The product of a negative number and a positive number is a _____ number.

16. The product of a negative number and a negative number is a _____ number.

Do not write below this line.

USING A MULTIPLICATION TABLE

1. Refer to the warmup for this lesson. Cut out the two strips at the bottom of the page. Then glue them appropriately to cover the zeroes in the warmup table. Notice that the grid now serves as a multiplication table. Use it to verify these products:

$4(3) = \underline{\quad}$ located in region <u> </u>	$3(-1) = \underline{\quad}$ located in region <u> </u>
$-2(5) = \underline{\quad}$ located in region <u> </u>	$-4(-2) = \underline{\quad}$ located in region <u> </u>
$-4(-3) = \underline{\quad}$ located in region <u> </u>	$5(-2) = \underline{\quad}$ located in region <u> </u>

Patterns for Multiplying Integers:

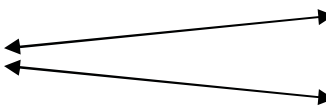
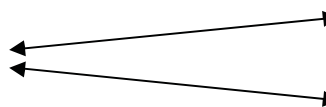


2. The product of a positive number and a positive number is _____.
That is, $(+) \bullet (+) = (\quad)$
3. The product of a positive number and a negative number is _____.
That is, $(+) \bullet (-) = (\quad)$
4. The product of a negative number and a positive number is _____.
That is, $(-) \bullet (+) = (\quad)$
5. The product of a negative number and a negative number is _____.
That is, $(-) \bullet (-) = (\quad)$

Cut out the **two** strips below on the **thick** lines.

-5	-4	-3	-2	-1	0	1	2	3	4	5
5	4	3	2	1	0	-1	-2	-3	-4	-5

RELATING DIVISION AND MULTIPLICATION

Complete the patterns.

	Multiplication Fact		Corresponding Division Facts
A.	$(5) \cdot (6) = 30$		$(30) \div (\underline{6}) = 5$ $(30) \div (\underline{\quad}) = 6$
B.	$(4) \cdot (\underline{\quad}) = -12$		$(-12) \div (4) = (\underline{\quad})$ $(-12) \div (\underline{\quad}) = 4$
C.	$(\underline{\quad}) \cdot (2) = -16$		$(-16) \div (\underline{2}) = (\underline{\quad})$ $(-16) \div (\underline{\quad}) = 2$
D.	$(-6) \cdot (\underline{\quad}) = 24$		$(24) \div (-6) = (\underline{\quad})$ $(24) \div (\underline{\quad}) = -6$

Patterns for Dividing Integers:

2. The quotient of a positive number divided by a positive number is _____.
That is, $(+) \div (+) = (\quad)$

3. The quotient of a positive number divided by a negative number is a _____.
That is, $(+) \div (-) = (\quad)$

4. The quotient of a negative number divided by a positive number is _____.
That is, $(-) \div (+) = (\quad)$

5. The quotient of a negative number divided by a negative number is _____.
That is, $(-) \div (-) = (\quad)$

FOURFOLD WAY: NUMBERS, PICTURES, WORDS, AND SYMBOLS

Ready (Summary)	Set (Goals)
<p>We will extend geometric patterns. We will use tables, graphs, words, and symbols to describe the patterns.</p>	<ul style="list-style-type: none"> • Record observations from geometric pictures as numbers in T-tables and graphs on coordinate planes. • Use inductive reasoning to find a rule from empirical data. • Find inputs and outputs using a rule.

Go (Warmup)

Continue each pattern for steps 1-5. Write a rule (in words) that fits each pattern, describing what is done to the stage number to arrive at an output value.

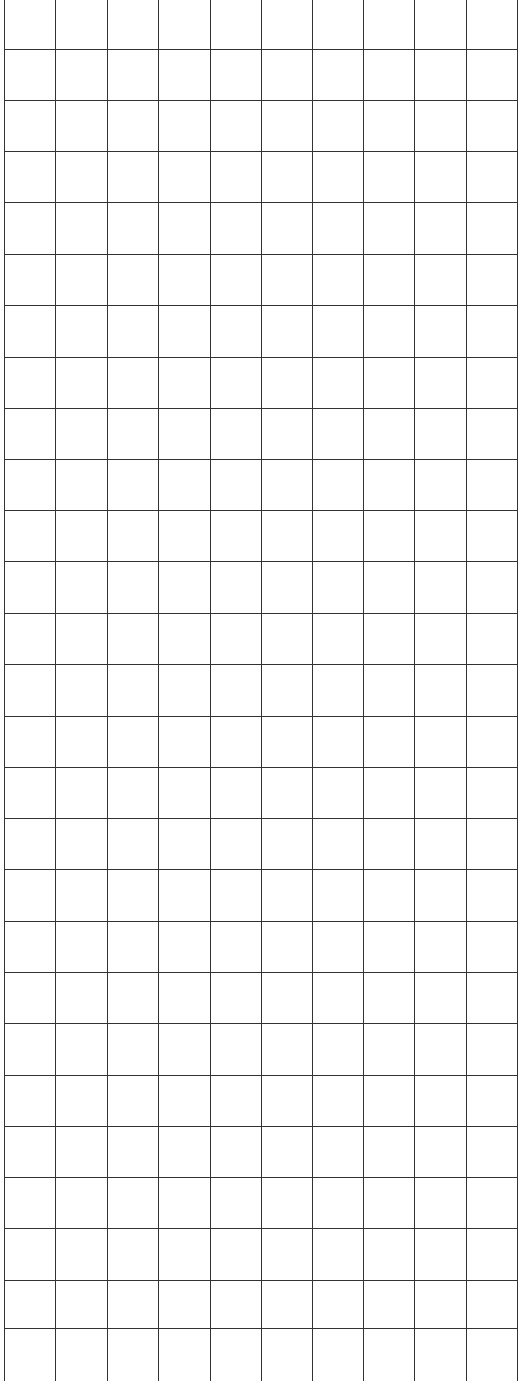
Stage #	1	2	3	4	5	Rule (in words)
Pattern 1	$1 + 4$ $= 5$	$2 + 4$ $=$ <input style="width: 30px; height: 20px;" type="text"/>	$3 + 4$ $=$ <input style="width: 30px; height: 20px;" type="text"/>			stage # plus ____
Pattern 2	$1 \cdot 4$ $= 4$	$2 \cdot 4$ $=$ <input style="width: 30px; height: 20px;" type="text"/>	$3 \cdot 4$ $=$ <input style="width: 30px; height: 20px;" type="text"/>			
Pattern 3	$1 \cdot 1 = 1^2$ $= 1$	$2 \cdot 2 = 2^2$ $=$ <input style="width: 30px; height: 20px;" type="text"/>	$3 \cdot 3$ $=$ <input style="width: 30px; height: 20px;" type="text"/> $=$ <input style="width: 30px; height: 20px;" type="text"/>			

4.2 Fourfold Way: Numbers, Pictures, Words, and Symbols

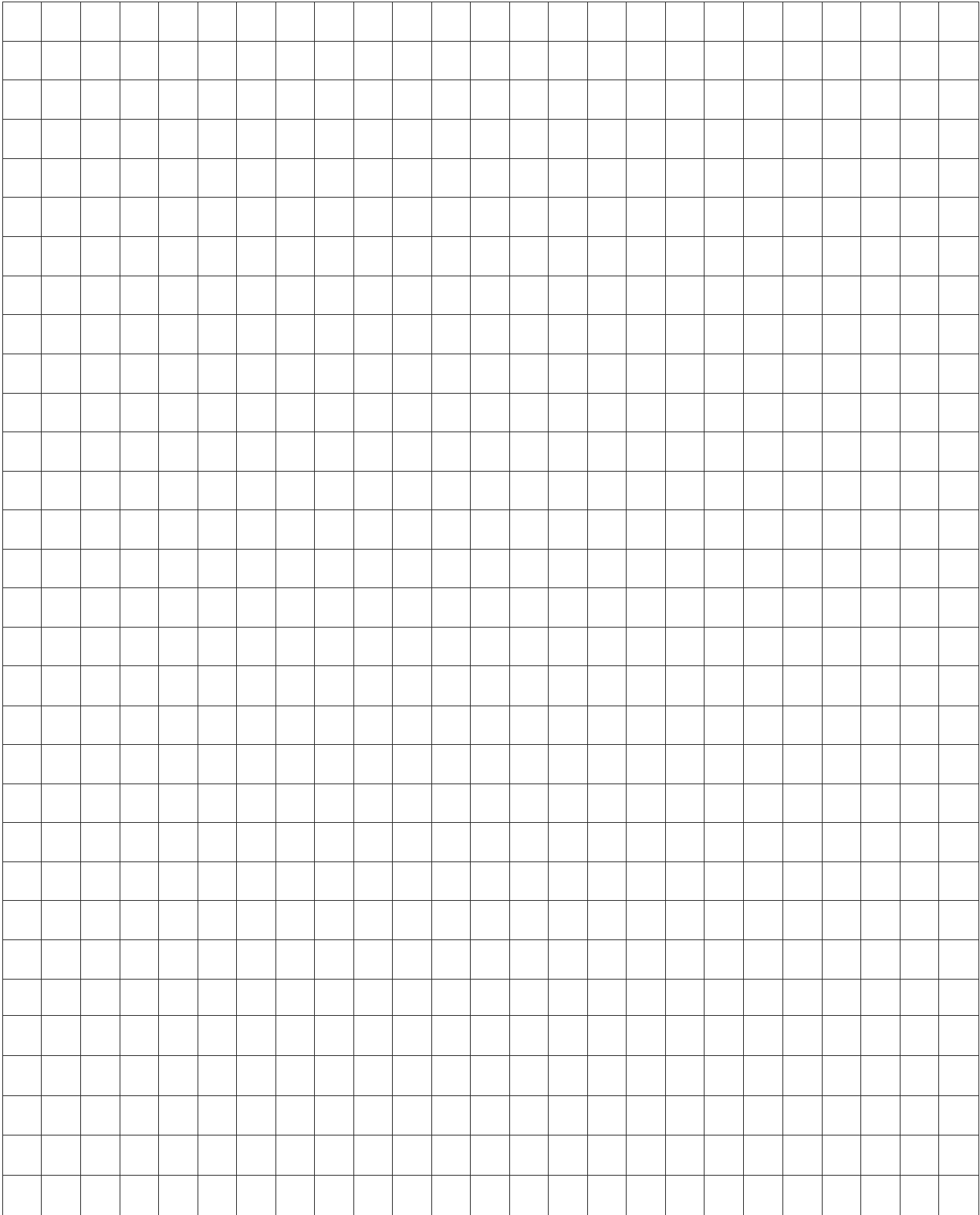
NUMBERS, PICTURES, WORDS, AND SYMBOLS TEMPLATE

A Geometric Pattern	Table		
1. Build and draw the first several steps suggested by this pattern.	Step # (Input)	Arithmetic	# of segments (Output)
Step 1	1		
Step 2	2		
Step 3	3		
Step 4	4		
Step 5	5		
	. . . 30		

NUMBERS, PICTURES, WORDS, AND SYMBOLS TEMPLATE (continued)

Table	Graph																		
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Step # (input)</th> <th style="padding: 5px;"># of toothpicks (output)</th> </tr> </thead> <tbody> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> <tr><td style="height: 20px;"> </td><td> </td></tr> </tbody> </table>	Step # (input)	# of toothpicks (output)																	
Step # (input)	# of toothpicks (output)																		
<p>2. Recursive Rule:</p> <p>_____</p>																			
<p>3. Explicit Rule (in words):</p> <p>_____</p>																			
<p>4. Explicit Rule (in symbols):</p> <p>_____</p>																			
<p>5. How many toothpicks are in step #50?</p> <p>_____</p>																			
<p>6. In what step number are there exactly _____ toothpicks? _____</p>																			

GRAPH PAPER



SKILL BUILDER 1

Complete these statements for remembering multiplication and division rules for integers.

1. The product of two positive numbers is _____
2. The product of two negative numbers is _____.
3. The product of a negative number a positive number is _____
4. The quotient of a positive number and a positive number is _____
5. The quotient of a negative number and a positive number is _____
6. The quotient of a negative number and a negative number is _____

Compute.

7. $3(5)$	8. $2 \cdot (-5)$	9. $(-3) \cdot (-9)$
10. $12 \div 4$	11. $-16 \div 2$	12. $24 \div (-6)$
<p>13. Juan says: “a negative and a negative make a positive.” He applies this rule and writes the following.</p> $(-12) + (-3) = 15$ <p>Is Juan correct? Explain.</p>		

4.3 Integers: Multiplication and Division 2

KNOWLEDGE CHECK 4

Show your work on a separate sheet of paper and write your answers on this page.

4.1 Integers: Multiplication and Division 1

Compute.

1. $(-8)(-8)$

2. $90 \div (-5)$

4.2 Fourfold Way: Numbers, Pictures, Words, and Symbols

3. The perimeter of a figure is the distance around it. Find the perimeter of the figure in each step. Write a rule in words for the perimeter of the figure at any step.



Step #	1	2	3	4	5	Rule in words
Perimeter of figure	3	4				

4.3 Integers: Multiplication and Division 2

Compute.

4. $-42 \div (-7)$

5. $-5 \cdot 12$

Highlighted Review: Whole Numbers: Multiplication, Properties of Multiplication

6. Multiply 612×42 .

7. $5 \times (3 \times 7) = (5 \times 3) \times 7$ is an example of the _____ property.

HIGHLIGHTED REVIEW PRACTICE 4

Whole Numbers: Multiplication Algorithm, Properties of Multiplication

Find each product using both a traditional algorithm and an area model. Show your work.

1. 12×12	2. 48×150
3. 7268×6	4. 125×52

Choose the best answer.

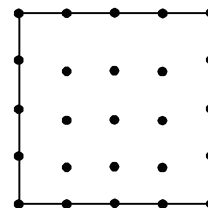
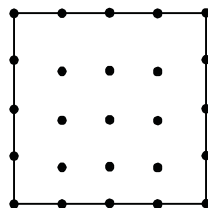
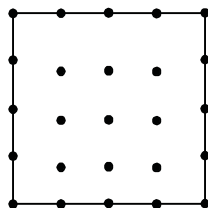
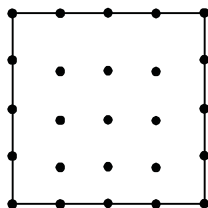
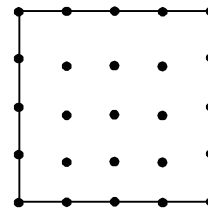
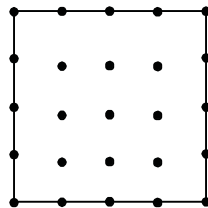
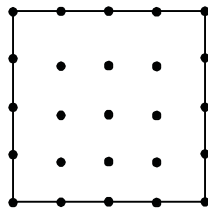
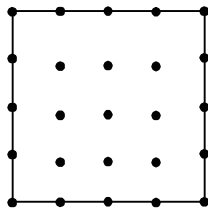
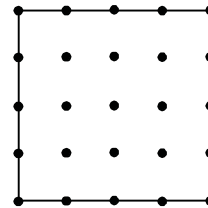
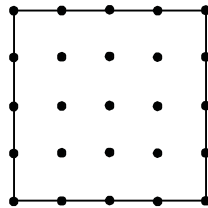
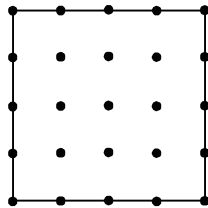
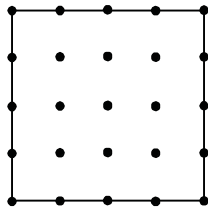
5. The property illustrated by the equation $(7 \times 8)(4) = (7)(8 \times 4)$ is:	
A. Commutative property of multiplication	C. Distributive Property
B. Associative property of multiplication	D. None of the above.

FRACTIONS: PARTS AND WHOLES

Ready (Summary)	Set (Goals)
<p>We will find fractional parts of a whole using an area model and find the areas of different shapes. We will add fractions using the model.</p>	<ul style="list-style-type: none"> • Identify the whole and its parts. • Find and compare areas of different shapes. • Identify congruent figures. • Add fractions.

Go (Warmup)

Show different ways to divide a unit square into fourths.



SQUARES PROBLEM

1. If each of the five congruent squares is equal to 1 square unit, find the area of each piece below.

A: _____ *F*: _____ *K*: _____

B: _____ *G*: _____ *L*: _____

C: _____ *H*: _____ *M*: _____

D: _____ *I*: _____ *N*: _____

E: _____ *J*: _____ *P*: _____

2. What would happen to the areas of the other shapes if the area of *N* was 1 square unit?

3. What would happen to the areas of the other shapes if the area of *B* was 1 square unit?

4. The value of the word “*MAN*” (that is, the sum of the areas of *M* + *A* + *N*) is

$\frac{1}{8} + \frac{1}{8} + \frac{1}{2}$ has a value of $\frac{3}{4}$. Find the value of these words:

“*MAP*”: _____ “*FLEA*”: _____ “*BEAN*”: _____

5. Create a word value that has value 1.

6. Challenge: Create a word that has as large a value as possible.

FOURFOLD WAY: GROWING SHAPES

Ready (Summary)

We will extend square and rectangle patterns. Then we will represent geometric measures in the pattern using an input – output table, a graph, with symbols, and with words.

Set (Goals)

- Use variables, parentheses, and exponents in expressions.
- Use formulas to find perimeter and area of rectangles.
- Describe geometric patterns numerically, symbolically, graphically, and mentally.
- Plot ordered pairs that satisfy a specified condition.
- Connect the slope of a line to its context in a graph.

Go (Warmup)

Complete each table. Find a rule that will give the output for any input.

Table 1

Input	Output
1	1
2	2
3	3
4	
5	
Rule: If the input is x , then the output will be _____	

Table 2




Input	Output
1	2
2	3
3	4
4	
5	
Rule: If the input is x , then the output will be _____	

Table 3

Input	Output
1	2
2	4
3	6
4	
5	
Rule: If the input is x , then the output will be _____	

GROWING SQUARES

Complete the pattern, tables, and questions below.

					
Stage #	1	2	3		
Table 1		Table 2		Table 3	
Stage number (n)	Length of side (L)	Stage number (n)	Perimeter (P)	Stage number (n)	Area (A)
n		n		n	
Rule: $L =$		Rule: $P =$		Rule: $A =$	

1. What is the perimeter of the figure obtained in stage #10?

rule: _____

substitute: _____

perimeter: _____

2. If the perimeter of the figure is 84, what is the stage number?

rule: _____

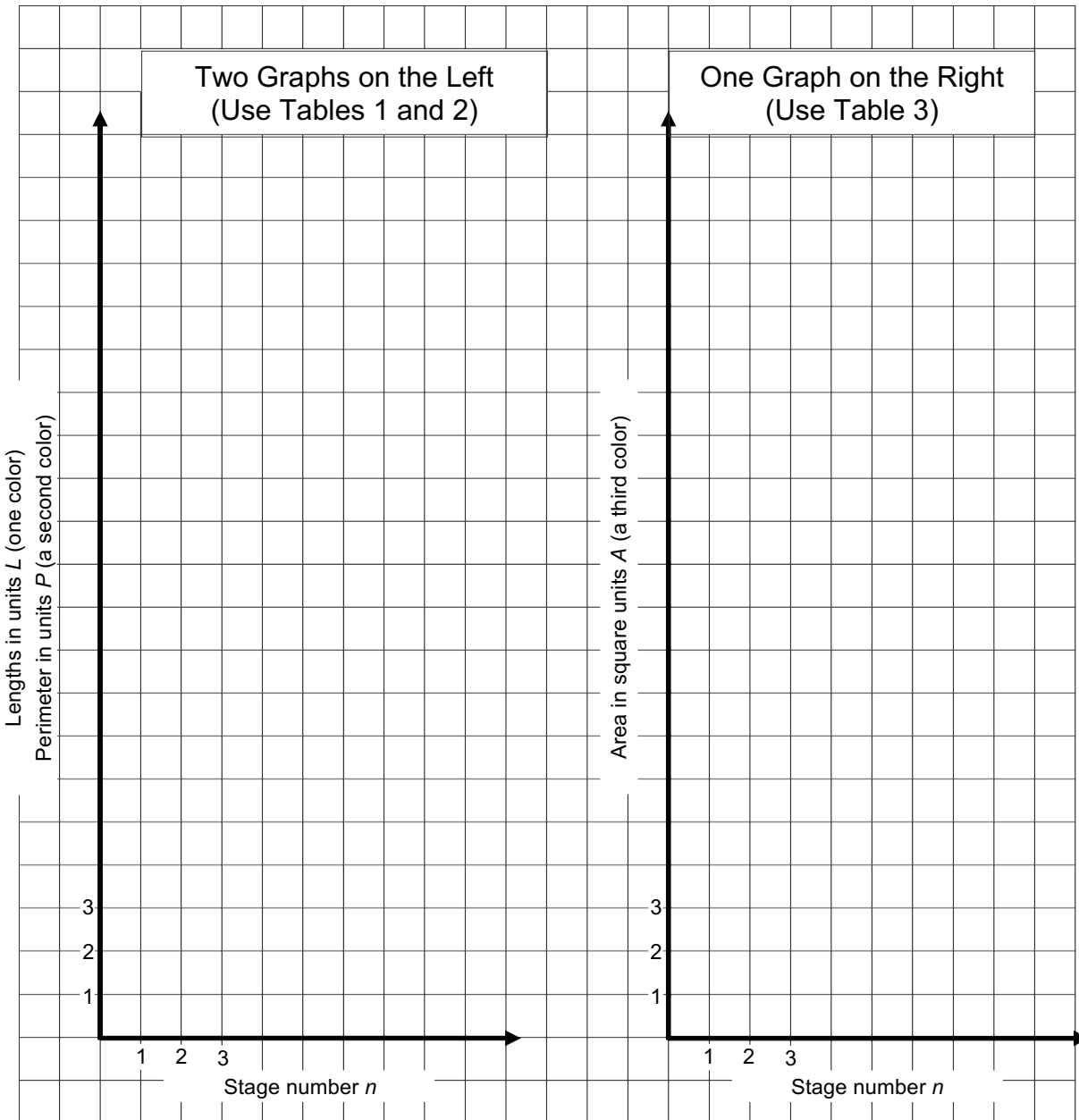
substitute: _____

stage number: _____

3. Use words or diagrams to explain how the length of the side and the perimeter of a square are related.

4. Use words or diagrams to explain how the length of the side and the area of a square are related.

GROWING SQUARES GRAPHS



1. Compare the two graphs on the left axes. Which is “steeper”? Why?

2. How is the graph on the right different from the two graphs on the left?

SKILL BUILDER 1A

1. What is the set of natural numbers? _____

2. What is the set of whole numbers? _____

3. What is different about whole numbers compared to natural numbers? _____

4. What is the set of integers? _____

5. What is different about integers compared to whole numbers? _____

6. List all the factors of 24. _____
7. Describe in words what it means for a number to be a factor of another number. _____

8. List the first seven multiples of 9. _____

SKILL BUILDER 1B

9. Describe in words what it means for a number to be a multiple of another number. _____

10. All even numbers are divisible by _____.

11. Even numbers end in _____, _____, _____, _____, _____.

12. List all the even numbers greater than 10 but less than 28. _____

13. Odd numbers end in _____, _____, _____, _____, _____.

14. List all the odd numbers between 10 and 28. _____

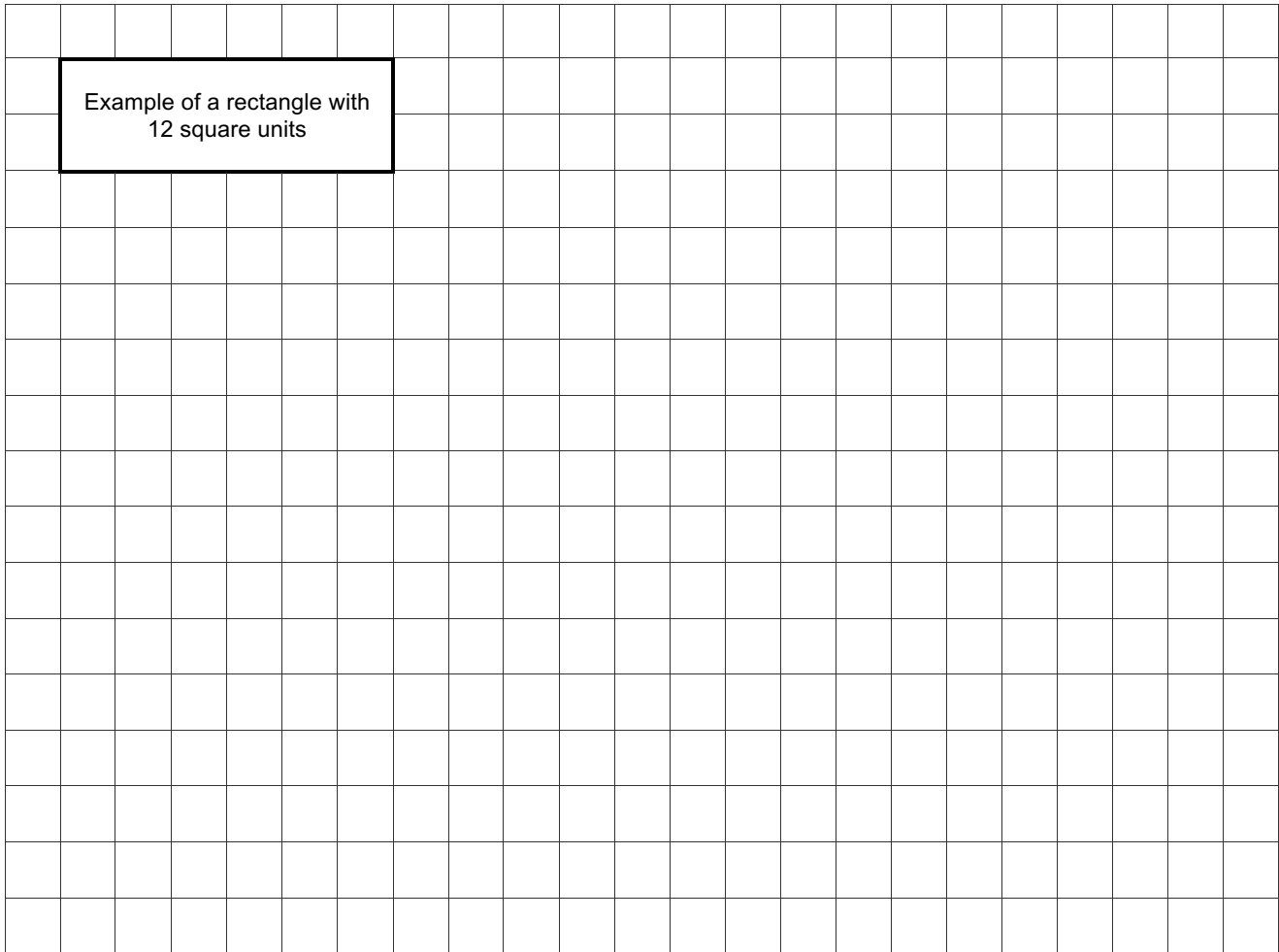
15. What are prime numbers? _____

16. What are composite numbers? _____

17. What natural number has exactly one factor? _____

SKILL BUILDER 1C

18. Use grid lines to draw all possible rectangles with the areas given below:
- a. 12 square units
 - b. 7 square units
 - c. 16 square units



19. What are the dimensions of the rectangles above?
- a. for 12 square units _____
 - b. for 7 square units _____
 - c. for 16 square units _____

SKILL BUILDER 1D

20. List all of the factors of

a. 12 _____

b. 7 _____

c. 16 _____

21. What is the relationship between the dimensions of the rectangles above and the factors of the numbers that describe their areas? _____

22. Is 7 a prime or composite number? Explain. _____

23. How many rectangles can be drawn with 7 square units? _____

24. Is 12 a prime or composite number? Explain. _____

25. How many rectangles can be drawn with 12 square units? _____

26. Is 16 a prime or composite number? Explain. _____

27. How many rectangles can be drawn with 16 square units? _____

28. Why do you think 16 is called a square number, while 7 and 12 are not? _____

Find the prime factorization of each number. In other words, write each number as the product of primes.

<p>Example:</p> <div style="text-align: center;"> $\begin{array}{c} 12 \\ / \quad \backslash \\ \textcircled{3} \quad 4 \\ \quad / \quad \backslash \\ \quad \textcircled{2} \quad \textcircled{2} \end{array}$ </div> <p style="margin-top: 20px;">$12 = 2 \cdot 2 \cdot 3$</p>	<p>29. 90</p> <p style="margin-top: 40px;">$90 =$ _____</p>	<p>30. 125</p> <p style="margin-top: 40px;">$125 =$ _____</p>
--	---	---

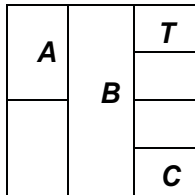
5.3 Factorization

KNOWLEDGE CHECK 5

Show your work on a separate sheet of paper and write your answers on this page.

5.1 Fractions: Parts and Wholes

Use the figure below for #1-2.



If the large square is equal to 1 whole, what fraction does each piece represent?

1. **A:** _____ **B:** _____ **C:** _____ **T:** _____
2. What is the value of $C + A + T$?

5.2 Fourfold Way: Growing Shapes

3. Create one more stage for the pattern:

$$2 + (1 \cdot 1) = 3$$

Stage 1

$$2 + (2 \cdot 2) = 6$$

Stage 2

$$2 + (3 \cdot 3) = 11$$

Stage 3

Stage 4

4. Write an equation for the pattern illustrated in #3.

5.3 Factorization

5. List all of the even numbers greater than or equal to 58 and less than 70.

6. Circle the prime numbers. 49 748 11 13

Highlighted Review: Whole Numbers: Division

Find each quotient using a division algorithm or procedure.

7. $9,512 \div 41$

8. $70,200 \div 200$

HIGHLIGHTED REVIEW PRACTICE 5

Whole Numbers: Division

Find each quotient using a division algorithm or procedure.

1. $132 \div 9$	2. $280 \div 20$
3. $1,282 \div 79$	4. $4,652 \div 8$

5. Antonio wants to mail a letter that requires 85¢ in postage. He only has 10¢ stamps. How many stamps should he put on the letter?

Choose the best answer.

6. Compute $7,562 \div 16$.
A. 472 r10 B. 472 C. 472 r625 D. 372

FRACTIONS: EQUIVALENCE 1

Ready (Summary)	Set (Goals)
We will use a linear model, review the area model, and use sense-making strategies to explore equivalence and ordering of fractions.	<ul style="list-style-type: none">• Understand the difference between linear and area models for fractions.• Compare and order proper fractions.• Use sense-making strategies to determine the equivalence and order of fractions.

Go (Warmup)

This segment has a length equal to 1 unit.



1. Estimate the number of units for the horizontal length of this paper.
2. Estimate the number of units for the vertical length of this paper.
3. Estimate the number of units for the length of your pencil.
4. Find an object that has an approximate length of $5\frac{1}{2}$ units.

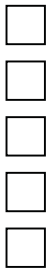
SPLITTING AND REPLICATING

1. Divide the rectangular bar below into three equal parts. Lightly shade in $\frac{1}{3}$ of the bar. Then, use the “splitting” method to show that $\frac{1}{3}$ is equivalent to $\frac{3}{9}$.



2. In the splitting method for showing equivalent fractions, the ratio of the part to the whole changes / stays the same (circle one).
3. In the splitting method for showing equivalent fractions, the size of the whole changes / stays the same (circle one).

4. Lightly shade in $\frac{2}{5}$ of the squares below. Then, use the “replicating” method to show that $\frac{2}{5}$ is equivalent to $\frac{8}{20}$.



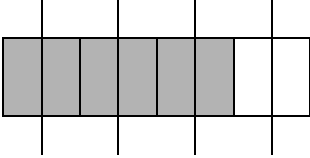
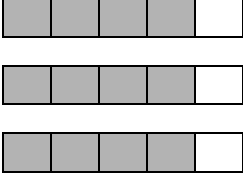
5. In the replicating method for showing equivalent fractions, the ratio of the part to the whole change / stays the same (circle one).
6. In the replicating method for showing equivalent fractions, the size of the whole change / stays the same (circle one).
7. Use a splitting diagram or replicating diagram to show that $\frac{1}{4} = \frac{3}{12}$

8. Did you use splitting or replicating to show the equivalent fractions?

6.1 Fractions: Equivalence 1

PRACTICE WITH SPLITTING AND REPLICATING

Use diagrams (splitting and replicating) to show that each pair of fractions are equivalent.

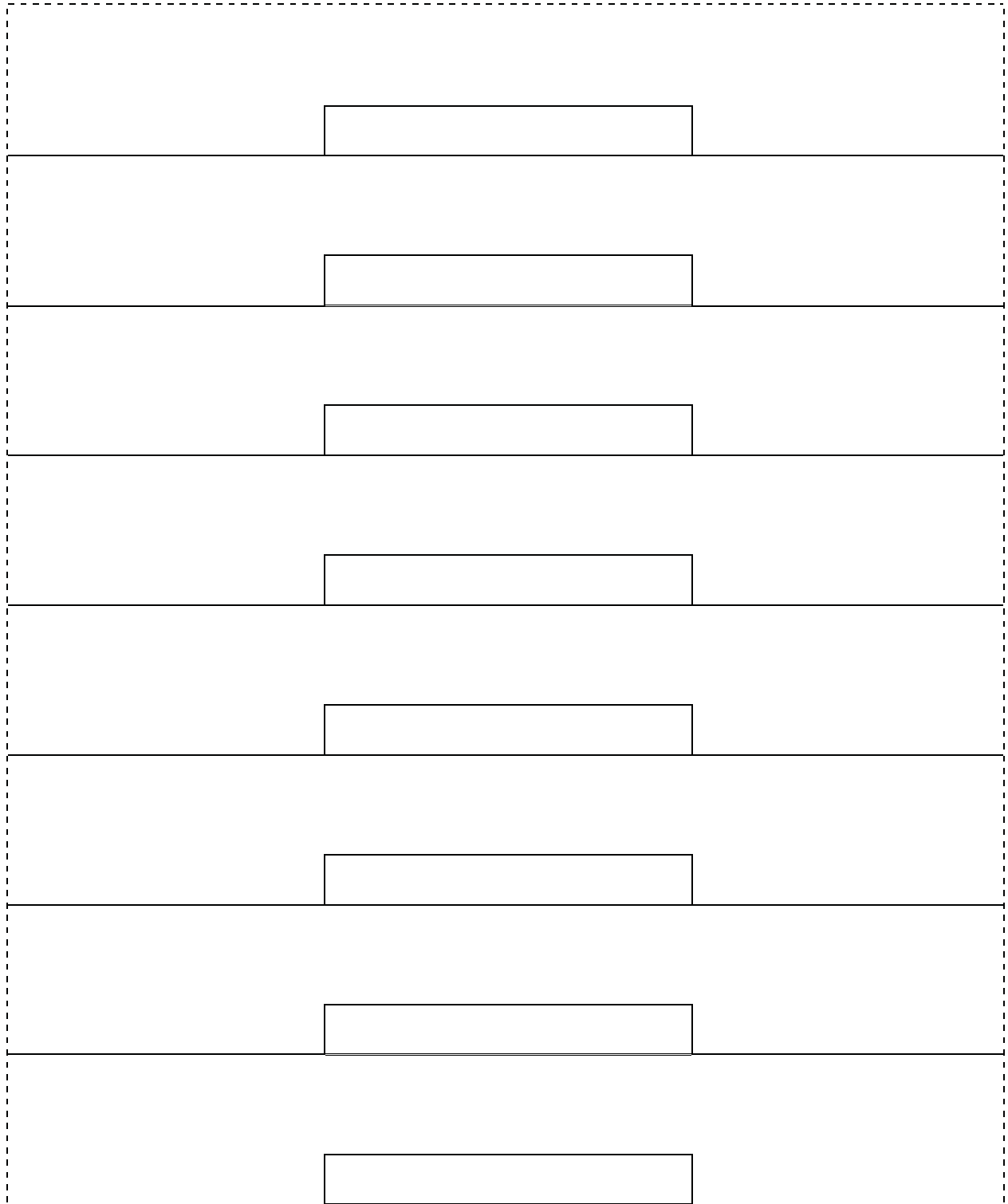
<p>1. $\frac{3}{4} = \frac{6}{8}$</p> <p>Splitting:</p>  <p>Replicating:</p>	<p>2. $\frac{4}{5} = \frac{20}{25}$</p> <p>Splitting:</p> <p>Replicating:</p> 
<p>3. $\frac{5}{6} = \frac{15}{18}$</p> <p>Splitting:</p> <p>Replicating:</p>	<p>4. $\frac{1}{2} = \frac{5}{10}$</p> <p>Splitting:</p> <p>Replicating:</p>

MULTIPLICATION CHART

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

FRACTION STRIPS

Cut on the dotted lines.



FOURFOLD WAY: CONVERSION GRAPHS

Ready (Summary)	Set (Goals)
<p>We will convert various measures and graph their relationships.</p>	<ul style="list-style-type: none"> • Convert quantities attached to units within and between measurement systems. • Plot and graph linear relationships. • Find equations of lines.

Go (Warmup)

Some Conversion Statements

3 feet = 1 yard

1 cup = 8 fluid ounces

2 cups = 1 pint

4 cups = 1 quart

4 quarts = 1 gallon

5 nickels = 1 dime

1 ton = 2,000 pounds

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

100 centimeters = 1 meter

2.2 pounds = 1 kilogram

Compare the values of these quantities. Use $>$, $<$, or $=$.

1. 3 dimes _____ 4 nickels

2. 225 hours _____ 9 days

3. 10 pounds _____ 10 kilograms

4. 4 gallons _____ 16 quarts

5. 90 minutes _____ 2 hours

6. 1 meter _____ 100 centimeters

7. 2 yards _____ 2 feet

8. 4 tons _____ 8,500 pounds

9. 3 weeks _____ 21 days

10. 32 fluid ounces _____ 1 pint

CONVERSION GRAPH TEMPLATE

_____ (x)	_____ (y)

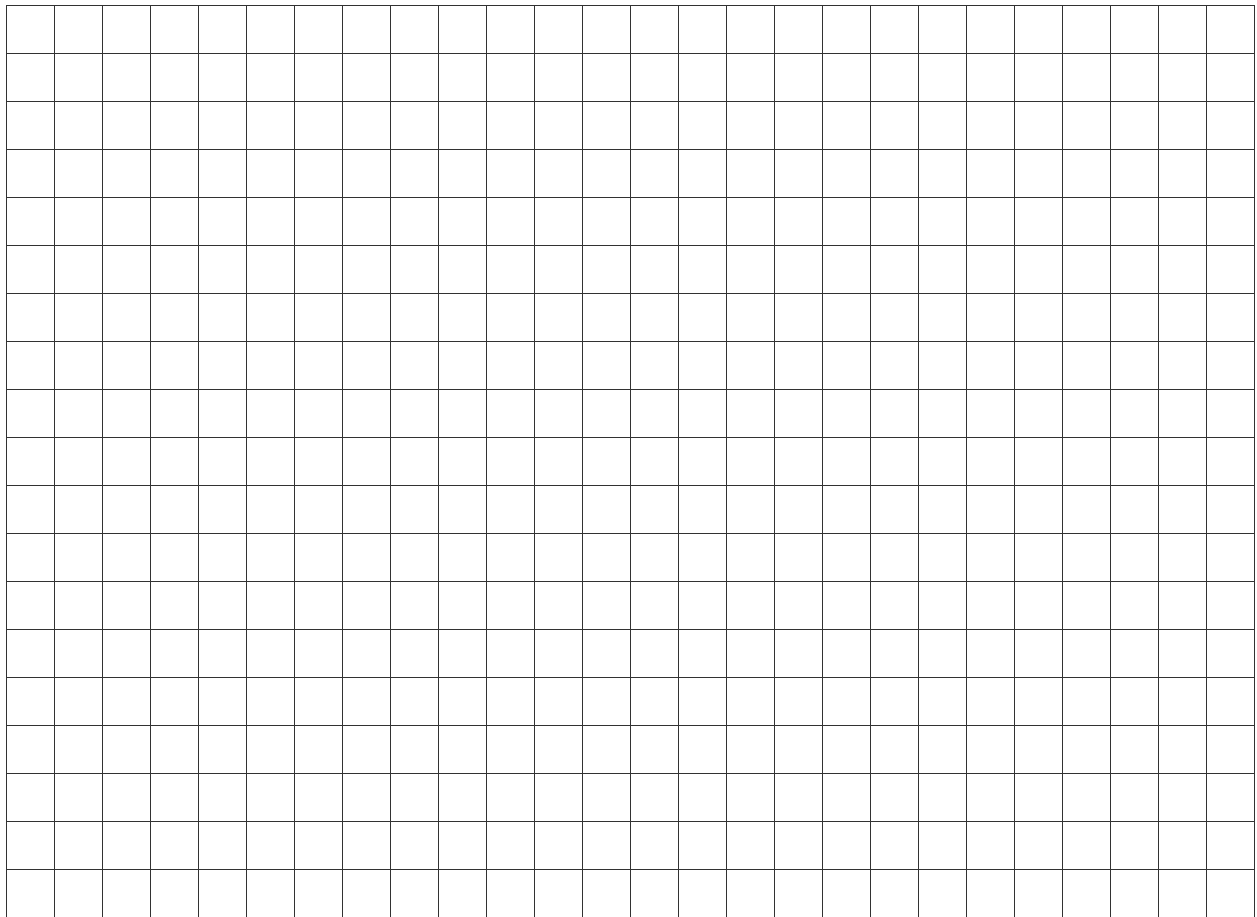
Let $x =$ _____

Let $y =$ _____

Equation:


$y =$ _____

Graph the relationship of your conversion.




SKILL BUILDER 1

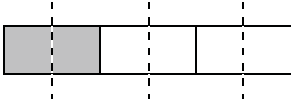
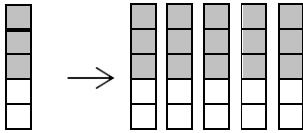
Draw a picture to represent each improper fraction. Then write the fraction as a mixed number or a whole number.

1. $\frac{7}{3} = 2\frac{1}{3}$ 	2. $\frac{7}{2}$	3. $\frac{15}{5}$
--	------------------	-------------------

Draw a picture to represent each mixed number. Then write the mixed number as an improper fraction or a whole number.

4. $1\frac{1}{3} = \frac{4}{3}$ 	5. $6\frac{1}{2}$	6. $4\frac{1}{9}$
--	-------------------	-------------------

Show equivalent fractions with a “splitting diagram” or a “replicating diagram.”

7. $\frac{1}{3} = \frac{\quad}{6}$ 	8. $\frac{3}{5} = \frac{\square}{25}$ 	9. $\frac{2}{4} = \frac{\square}{8}$
10. $\frac{3}{5} = \frac{\square}{20}$	11. $\frac{3}{4} = \frac{\square}{16}$	12. $\frac{3}{4} = \frac{\square}{24}$

6.3 Fractions: Renaming

KNOWLEDGE CHECK 6

Show your work on a separate sheet of paper and write your answers on this page.

6.1 Fractions: Equivalence 1

1. Which is greater, $\frac{4}{9}$ or $\frac{4}{5}$? Explain.
2. Use a fraction model to show that $\frac{7}{11}$ is greater than $\frac{3}{11}$.

6.2 Fourfold Way: Conversion Graphs

3. Use the given information to convert dimes to nickels in the table.

dimes (x)	nickels (y)
0	
1	
2	
3	
4	
5	
x	

There are 2 nickels in 1 dime.
(2 nickels per dime = $\frac{2 \text{ nickels}}{1 \text{ dime}}$)

Let x = the number of dimes.
Let y = the number of nickels.

Write an equation that changes dimes to nickels.

y = _____

4. On graph paper, use the values from the table to graph the relationship between dimes and nickels.

6.3 Fractions: Renaming

5. Write $8\frac{1}{6}$ as an improper fraction. Show this with a diagram.
6. Use the multiplication property of 1 to find the missing number in $\frac{9}{15} = \frac{\square}{45}$.

Highlighted Review: Integers: Addition and Subtraction

Compute.

7. $-6 + (-5) - (-18)$

8. $11 - (-7) + 9$

HIGHLIGHTED REVIEW PRACTICE 6

Integers: Addition and Subtraction

Compute.

1. $8 + (-18)$	2. $-12 + (-2)$	3. $-6 - (-12)$
4. $-32 + 23$	5. $-14 - 2$	6. $17 + (-7)$
7. $102 + (-4)$	8. $210 + (-13)$	9. $-78 + (-42)$

Choose the best answer.

10. The sum of a positive number and zero is: A. Always positive B. Zero C. Always negative D. Sometimes negative

FRACTIONS: EQUIVALENCE 2

Ready (Summary)	Set (Goals)
Use an area model to explore fraction, decimal fraction, and percent concepts.	<ul style="list-style-type: none"> • Convert fractions to decimals and percents. • Know that percent means parts of a hundred.

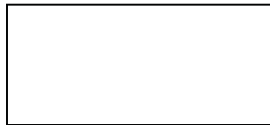
Go (Warmup)

DeShawn, Kate, and Maya have the **same size** gardens.

DeShawn planted one-half of his garden.

Kate planted three-fourths of her garden.

Maya planted three-eighths of her garden.



DeShawn's Garden



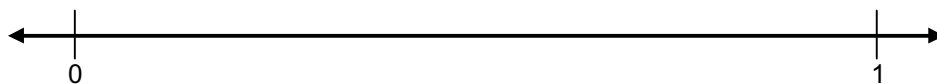
Kate's Garden



Maya's Garden

1. Whose garden is the largest? _____
2. Shade in the planted areas of their gardens.
3. Use numbers to write the planted areas of each garden as a fraction.

4. Whose garden has the greatest planted area? _____
5. Whose garden has the least planted area? _____

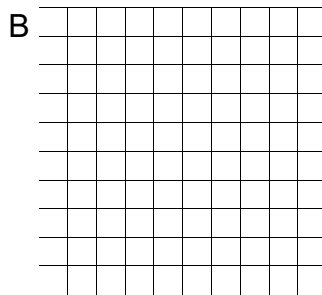
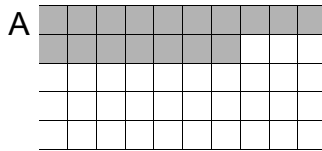


6. Estimate the correct location of the fractions and place them on the numberline above. Explain how you know the correct order.

FRACTION, DECIMAL, AND PERCENT GARDENS 1

For each problem, the ratio of shaded squares to all squares in figure A is given as a fraction. Shade figure B so that there is an equal ratio of shaded squares to all squares when compared to first figure A.

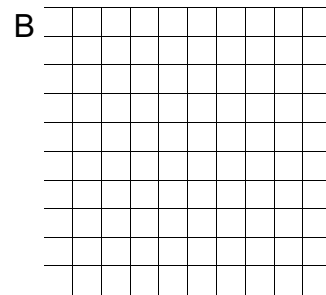
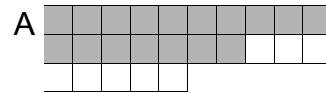
1.



$$\frac{17}{50} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

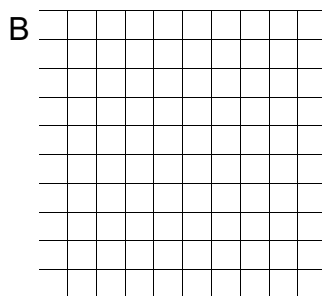
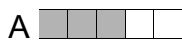
2.



$$\frac{17}{25} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

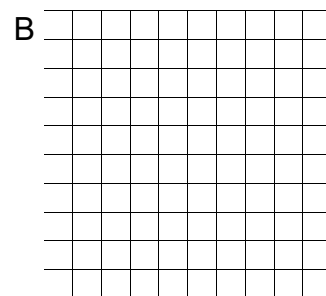
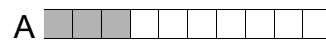
3.



$$\frac{3}{5} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

4.



$$\frac{3}{10} = \frac{\quad}{100} = \quad\% = \quad$$

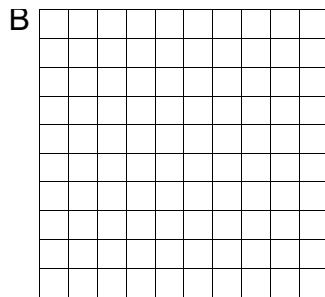
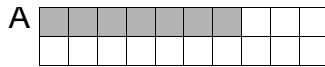
fraction percent decimal

Which of the fractions above are greater than $\frac{1}{2}$? Explain. _____

FRACTION, DECIMAL, AND PERCENT GARDENS 2

For each problem, the ratio of shaded squares to all squares in figure A is given as a fraction. Shade figure B so that there is an equal ratio of shaded squares to all squares when compared to first figure A.

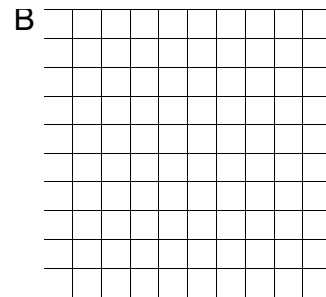
1.



$$\frac{7}{20} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

2.

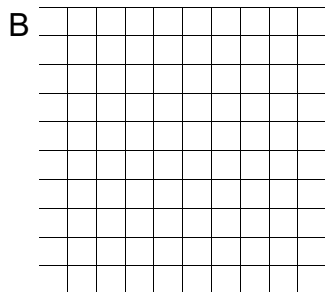


$$\frac{17}{20} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

Which fraction is smaller: $\frac{7}{20}$ or $\frac{17}{20}$? Explain. _____

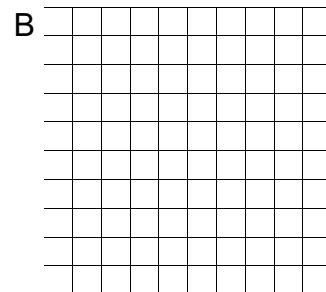
3.



$$\frac{3}{4} = \frac{\quad}{100} = \quad\% = \quad$$

fraction percent decimal

4.



$$\frac{4}{5} = \frac{\quad}{100} = \quad\% = \quad$$

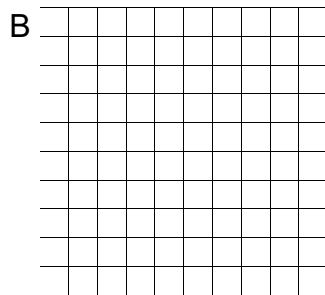
fraction percent decimal

Which fraction is smaller: $\frac{3}{4}$ or $\frac{4}{5}$? Explain. _____

FRACTION, DECIMAL, AND PERCENT GARDENS 3

For each problem, the ratio of shaded squares to all squares in figure A is given as a fraction. Shade figure B so that there is an equal ratio of shaded squares to all squares when compared to first figure A.

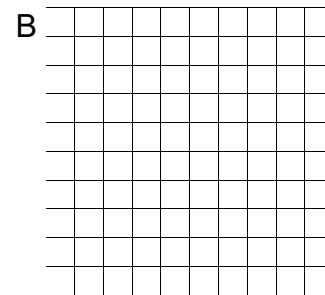
1.



$$\frac{1}{2} = \frac{\quad}{100} = \quad \% = \quad$$

fraction percent decimal

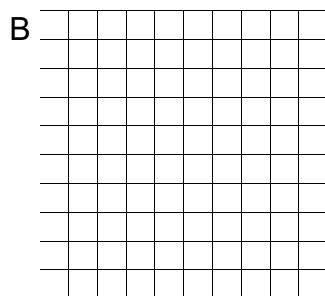
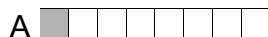
2.



$$\frac{1}{4} = \frac{\quad}{100} = \quad \% = \quad$$

fraction percent decimal

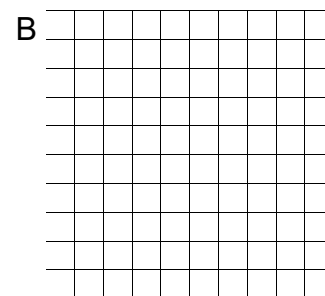
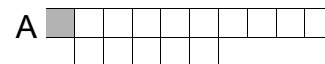
3.



$$\frac{1}{8} \text{ is about } \frac{\quad}{100} = \quad \% = \quad$$

fraction percent decimal

4.



$$\frac{1}{16} \text{ is about } \frac{\quad}{100} = \quad \% = \quad$$

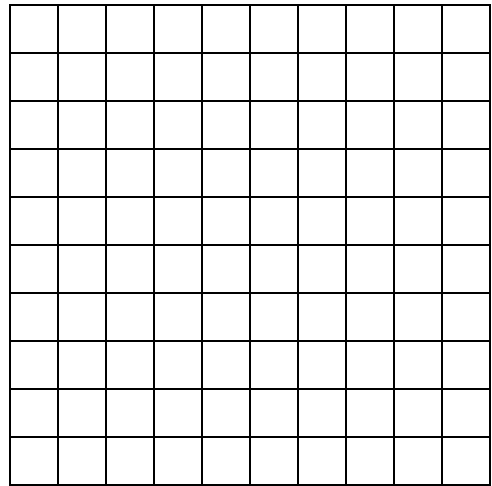
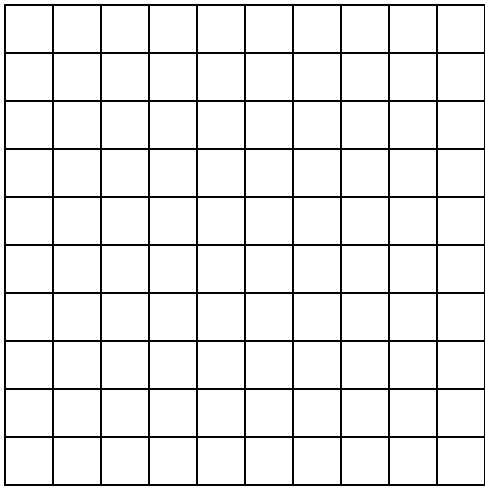
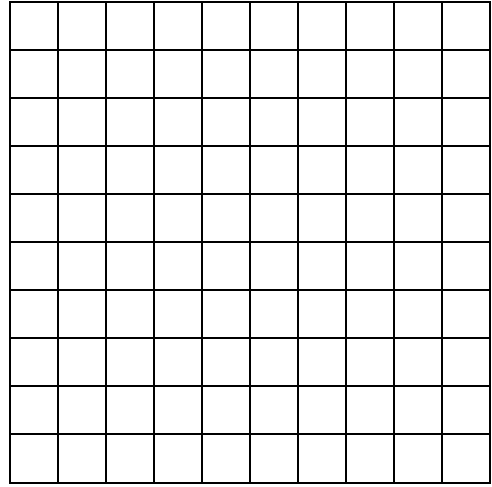
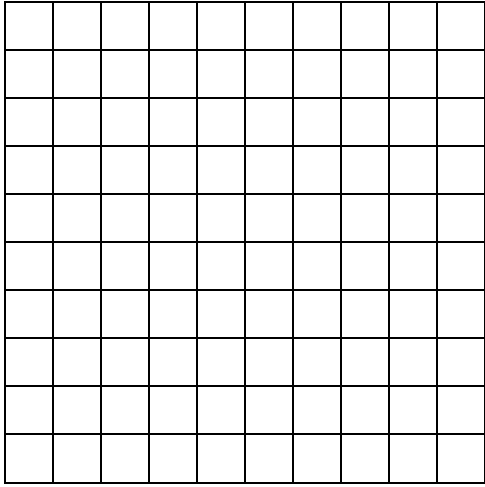
fraction percent decimal

Order the fractions given above from smallest to largest. Explain. _____

7.1 Fractions: Equivalence 2

8.1 Fractions: Equivalence 3

HUNDRED-SQUARE GRIDS



NUMBER LINES: FRACTIONS

Ready (Summary)	Set (Goals)
<p>We will use sense-making strategies to order fractions on a number line.</p>	<ul style="list-style-type: none"> • Use sense-making strategies to compare and order fractions. • Identify unit fractions. • Use benchmark fractions to locate other fractions on a number line.

Go (Warmup)

These are unit fractions: $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{9}$, $\frac{1}{15}$

These are not unit fractions: $\frac{3}{4}$, $\frac{5}{9}$, $\frac{7}{15}$, $\frac{3}{2}$, $3\frac{5}{8}$

1. Give three more examples of unit fractions.

2. Explain what a unit fraction is in your own words.

NUMBER LINE A

Estimate the location of each number on the number line:

0 1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{6}{8}$ $\frac{6}{10}$ $\frac{6}{7}$ $\frac{7}{8}$

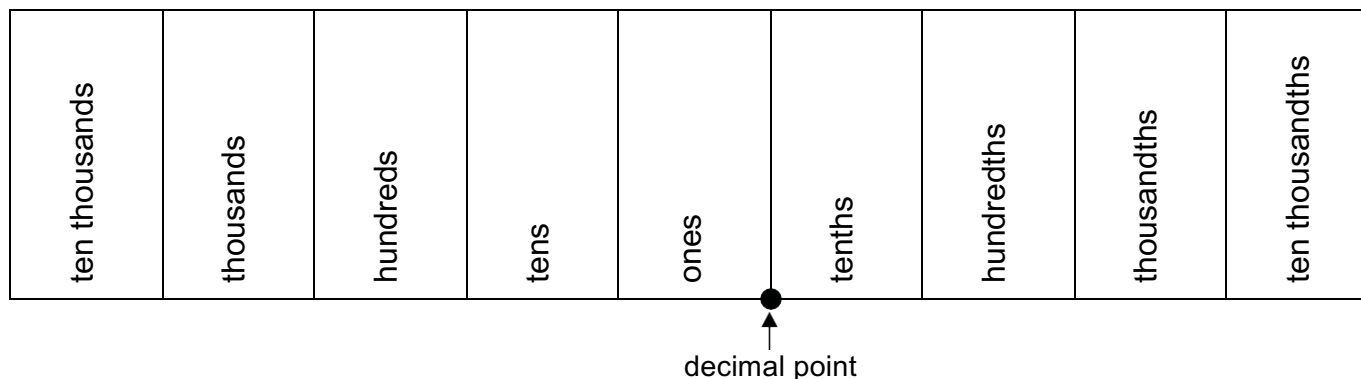


1. What benchmark fractions did you locate on your number line?

2. Explain how you located $\frac{6}{8}$ on the number line.

3. Explain how you located $\frac{6}{7}$ and $\frac{7}{8}$ on the number line.

SKILL BUILDER 1



1. What does the 7 represent in 84.273? _____
2. What does the 3 represent in 84.273? _____
3. Write 30.194 in words. _____
4. Circle the digit in the tenths place. 3 0 . 1 9 4
5. Circle the digit in the tens place. 3 0 . 1 9 4
6. Round 457.568 to the nearest tenth. _____
7. Round 79.302 to the nearest hundredth. _____

Write expanded forms of each number in three different ways.

Standard Form	Expanded Form #1	Expanded Form #2	Expanded Form #3
Ex. 3.25	$3(1) + 2 \frac{1}{10} + 5 \frac{1}{100}$	$3(1) + 2(0.1) + 5(0.01)$	$3 + 0.2 + 0.05$
8. 3.51			
9. 1.023			
10. .302			

7.3 Decimals: Place Value, Rounding, and Expanded Form

KNOWLEDGE CHECK 7

Show your work on a separate sheet of paper and write your answers on this page.

7.1 Fractions: Equivalence 2

Complete problems.

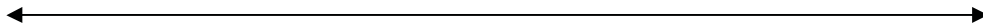
1. $\frac{3}{25} = \frac{\quad}{100} = \text{_____\%} = \text{______}$
fraction percent decimal

2. $\frac{6.5}{10} = \frac{\quad}{100} = \text{_____\%} = \text{______}$
fraction percent decimal

7.2 Number Lines: Fractions

3. Order these numbers from least to greatest: $\frac{6}{3}, \frac{3}{6}, 3\frac{1}{3}, \frac{2}{3}$

4. Estimate the location of each number from problem #3 on the number line:



7.3 Decimals: Place Value, Rounding, and Expanded Form

5. What does the 7 represent in 0.17?

Complete the expanded form.

6. $0.17 = 1 \times (\quad) + 7 \times (\quad)$

Highlighted Review: Integer Multiplication and Division

Compute.

7. $(-6 - 3)(-2 + 7)$

8. $(-20 - 20) \div (-4)(2)$

HIGHLIGHTED REVIEW PRACTICE 7

Integers: Multiplication and Division

Compute.

1. $-6 \cdot (-9)$	2. $20 \cdot 3$	3. $(-20)(-3)$
4. $\frac{-56}{7}$	5. $-63 \div (-9)$	6. $-10 \div (-1)$
7. $36 \div (-6)$	8. $42 \div 7$	9. $10 \cdot (-4)$

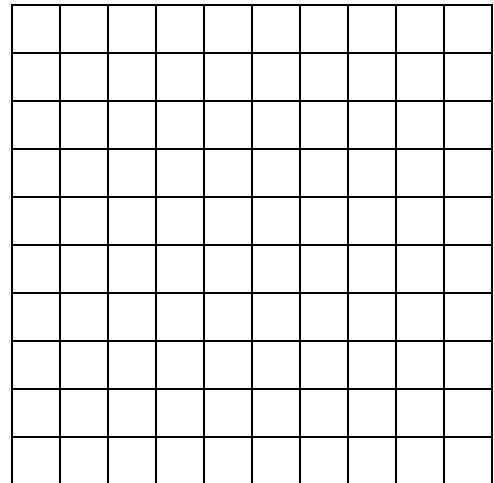
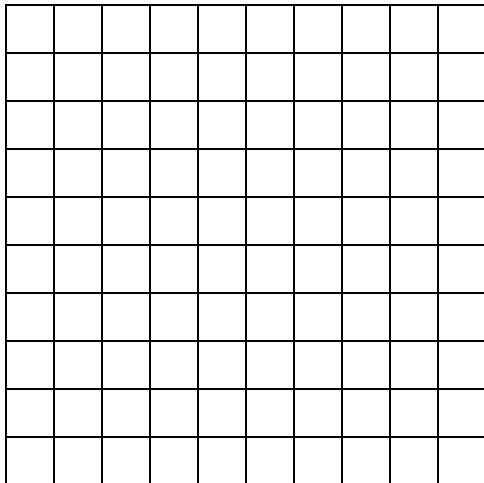
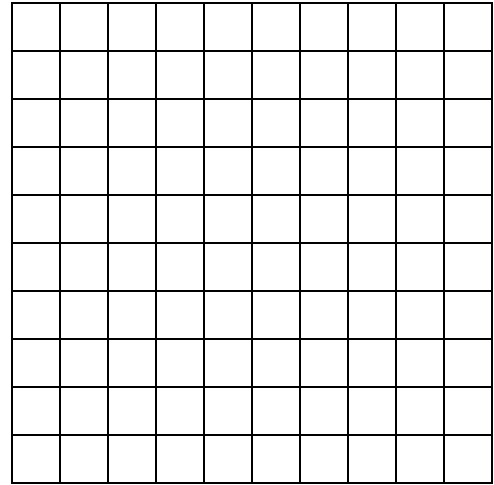
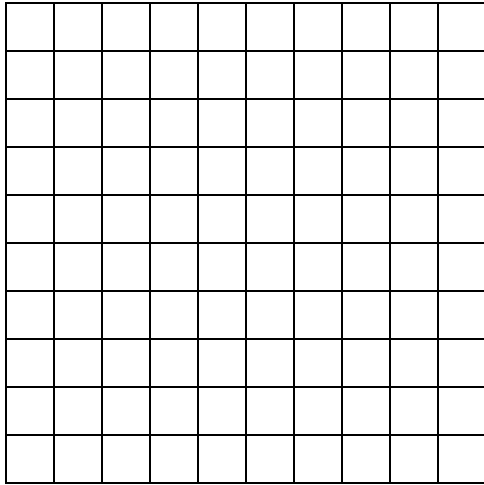
Choose the best answer.

10. The quotient of a negative number divided by a negative number is:

- | | |
|--------------------|-----------------------|
| A. Always positive | B. Zero |
| C. Always negative | D. Sometimes negative |

- 7.1 Fractions: Equivalence 2
- 8.1 Fractions: Equivalence 3

HUNDRED-SQUARE GRIDS



FRACTIONS: EQUIVALENCE 3

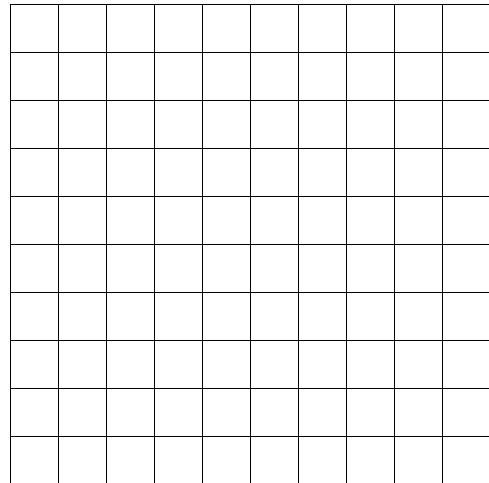
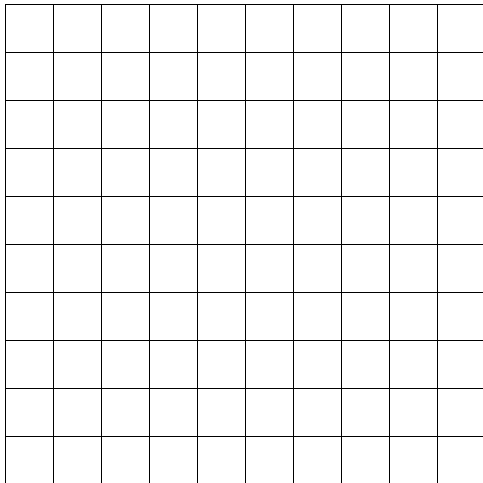
Ready (Summary)	Set (Goals)
We will learn various strategies to convert between fractions and decimals. We will play a game to practice ordering fractions.	<ul style="list-style-type: none">• Use a variety of strategies to convert between fractions and decimals.• Demonstrate conversion fluency between common fractions and decimals.• Compute with simple fractions.

Go (Warmup)

Find the decimal and percent equivalents for the following fractions. Use more than one strategy for each.

1. $\frac{1}{4} = \underline{\hspace{2cm}}$

2. $\frac{1}{3} = \underline{\hspace{2cm}}$



ALL ABOUT EIGHTHS

1. Use two different methods to find the decimal equivalent for $\frac{1}{8}$.

Method 1	Method 2
Rename the fraction $\frac{1}{8}$ with a denominator that is a power of 10. $1 \frac{\square}{8} = \frac{\square}{1000}$ Therefore $\frac{1}{8} = \underline{\hspace{2cm}}$	Use the fact that $\frac{1}{4} = 0.25 = 0.250$. Therefore $\frac{1}{8} = \underline{\hspace{2cm}}$

2. Complete this table:

Fraction	$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$	$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{8}$	$\frac{8}{8}$
Decimal								

3. Show how to use the decimal equivalent for $\frac{2}{8}$ to find the decimal equivalent for $\frac{1}{8}$.
4. Show how to use the decimal equivalent for $\frac{3}{8}$ to find the decimal equivalent for $\frac{3}{4}$.
5. Show how to use the decimal equivalent for $\frac{3}{8}$ to find the decimal equivalent for $\frac{1}{8}$.

FRACTIONS TO DECIMALS

Use the given decimal equivalents for $\frac{1}{3}$ and $\frac{1}{4}$ or other sense-making strategies to change the following fractions to decimals. Do not use the division algorithm or a calculator. Do not use approximations.

1. $\frac{1}{2}$	2. $\frac{2}{2}$		
3. $\frac{1}{3} = 0.33\bar{3}$	4. $\frac{2}{3}$	5. $\frac{3}{3}$	
6. $\frac{1}{4} = 0.25$	7. $\frac{2}{4}$	8. $\frac{3}{4}$	9. $\frac{4}{4}$
10. $\frac{1}{5}$	11. $\frac{2}{5}$	12. $\frac{3}{5}$	13. $\frac{4}{5}$

FRACTIONS TO DECIMALS (continued)

Change the following fractions to decimals.

14. $\frac{1}{8}$	15. $\frac{3}{8}$	16. $\frac{5}{8}$	17. $\frac{7}{8}$
18. $\frac{1}{9}$	19. $\frac{2}{9}$	20. $\frac{3}{9}$	21. $\frac{4}{9}$
22. $\frac{1}{10}$	23. $\frac{2}{10}$	24. $\frac{3}{10}$	25. $\frac{10}{10}$
26. $\frac{1}{20}$	27. $\frac{2}{20}$	28. $\frac{3}{20}$	29. $\frac{9}{20}$
30. $\frac{1}{25}$	31. $\frac{2}{25}$	32. $\frac{5}{25}$	33. $\frac{14}{25}$

NUMBER LINES: RATIONAL NUMBERS

Ready (Summary)	Set (Goals)
<p>We will practice ordering rational numbers on a number line.</p>	<ul style="list-style-type: none"> • Compare and order positive and negative fractions and decimals. • Convert between fractions and decimals, and use these representations for estimation. • Distinguish between terminating and repeating decimals. • Find absolute values of numbers.

Go (Warmup)

Use the symbol $<$, $>$, or $=$ to make each statement true.

1. -0.33 _____ 0.3

2. $\frac{1}{3}$ _____ 0.3

3. $|-3|$ _____ 0

4. $|-3|$ _____ $-\frac{1}{3}$

5. 0 _____ -0.33

6. 0.3 _____ $-\beta$ |

7. $-\frac{1}{3}$ _____ $\frac{1}{3}$

8. $-\frac{1}{3}$ _____ -0.33

8.2 Number Lines: Rational Numbers

NUMBER LINE A

1. Estimate the location of each number on the number line:

$$-\frac{3}{4} \quad \left|-\frac{6}{5}\right| \quad -0.8 \quad -0.088 \quad 1.12$$



2. Write an inequality statement to show the order of the numbers.

_____ < _____ < _____ < _____ < _____

3. What benchmark fractions did you locate on your number line?

4. Explain how you located $-\frac{3}{4}$ and -0.8 on the number line.

5. Explain how you located -0.8 and -0.088 on the number line.

SKILL BUILDER 1

Compute.

1. $0.4 + 12 + 3.7$	2. $2.5 + 7 + 0.3$	3. $3.5 - 0.9$
4. $\begin{array}{r} 12.8 \\ - 0.53 \\ \hline \end{array}$	5. $\begin{array}{r} 0.87 \\ + 0.13 \\ \hline \end{array}$	6. $\begin{array}{r} 12.6 \\ - 4.83 \\ \hline \end{array}$
7. $18.43 - 3$	8. $0.7 + 0.8 + 0.5$	9. $1,242 - 0.3$

Use $<$ or $>$ to make each inequality true.

10. $0.3 \underline{\hspace{1cm}} 0.25$	11. $5.67 \underline{\hspace{1cm}} 5.76$	12. $0.234 \underline{\hspace{1cm}} -2.304$
13. Phoenix says: "three tenths is less than thirty hundredths because three is less than thirty." Is he correct? Explain.		

KNOWLEDGE CHECK 8

Show your work on a separate sheet of paper and write your answers on this page.

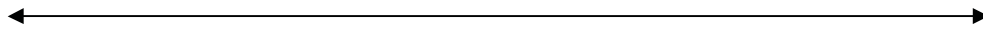
8.1 Fractions: Equivalence 3

1. What is the decimal equivalent for $\frac{21}{100}$?
2. What is the fraction equivalent for 0.16?

8.2 Number Lines: Rational Numbers

3. Estimate the location of each number on the number line:

-6 13 -16 -6.5 13.7 -15.4



4. Which is greater -2.32 or -2.3? Explain how you know.

8.2 Decimals: Ordering, Addition and Subtraction

Compute.

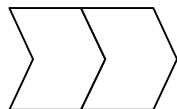
5. $8.58 + 11.2 + 0.33$
6. $418.96 - 7.532$

Highlighted Review: Multiple Representations

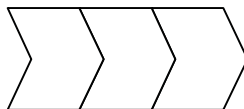
7. Illustrate the next stage in the pattern.



Stage 1



Stage 2



Stage 3

Stage 4

8. Find the perimeter of the figure above at each stage. Write a rule for the perimeter of the figure at stage n .

Stage #	1	2	3	4	5	n
Perimeter	6					

Rule: _____

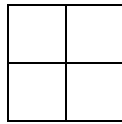
HIGHLIGHTED REVIEW PRACTICE 8

Multiple Representations

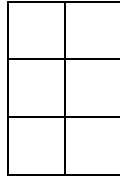
Here is a geometric pattern built with square tiles.



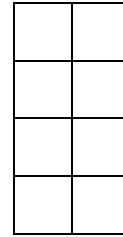
Stage 1



Stage 2



Stage 3



Stage 4

Stage 5

1. Illustrate the next stage in the geometric pattern.
2. Find a pattern for the geometric pattern and complete the table.
3. Describe the pattern in words.

Input	Output
1	
2	
3	
4	
5	
6	

4. Find a rule that fits the pattern. Rule: $y =$ _____
5. Find the input if the output is 12. _____
6. Find the input if the output is 50. _____
7. Find the input if the output is 20. _____
8. Find the input if the output is 120. _____

NUMERICAL EXPRESSIONS AND EQUATIONS

Ready (Summary)

We will discuss the difference between expressions and equations. We will write and evaluate expressions. Then we will find numbers to make equations true.

Set (Goals)

- Understand the difference between expressions and equations.
- Write expressions and evaluate them using conventions for order of operations.
- Understand that a variable in an equation represents an unknown value.
- Use variables to represent varying quantities in functional relationships.

Go (Warmup)

These are examples of numerical expressions .	These are examples of numerical equations .
3×7 $-4 + 6$ 5 $\frac{4 + 6}{2}$	$2 - 7 = -5$ $4 + 1 = \frac{40}{8}$ $-11 = -5 + (-6)$ $9 + 3 = 20 - 8$

1. For each of the following, draw a box around the expressions and underline the equations below.

36	$12 = \frac{24}{2}$	$170 = 10 \times 17$
$13 - 4 - 8$	$6 - (-2) = 8$	$4(7 + 2)$

2. In the box above, find two expressions that have the same value. Write an equation below that states the two expressions are equivalent.

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

3. In your own words, explain the difference between an expression and an equation.

EVALUATING EXPRESSIONS

When evaluating expressions:

- First evaluate expressions within parentheses.
- Then do all multiplication and division (from left to right).
- Finally do all addition and subtraction (from left to right).

For problems #1- 4, let $\bigcirc = 5$, $\square = 4$, and $\triangle = 2$.

Evaluate the expressions.

<p>1.</p> $\bigcirc + \square$	<p>2.</p> $\bigcirc \times \square$
<p>3.</p> $(\bigcirc + \square) \times \triangle$	<p>4.</p> $\bigcirc + \square \times \triangle$

For problems #5 - 8, let $\bigcirc = 3$, $\square = 18$, and $\triangle = 2$.

Evaluate the expressions.

<p>5.</p> $\triangle + \bigcirc \times \bigcirc$	<p>6.</p> $-(\bigcirc + \square)$
<p>7.</p> $\square \div \bigcirc \times \triangle$	<p>8.</p> $\square \div (\bigcirc \times \triangle)$

9.1 Numerical Expressions and Equations

TARGET VALUES

- Using each of the numbers 3, 6, and 12 exactly once, write one expression for each target value.
- Use any operation symbols or grouping symbols necessary.

#	Target Value	Expression
1.	18	$3(12 - 6)$
2.	21	
3.	15	
4.	14	

- Using each of the numbers 2, 5, and 8 exactly once, write one expression for each target value.
- Use any operation symbols or grouping symbols necessary.

#	Target Value	Expression
5.	5	$2 + (8 - 5)$
6.	15	
7.	2	
8.	11	
9.	9	
10.	20	

EQUATIONS 1

Place numbers in the shapes to make the equations true. Use integers and fractions.

1. $12 = \square \circlearrowleft$

2. $12 = \square + \circlearrowleft$

3. $12 = \square - \circlearrowleft$

4. $12 = \square - \circlearrowleft$

5. $12 = \square \times \circlearrowleft$

6. $12 = \square \times \circlearrowleft$

7. $12 = \square \div \circlearrowleft$

8. $12 = \square \div \circlearrowleft$

9. $4 + 7 = \square - \circlearrowleft$

10. $21 - 5 = \square \times \circlearrowleft$

11. $\square - \circlearrowleft = \frac{24}{3}$

12. $\square + \circlearrowleft = 3 \times 6$

13. $(4 + 3) \times \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} + \circlearrowleft \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} = 35$

14. $(4 + 3) \times \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} + \circlearrowleft \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} = 35$

15. $8 = \frac{\begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} + \circlearrowleft \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array}}{2}$

16. $8 = \frac{\begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} + \circlearrowleft \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array}}{2}$

EQUATIONS 2

Fill in the blank shapes to make the equations true.

1. $12 = \square + 8$

2. $12 = 15 - \square$

3. $12 = \square \times 2$

4. $12 = 120 \div \square$

5. $8 + 1 = 3 \times \bigcirc$

6. $30 - 5 = \bigcirc + 10$

7. $\frac{\bigcirc}{2} = 22 - 16$

8. $6 \times \bigcirc = \frac{36}{6}$

9. $(15 - 8) \times 3 = \square + 17$

10. $13 + \square = \frac{100}{(9 - 4)}$

11. $17 + 4 = \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} 12 + \bigcirc \begin{array}{c} \square \\ \square \\ \square \\ \square \end{array} + 4$


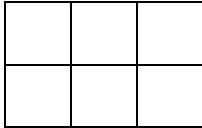
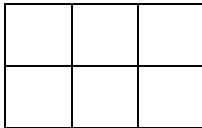
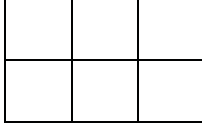
12. $\bigcirc \times 3 = \begin{array}{c} \square 28 \square \\ \square 7 \square \\ \square \end{array} \times 3$

FRACTIONS: ADDITION AND SUBTRACTION 1

Ready (Summary)	Set (Goals)
<p>We will add and subtract proper fractions using pictures.</p>	<ul style="list-style-type: none"> • Understand the need for common denominators and perform fraction addition and subtraction. • Establish a conceptual foundation for fraction addition and subtraction. • Use mathematical reasoning to explain student misconceptions in fraction addition and subtraction.

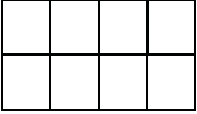
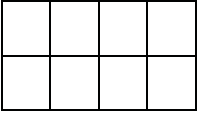
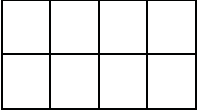
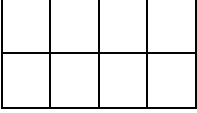
Go (Warmup)

Shade the appropriate portions in each problem. Then record the numbers.

	Words	Picture	Numbers
1.	Shade one-sixth of the rectangle.		$\frac{1}{6}$
2.	Shade two-sixths of the rectangle.		
3.	Shade one-sixth of the rectangle plus two-sixths of the rectangle. How much of the rectangle is shaded?		$\frac{1}{6} + \frac{2}{6} = \underline{\hspace{2cm}}$ $= \underline{\hspace{2cm}}$
4.	Lightly shade two-sixths of the rectangle. Re-shade darker one-sixth of the rectangle. How much of the rectangle remains lightly shaded? (This is subtraction)		$\frac{2}{6} - \frac{1}{6} = \underline{\hspace{2cm}}$

SANDWICH PROBLEMS

Shade the appropriate portion in each problem. Then record the numbers.

	Words	Picture	Numbers
1.	Shade three-eighths of the sandwich.		
2.	Shade one-fourth of the sandwich.		
3.	Shade three-eighths of the sandwich plus one-fourth of the sandwich. How much of the sandwich is shaded?		$\frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{\quad}{8} = \frac{\quad}{8}$
4.	Shade three-eighths of the sandwich minus one-fourth of the sandwich. How much of the sandwich is shaded?		






5. Why do the denominators have to be the same for both fractions when adding and subtracting?

6. A student added this way: $\frac{3}{8} + \frac{1}{4} = \frac{4}{12}$. Find the sum. Why is this wrong? Why does this answer **not** make sense?

7. A student subtracted this way: $\frac{3}{8} - \frac{1}{4} = \frac{2}{8}$. Find the difference. Why is this wrong? Why does this answer **not** make sense?

PROTEIN BAR PROBLEMS

Shade the appropriate portion in each problem. Then record the numbers.

	Words	Picture	Numbers
1.	Shade one-half of the protein bar.		
2.	Shade two-thirds of the protein bar.		
3.	Shade two-thirds of a protein bar plus one-half of a protein bar. How much of a protein bar is shaded?	 	$\frac{2}{3} + \frac{1}{2} = \underline{\quad} + \underline{\quad}$ $= \underline{\quad} \text{ OR } \underline{\quad}$ <small>(improper fraction) (mixed number)</small>
4.	Shade two-thirds of a protein bar minus one-half of a protein bar. How much of this protein bar is shaded?		$\frac{2}{3} - \frac{1}{2} = \underline{\quad} - \underline{\quad}$ $= \underline{\quad}$

5. Why do the denominators have to be the same for both fractions when adding and subtracting?

6. A student added this way: $\frac{1}{2} + \frac{2}{3} = \frac{3}{5}$. Find the sum. Why is this wrong? Why does this answer **not** make sense?

7. A student added this way: $\frac{2}{3} - \frac{1}{2} = \frac{1}{1}$. Find the difference. Why is this wrong? Why does this answer **not** make sense?

SKILL BUILDER 1A

Write three equivalent fractions for each fraction.

1. $\frac{1}{8}$	2. $\frac{5}{7}$	3. $\frac{9}{10}$
------------------	------------------	-------------------

Find a common denominator for each pair of fractions.

4. $\frac{2}{3}$ and $\frac{5}{6}$	5. $\frac{3}{8}$ and $\frac{1}{6}$	6. $\frac{1}{9}$ and $\frac{2}{6}$
------------------------------------	------------------------------------	------------------------------------

Showing your work, find each sum or difference in lowest terms. Use pictures as needed.

7. $\frac{5}{6} - \frac{1}{6}$	8. $\frac{3}{10} + \frac{7}{10}$
9. $\frac{2}{3} - \frac{1}{9}$	10. $\frac{3}{12} + \frac{1}{6}$

SKILL BUILDER 1B

Showing your work, compute each sum or difference in lowest terms. Use pictures as needed.

11. $\frac{5}{12} - \frac{1}{4}$	12. $\frac{7}{8} + \frac{1}{2}$
13. $\frac{5}{6} - \frac{5}{9}$	14. $\frac{4}{5} + \frac{5}{6}$
15. $\frac{1}{6} + \frac{1}{3} + \frac{2}{9}$	16. $\frac{1}{4} + \frac{1}{2} - \frac{2}{6}$
17. Sammy ate $\frac{3}{4}$ of an orange and $\frac{3}{10}$ of another one. How many oranges did he eat in all? Explain why $\frac{6}{14}$ does not make sense as an answer to this problem.	

KNOWLEDGE CHECK 9

Show your work on a separate sheet of paper and write your answers on this page.

9.1 Numerical Expressions and Equations

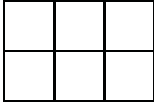
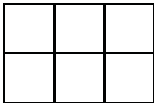
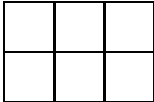
Evaluate each expression for $\bigcirc = 5$, $\square = 3$, and $\triangle = -2$.

1. $\bigcirc \times \square + \bigcirc \times \triangle$

2. $\square \begin{matrix} \square \\ \square \\ \square \end{matrix} \triangle - \bigcirc \begin{matrix} \square \\ \square \\ \square \end{matrix}$

9.2 Fractions: Addition and Subtraction 1

Shade the appropriate portions in each problem. Then record the numbers.

Words	Picture	Numbers
3. Shade five-sixths of this rectangle.		
4. Shade one-sixth of this rectangle.		
5. Shade five-sixths minus one-sixth of this rectangle. How much of this rectangle is shaded?		

9.3 Fractions: Addition and Subtraction 2

Compute. Express each answer in lowest terms.

6. $\frac{13}{14} - \frac{9}{14}$

7. $1\frac{3}{10} + \frac{3}{8}$

Highlighted Review: Fraction: Concepts and Equivalence

8. Write $4\frac{1}{5}$ as an improper fraction. Show this with a diagram.

9. Use a fraction model to show that $\frac{7}{12}$ is greater than $\frac{5}{12}$.

HIGHLIGHTED REVIEW PRACTICE 9

Fractions: Concepts and Equivalence

Draw a picture to represent each improper fraction. Then write the fraction as a mixed number or a whole number.

1. $\frac{23}{8}$	2. $\frac{17}{6}$
-------------------	-------------------

Draw a picture to represent each mixed number. Then write the mixed number as an improper fraction.

3. $3\frac{7}{10}$	4. $2\frac{5}{12}$
--------------------	--------------------

Show equivalent fractions with a “splitting diagram” or a “replicating diagram.”

5. $\frac{3}{8} = \frac{\square}{16}$	6. $\frac{2}{7} = \frac{\square}{21}$
---------------------------------------	---------------------------------------

Choose the best answer.

7. Which number is equivalent to $\frac{11}{12}$?			
A. $\frac{22}{12}$	B. $\frac{22}{23}$	C. $\frac{11}{24}$	D. $\frac{33}{36}$

ALGEBRAIC EXPRESSIONS AND EQUATIONS

Ready (Summary)	Set (Goals)
We will write and evaluate expressions that represent the costs of items on a menu. We will find values that make equations true.	<ul style="list-style-type: none">• Solve problems with money and decimals.• Use variables in expressions and equations.• Use the distributive property and the conventions for order of operations to evaluate expressions.• Find a value that makes an equation true.• Write verbal statements symbolically.

Go (Warmup)

Use exactly one 4 and one -2 to make as many different expressions as you can, and find the value of each. Then, write your expression and its value as an equation.

Expression	Equation
Example: $4 + (-2)$	$2 = 4 + (-2)$

PIZZA PLACE VARIABLES AND EXPRESSIONS

<u>Pizza by the slice:</u>	
Cheese	\$1.00
Pepperoni	\$1.25
Deluxe	\$1.75
<u>Drinks:</u>	
Small.....	\$0.95
Medium.....	\$1.20
Large	\$1.60
Extra large	\$1.90

Your teacher will read some orders aloud.

<ul style="list-style-type: none"> • Define your variables. <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let ____ = the cost of a _____</p> <p>Let ____ = the cost of a _____</p>	<ul style="list-style-type: none"> • Use the variables that you recorded to write expressions that match each order. • Then evaluate each expression. <p>1. Expression: <u> $c + p$ </u></p> <p>Evaluate:</p> <p>2. Expression: _____</p> <p>Evaluate:</p> <p>3. Expression: _____</p> <p>Evaluate:</p>
---	--

PIZZA PLACE VARIABLES AND EXPRESSIONS (continued)

<u>Pizza by the slice:</u>	
Cheese	\$1.00
Pepperoni	\$1.25
Deluxe	\$1.75
 <u>Drinks:</u>	
Small.....	\$0.95
Medium.....	\$1.20
Large	\$1.60
Extra large	\$1.90

Your teacher will read some orders aloud.

<ul style="list-style-type: none"> • Define your variables. <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let _ = the cost of a _____</p> <p>Let = the cost of a _____</p>	<ul style="list-style-type: none"> • Use the variables that you recorded to write expressions that match each order. • Then evaluate each expression. <p>4. Expression: _____</p> <p style="padding-left: 20px;">Evaluate:</p> <p>5. Expression: _____</p> <p style="padding-left: 20px;">Evaluate:</p> <p>6. Expression: _____</p> <p style="padding-left: 20px;">Evaluate:</p>
--	---

PIZZA PLACE EQUATIONS

<u>Pizza by the slice:</u>	
Cheese	$c = \$1.00$
Pepperoni	$p = \$1.25$
Deluxe	$d = \$1.75$
<u>Drinks:</u>	
Small	$s = \$0.95$
Medium	$m = \$1.20$
Large	$L = \$1.60$
Extra large	$x = \$1.90$

Find a menu item with a cost that makes the following equations true. In different problems, the need not represent the same menu item.

1. $p + \text{} = 3c$

Menu item: _____

Cost of menu item = _____

2. $2s = \text{}$

Menu item: _____

Cost of menu item = _____

3. $2m + L = p + \text{} + c$

Menu item: _____

Cost of menu item = _____

PIZZA PLACE EQUATIONS (continued)

<u>Pizza by the slice:</u>	
Cheese	$c = \$1.00$
Pepperoni	$p = \$1.25$
Deluxe	$d = \$1.75$
<u>Drinks:</u>	
Small	$s = \$0.95$
Medium	$m = \$1.20$
Large	$L = \$1.60$
Extra large	$x = \$1.90$

Find a menu item with a cost that makes the following equations true. In different problems, the need not represent the same menu item.

4. $m + 2 \text{ } = 4p$

Menu item: _____

Cost of menu item = _____

5. $4p = 5 \text{ }$

Menu item: _____

Cost of menu item = _____

6. $5s + \text{ } = 2 \text{ } + 2d$

Menu item: _____

Cost of menu item = _____

PIZZA PLACE MENU

<u>Pizza by the slice:</u>	
Cheese	\$1.00
Pepperoni	\$1.25
Deluxe	\$1.75
<u>Drinks:</u>	
Small.....	\$0.95
Medium	\$1.20
Large	\$1.60
Extra large	\$1.90

BALANCE PUZZLES 1

Ready (Summary)	Set (Goals)
<p>We will use the concept of balance to understand the meaning of the equal sign and solve balance puzzles.</p>	<ul style="list-style-type: none"> • Emphasize that the equal sign is a relational symbol, not a “to do” symbol. • Establish a foundation for the concept of balance and the rules of equality prior to solving equations by symbol manipulation. • Understand and use concept of a variable.

Go (Warmup)

Find values for the circle and square that make each equation true. The shapes may have different values in different problems.

1. $\frac{4 + 6}{2} = \frac{40}{\square}$

2. $3 \cdot \bigcirc = 3(19 - 7)$

3. $10 + \square = \bigcirc - 5$

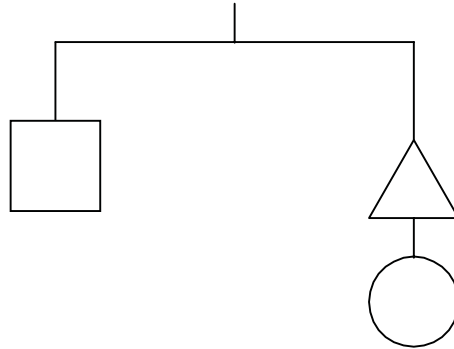
4. $\bigcirc - \square = \frac{4(12)}{6}$

FIND EACH WEIGHT 1

For each puzzle:

- The same shapes have the same weight.
- Different shapes have different weights.
- A horizontal bar shows balance.
- Each problem has only one correct solution.
- Use the clues for help.

1.



Total weight = 8

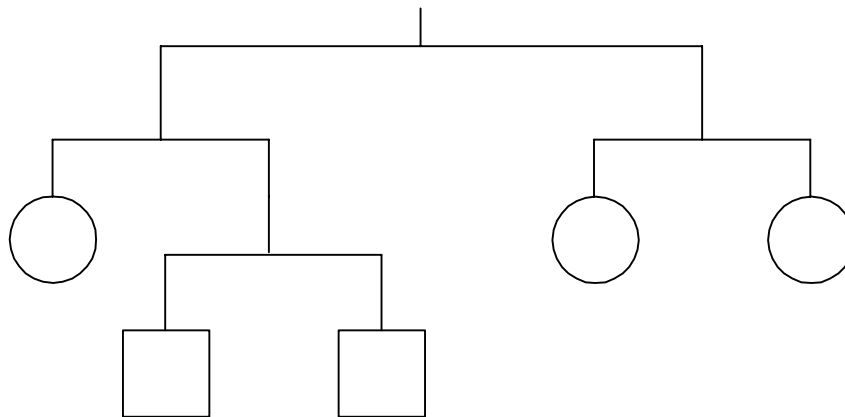
$$\triangle = 1$$

$$\bigcirc = \underline{\hspace{1cm}}$$

$$\square = \underline{\hspace{1cm}}$$

Verify the solution by writing a numerical equation to show that the scale is balanced:

2.



Total weight = 40

$$\bigcirc = \underline{\hspace{1cm}}$$

$$\square = \underline{\hspace{1cm}}$$

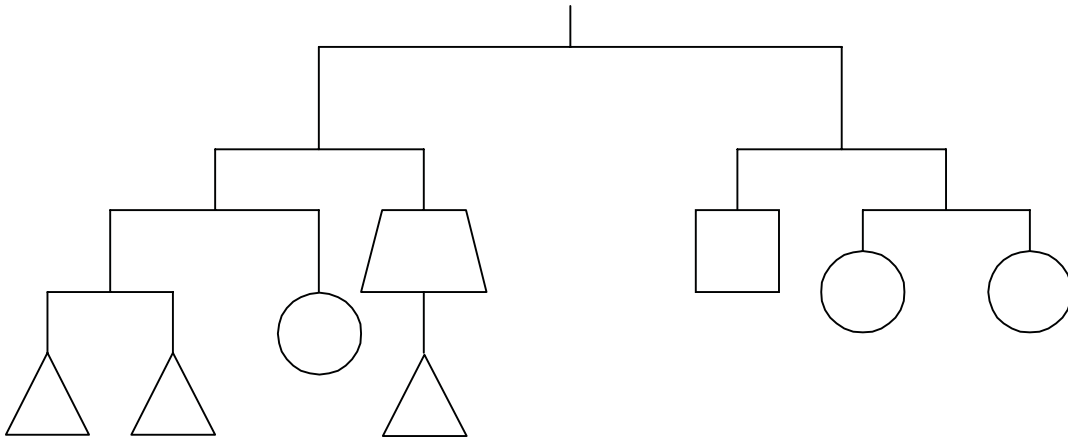
Verify the solution by writing a numerical equation to show that the scale is balanced.

FIND EACH WEIGHT 2

For each puzzle:

- The same shapes have the same weight.
- Different shapes have different weights.
- A horizontal bar shows balance.
- Each problem has only one correct solution.
- Use the clues for help.

1.



Total weight = 64

$\triangle = \underline{\hspace{1cm}}$

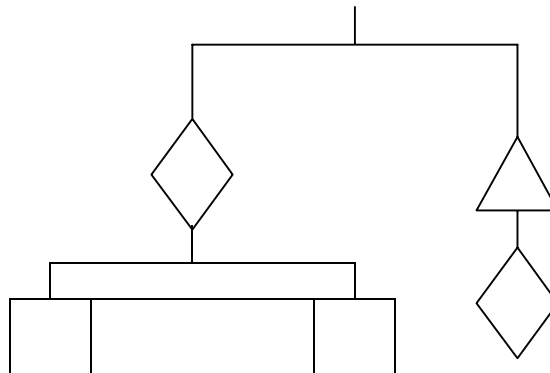
$\bigcirc = \underline{\hspace{1cm}}$

$\square = \underline{\hspace{1cm}}$

$\text{trapezoid} = \underline{\hspace{1cm}}$

Verify the solution by writing a numerical equation to show that the scale is balanced.

2



Total weight = 54

$\triangle = 20$

$\diamond = \underline{\hspace{1cm}}$

$\square = \underline{\hspace{1cm}}$

Verify the solution. Write a numerical equation to show that the scale is balanced.

SKILL BUILDER 1A

Shade the appropriate portions in each problem. Then record the numbers.

Words	Picture	Numbers
<p>1. You have two and one-third protein bars. Shade the picture to show this amount.</p>		$2\frac{1}{3}$ $= 2 + \frac{1}{3}$
<p>2. Your friend has one and two-thirds protein bars. Shade the picture to show this amount.</p>		$1\frac{2}{3}$ $= 1 + \frac{2}{3}$
<p>3. You have two and one-third protein bars. Your friend gives you another one and two-thirds protein bars. Shade the picture to help figure out how many protein bars you have total?</p>		$2\frac{1}{3} + 1\frac{2}{3}$ $= \square 2 + \frac{1}{3} \square + \square 1 + \frac{2}{3} \square$ $= 2 + 1 + \frac{1}{3} + \frac{2}{3}$ $= \underline{\quad} + \frac{\square}{\square} = \underline{\quad}$
<p>4. There are two protein bars. You eat three-fifths of a protein bar. How many protein bars are left?</p>		$2 - \frac{3}{5}$ $= 1 \frac{\square}{\square}$

Compute. Then place the result on the number line. (Hint: rules for integer subtraction apply.)

<p>5. $1 - 3$</p> <div style="text-align: center;"> </div>	<p>6. $\frac{1}{5} - \frac{3}{5}$</p> <div style="text-align: center;"> </div>
---	---

SKILL BUILDER 1B

Use pictures, if needed, to make sense of each operation.

7. $3\frac{1}{2} + \frac{3}{8} + \frac{1}{2}$	8. $3 - \frac{1}{2}$	9. $\frac{1}{4} - \frac{3}{4}$
---	----------------------	--------------------------------

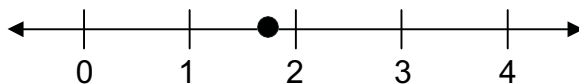
Compute each operation mentally.

10. $\frac{1}{8} + 3 + \frac{5}{8}$	11. $1 - \frac{3}{4}$	12. $\frac{1}{5} - \frac{3}{5}$
13. $2\frac{1}{9} + 1\frac{3}{4} + 2\frac{1}{4}$	14. $6 - \frac{2}{3}$	15. $\frac{2}{7} - \frac{3}{7}$
16. $4\frac{1}{5} + 2\frac{1}{8} + 3\frac{4}{5}$	17. $9 - \frac{4}{7}$	18. $\frac{2}{9} - \frac{5}{9}$

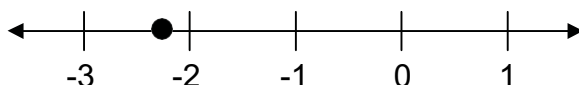
SKILL BUILDER 1C

Write each number as the sum or difference of an integer and of a fraction. Then label the number lines and place each number on the lines.

Ex: $1\frac{3}{4} = 1 + \frac{3}{4}$



Ex: $-2\frac{1}{3} = -2 + -\frac{1}{3}$ or $-2 - \frac{1}{3}$



<p>19. $2\frac{1}{5}$</p> <p style="text-align: center;">←—————→</p>	<p>20. $-1\frac{1}{5}$</p> <p style="text-align: center;">←—————→</p>
<p>21. $-\frac{2}{5}$</p> <p style="text-align: center;">←—————→</p>	<p>22. $-3\frac{1}{3}$</p> <p style="text-align: center;">←—————→</p>

KNOWLEDGE CHECK 10

Show your work on a separate sheet of paper and write your answers on this page.

10.1 Algebraic Expressions and Equations

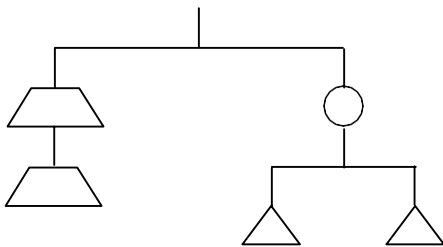
1. Evaluate $4x - 6$ for $x = 5$.

2. Solve for x : $4x = 21 + x$

10.2 Balance Puzzles 1

Find the weight of each shape. Then write a numerical equation to show that each scale is balanced.

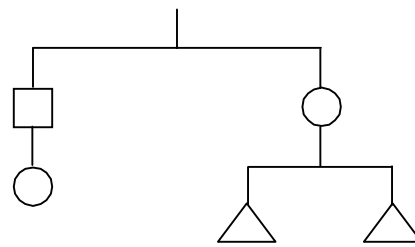
3.



Total weight = 24

$\bigcirc = 8$ $\text{trapezoid} = \underline{\hspace{1cm}}$ $\triangle = \underline{\hspace{1cm}}$

4.



Total weight = 68

$\square = 10$ $\bigcirc = \underline{\hspace{1cm}}$ $\triangle = \underline{\hspace{1cm}}$

10.3 Fractions: Addition and Subtraction 3

Compute each sum or difference mentally.

5. $5\frac{3}{7} + 2\frac{1}{7}$

6. $2 - \frac{3}{7}$

7. $\frac{6}{9} - \frac{8}{9}$

Highlighted Review: Decimals: Place Value, Rounding, and Expanded Form

8. Round 68.245 to the nearest tenth.

9. Write 12.037 in three different expanded forms.

HIGHLIGHTED REVIEW PRACTICE 10

Decimals: Place Value, Rounding, and Expanded Form

1. Write 62.308 in words.

2. Write 62.308 in three different expanded forms

Write the value represented by each underlined digit.

3. 65.368

face value:

place value:

total value:

4. 813.24

face value:

place value:

total value:

5. Circle the digit in the tens place.

6 3 1 . 2 5

6. Round 645.7714 to the nearest tenth.

7. Round 36.6192 to the nearest hundredth.

8. Round 756.9973 to the nearest thousandth.

Choose the best answer.

9. What is the place value of the underlined digit in 43.152?

A. hundreds

B. hundredths

C. thousands

D. thousandths

BALANCE PUZZLES 2

Ready (Summary)	Set (Goals)
<p>We will use the concept of balance to understand the meaning of the equal sign and solve balance scale puzzles.</p>	<ul style="list-style-type: none">• Emphasize that the equal sign is a relational symbol, not a “to do” symbol.• Establish a foundation for the concept of balance and the laws of equality prior to solving equations by symbol manipulation.• Understand the meaning of a variable.

Go (Warmup)

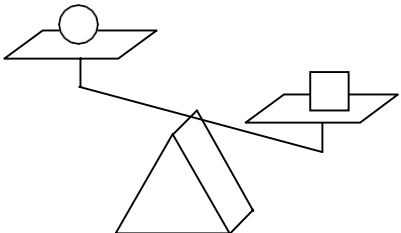
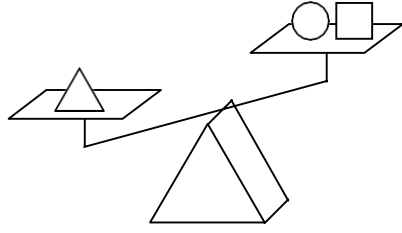
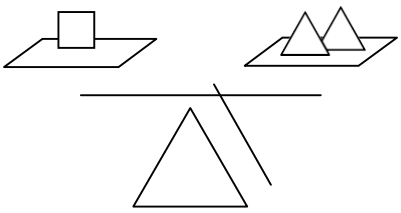
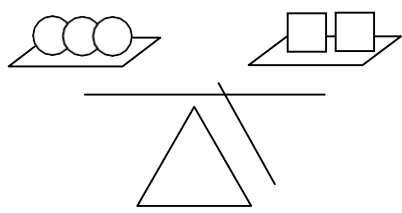
1. What does it mean to say that a scale is balanced?

2. What does an equal sign mean?

WHICH WEIGHS MORE?

- A balance scale is used to weigh different stones. The pictures on the scales show the shapes of the stones.
- The stones are not drawn to scale, so you cannot tell just by looking which weighs more or less.
- On the same scale, all stones of the same shape have the same weight. However, each problem is separate from the others. Therefore, no one problem gives any information about another problem.

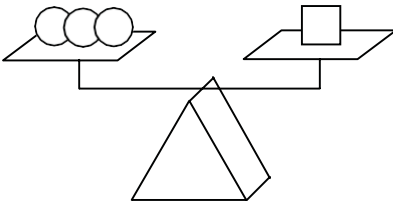
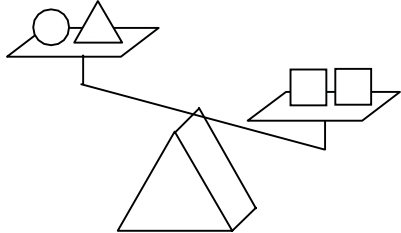
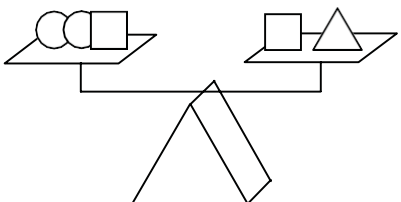
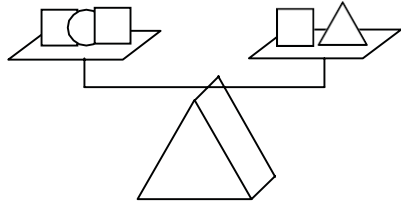
Which stone weighs more? Write an inequality for each pair of stones. Explain how you know.

<p>1.</p>  <p style="text-align: center;">○ <u> </u> < <u> </u> □</p> <p>Explanation:</p>	<p>2.</p>  <p style="text-align: center;">△ <u> </u> ○</p> <p style="text-align: center;">△ <u> </u> □</p> <p>Explanation:</p>
<p>3.</p>  <p style="text-align: center;">△ <u> </u> □</p> <p>Explanation:</p>	<p>4.</p>  <p style="text-align: center;">○ <u> </u> □</p> <p>Explanation:</p>

MAKE UP THE WEIGHTS

- A balance scale is used to weigh different stones. The pictures on the scales show the shapes of the stones.
- The stones are not drawn to scale, so you cannot tell just by looking which weighs more or less.
- On the same scale, all stones of the same shape have the same weight. However, each problem is separate from the others. Therefore, no one problem gives any information about another problem.

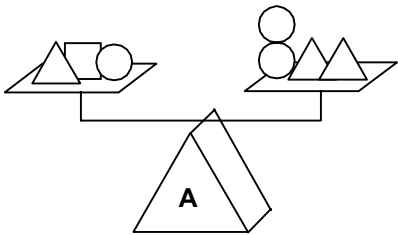
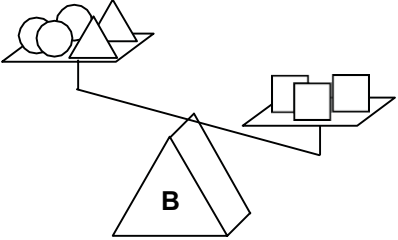
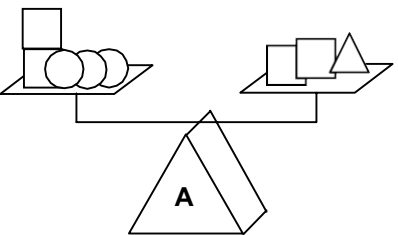
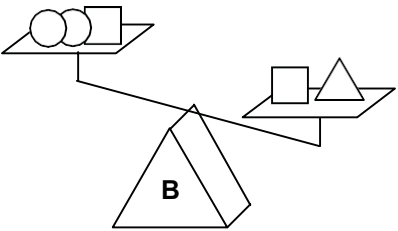
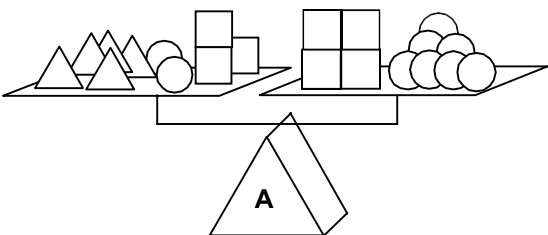
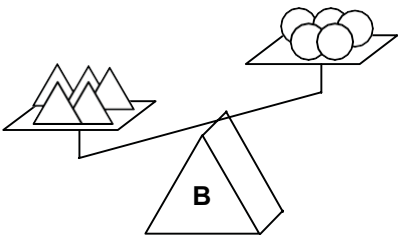
Make up a reasonable weight for each block. Use those values to write a number sentence that describes the weights on the scale.

<p>1.</p>  <p>Let $\bigcirc = 4$ $\square = 12$</p> <p>Number sentence:</p> <p style="text-align: center;">$4 + 4 + 4 = 12$</p>	<p>2.</p>  <p>Let $\triangle = \underline{\quad}$ $\square = \underline{\quad}$</p> <p>Number Sentence:</p>
<p>3.</p>  <p>Let $\triangle = \underline{\quad}$ $\square = \underline{\quad}$</p> <p>Number sentence:</p>	<p>4.</p>  <p>Let $\triangle = \underline{\quad}$ $\square = \underline{\quad}$</p> <p>Number sentence:</p>

WHAT'S MISSING?

- A balance scale is used to weigh different stones. The pictures on the scales show the shapes of the stones.
- The stones are not drawn to scale, so you cannot tell just by looking which weighs more or less.
- On the same scale, all stones of the same shape have the same weight. However, each problem is separate from the others. Therefore, no one problem gives any information about another problem.

Use the information on balanced scale A to find the **one stone** that will balance scale B.

<p>1.</p>  <p style="text-align: center;">A</p>	 <p style="text-align: center;">B</p>
<p>2.</p>  <p style="text-align: center;">A</p>	 <p style="text-align: center;">B</p>
<p>3.</p>  <p style="text-align: center;">A</p>	 <p style="text-align: center;">B</p>

SOLVING EQUATIONS 1

Ready (Summary)	Set (Goals)
We will solve linear equations using a visual model and record the steps with pictures and algebraic symbols.	<ul style="list-style-type: none">• Use variables to translate statements into algebraic expressions.• Simplify expressions.• Solve algebraic equations and use substitution to check solutions.


Go (Warmup)


Translate these statements into expressions using numbers and symbols. Then, evaluate for $m = 6$ and $n = 4$.


1. Twice the sum of two numbers, m and n .
2. The sum of m and twice a number n .
3. The value in cents of n quarters and m dimes.
4. If Mardi is m years old and Nicole is n years old, the difference between Mardi's and Nicole's ages in 10 years.
5. If you want to share m apples evenly between n people, the number of apples that each person should get.


INTRODUCTION TO SOLVING EQUATIONS

Build and record equations following your teacher's instructions.

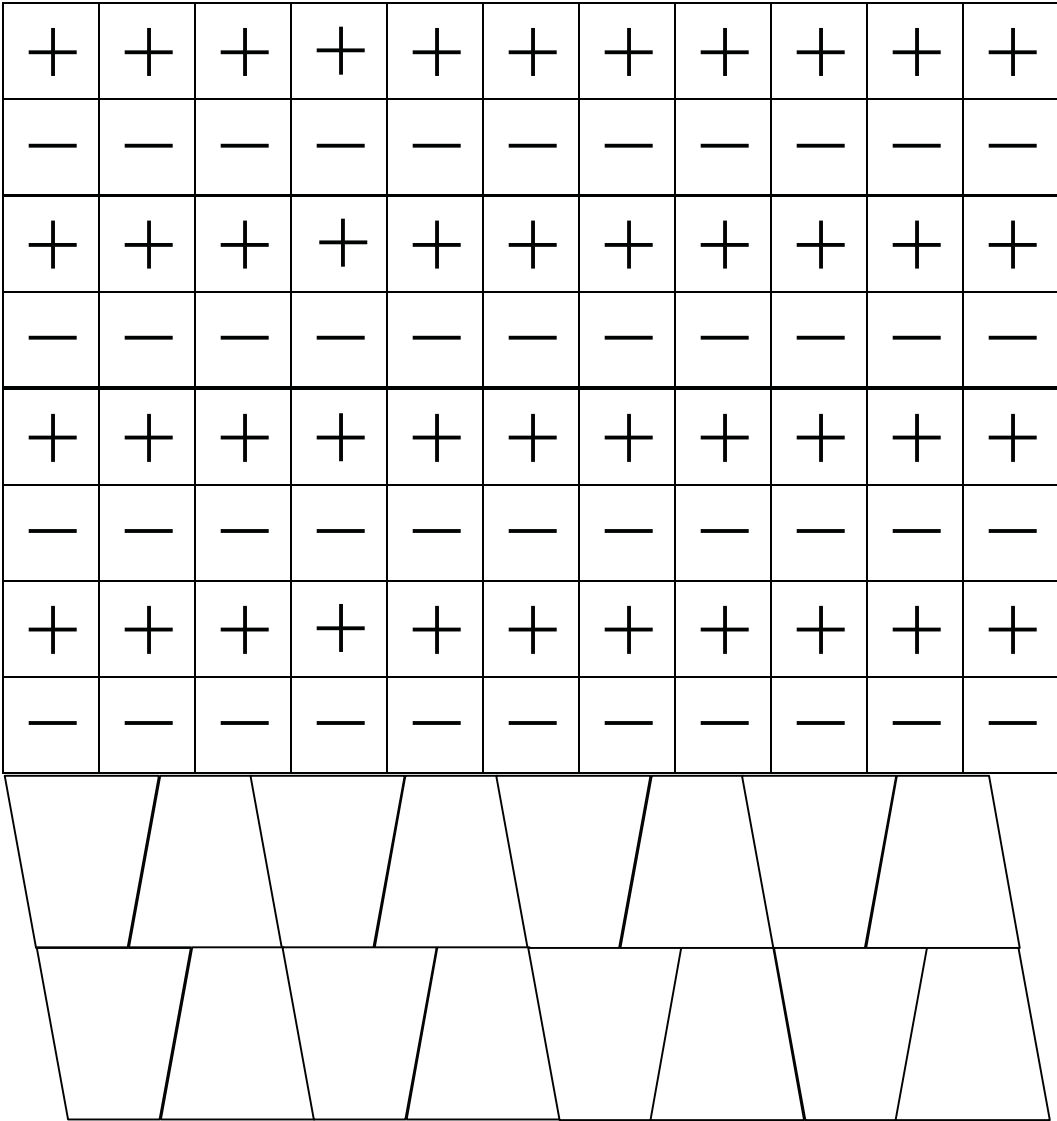
1.	Picture	Equation
		$x = 3$

2.	Picture	Equation
		$6 = x + 2$ $x = \underline{\quad}$ Check: $6 = \underline{\quad} + 2$

3.	Picture	Equation
		$2x = 6$ $x = \underline{\quad}$ Check: $2(\underline{\quad}) = 6$

4.	Picture	Equation
		$2x + 3 = 11$ $x = \underline{\quad}$ Check: $2(\underline{\quad}) + 3 = 11$

CUPS AND MARKERS



SOLVING EQUATIONS TEMPLATE

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; display: flex; flex-direction: column; justify-content: space-around;"> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> </div>	
Check your solution using substitution:		

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; display: flex; flex-direction: column; justify-content: space-around;"> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> <div style="border-bottom: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-bottom: 1px dashed black; width: 100%;"></div> </div>	
Check your solution using substitution:		

SKILL BUILDER 1A

Use the five step process to add fractions:

Example: $4\frac{1}{3} + 5\frac{5}{6}$.

Step 1: Rewrite the problem in an expanded form.	$\square \square 4 + \frac{1}{\square \square} + \square \square 5 + \frac{5}{\square \square}$
Step 2: Rewrite without parentheses.	$4 + \frac{1}{3} + 5 + \frac{5}{6}$
Step 3: Regroup by placing the integer terms together and the fraction terms together.	$4 + 5 + \frac{5}{6} + \frac{1}{3}$
Step 4: Combine integers, and write fractions with a common denominator.	$9 + \frac{5}{6} + \frac{2}{6}$
Step 5: Combine fractions and simplify.	$9 + \frac{7}{6} = 9 + 1 + \frac{1}{6} = 10\frac{1}{6}$

1. $2\frac{3}{4} + 5\frac{1}{8}$	2. $4\frac{1}{6} + 2\frac{2}{3}$
3. $1\frac{3}{5} + 2\frac{5}{6}$	4. $\frac{3}{8} + 2\frac{5}{6}$

SKILL BUILDER 1B

Use the five step process to subtract fractions:

Example: $5\frac{3}{5} - 4\frac{7}{10}$.

Step 1: Rewrite the problem in an expanded form.	$\square \square 5 + \frac{\square 3}{\square 5} - \square \square 4 + \frac{\square 7}{\square 10}$
Step 2: Rewrite without parentheses. (watch the signs!)	$5 + \frac{3}{5} - 4 - \frac{7}{10}$
Step 3: Regroup by placing the integer terms together and the fraction terms together.	$5 - 4 + \frac{3}{5} - \frac{7}{10}$
Step 4: Combine integers, and write fractions with a common denominator.	$1 + \frac{6}{10} - \frac{7}{10}$
Step 5: Combine fractions and simplify.	$1 - \frac{1}{10} = \frac{9}{10}$

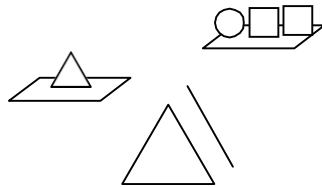
5. $5\frac{1}{2} - 1\frac{1}{4}$	6. $5\frac{5}{8} - 3\frac{1}{4}$
7. $3\frac{1}{6} - 1\frac{3}{4}$	8. $6\frac{2}{3} - 1\frac{4}{5}$

KNOWLEDGE CHECK 11

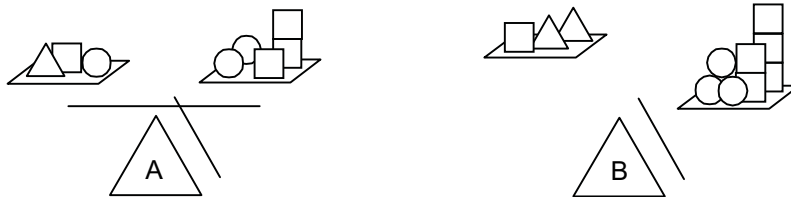
Show your work on a separate sheet of paper and write your answers on this page.

11.1 Balance Puzzles 2

1. Name the heaviest stone and explain how you know.



2. Use the information on the balanced scale (A) to find the **one stone** that will balance scale B.



11.2 Solving Equations 1

3. Translate “the sum of x and y is 10” into an algebraic equation.
 4. Build, draw, record and solve the equation $2x + 5 = 7$.

11.3 Fractions: Addition and Subtraction 4

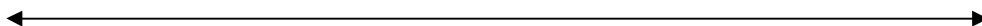
5. $5\frac{5}{6} + 1\frac{2}{4}$

6. $6\frac{4}{7} - 3\frac{1}{3}$

Highlighted Review: Ordering Rational Numbers

7. Order these numbers from least to greatest: $\frac{7}{4}$, $\frac{1}{4}$, $1\frac{2}{3}$, $\frac{2}{3}$

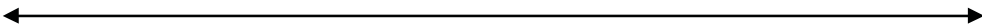
8. Estimate the location of the numbers from problem #7 above on the number line.



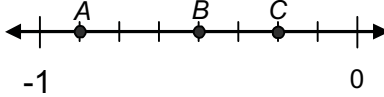
HIGHLIGHTED REVIEW PRACTICE 11

Ordering Rational Numbers

Complete each statement with $>$, $<$, or $=$. Explain how you know.

<p>1. $1\frac{2}{3}$ _____ 1.6</p>	<p>2. 2.66 _____ $2\frac{2}{3}$</p>
<p>3. -0.6 _____ $-\frac{2}{3}$</p>	<p>4. -0.81 _____ 0.81</p>
<p>5. Order these numbers from least to greatest: $\frac{7}{10}$, $\frac{4}{5}$, $2\frac{1}{5}$, $-\frac{2}{5}$</p>	
<p>6. Estimate the location of the numbers from #5 on the number line:</p> <div style="text-align: center; margin-top: 10px;">  </div>	

Choose the best answer.

<p>7. What number does B represent?</p>			
			
A. $\frac{1}{2}$	B. $-\frac{1}{2}$	C. $\frac{1}{8}$	D. $-\frac{1}{8}$

INPUTS AND OUTPUTS 1

Ready (Summary)	Set (Goals)
<p>We will use input-output equations, tables, and graphs to find out how much time is needed to save for a camera and for a printer.</p>	<ul style="list-style-type: none"> • Use tables, graphs, equations, and words to solve problems. • Informally introduce the slope-intercept form of a line.

Go (Warmup)

Rule: Multiply each input number by 3 and then add 5 to get each output number.

Input Number (x)	Output Number (y)
10	$(10)(3) + 5 = 35$
1	
0	
9	
11	
20	

What is an equation for this rule? Use x for input and y for output.

$y =$ _____

SAVING FOR A CAMERA: INSTRUCTIONS

A digital camera costs \$240.

Julie wants to save for the camera. She has \$100 in the bank to start, and she is going to save \$10 each month.

Christina also wants to save for the camera. She has \$40 in the bank to start, and she is going to save \$25 each month.

How many months will it take Julie and Christina to each save up for the digital camera?

- Let m represent the amount of money that Julie and Christina are going to deposit in their bank accounts each *month*.
- Let b represent the amount that Julie and Christina each already have in the *bank* to start.
- In the tables on the next page, keep track of the amounts that each girl has when they start to save, and how much they have each month until they each reach their goal.
- Let x represent the number of months that Julie and Christina have been saving and y represent the total amount saved.

SAVING FOR A CAMERA: TABLES

To find the total amount saved, use the equation form $y = mx + b$.

JULIE

$m = \$10$ per month
 $b = \$100$ in the bank

$$y = 10x + 100$$

x (# of months)	y (total amount saved)
0	$10(0) + 100 = 100$
1	$10(\underline{\quad}) + 100 = \underline{\quad}$

CHRISTINA

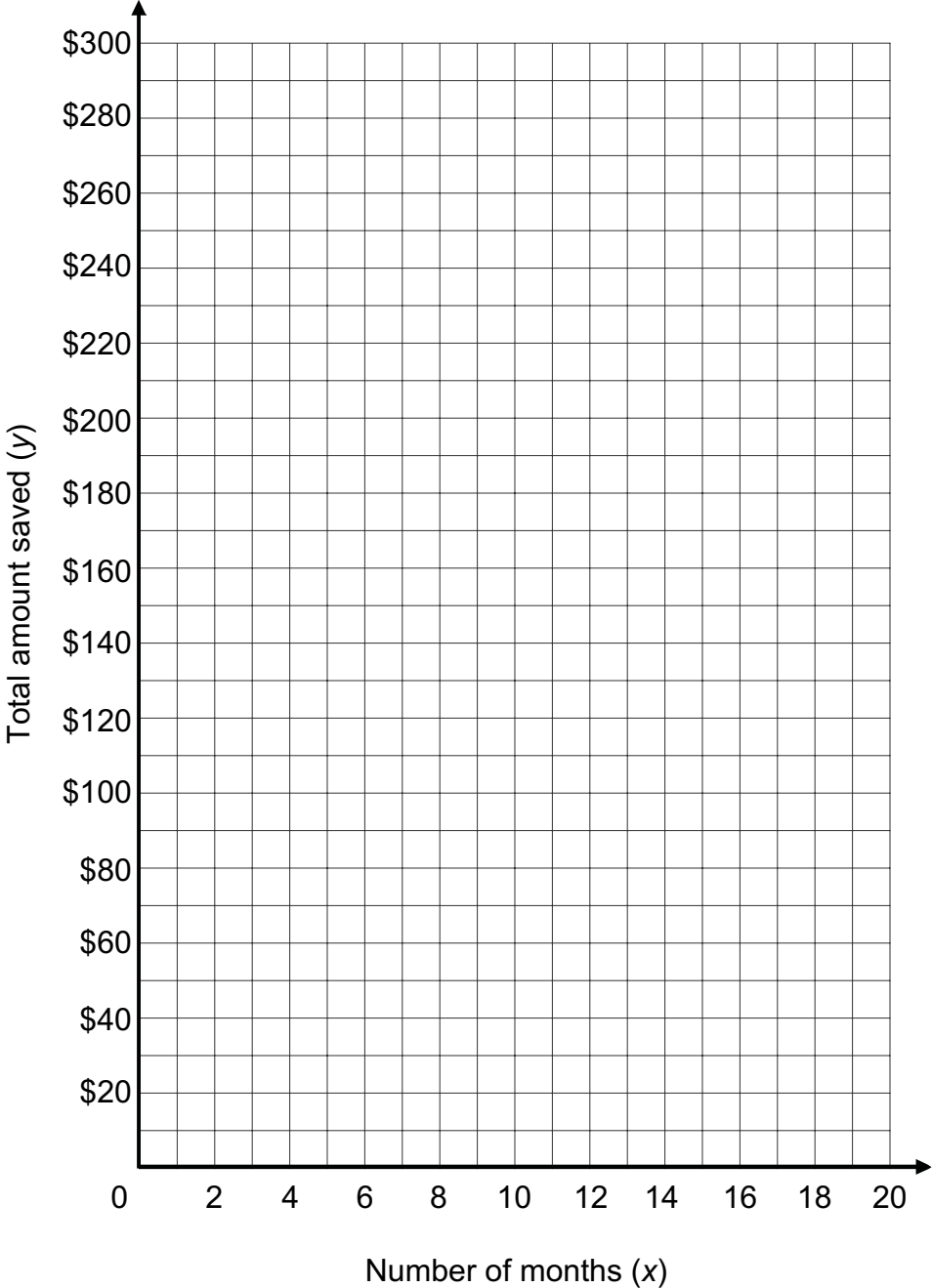
$m = \$25$ per month
 $b = \$40$ in the bank

$$y = 25x + 40$$

x (# of months)	y (total amount saved)

SAVING FOR A CAMERA: GRAPHS

Use the data from the previous page to make graphs representing the total amount of money that Julie and Christina will save each month. Use one color for Julie's graph and another color for Christina's graph.



FRACTIONS: MULTIPLICATION 1

Ready (Summary)	Set (Goals)
We will use whole number multiplication concepts to provide meaning for fraction multiplication.	<ul style="list-style-type: none"> • Extend concepts of whole number multiplication to fraction multiplication. • Develop fraction multiplication concepts and procedures.

Go (Warmup)

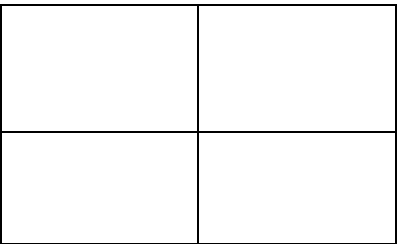
Write each multiplication expression as a repeated addition expression.
Then, find the sum.

<p>1. $6(5) = \underline{\quad} + \square + \square +$ $\underline{\quad} + \square + \underline{\quad}$ $= \underline{\quad}$</p>	<p>2. $4(7) = \underline{\hspace{2cm}}$ $= \underline{\hspace{2cm}}$</p>
---	---

Compute each sum.

<p>3. $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$</p>	<p>4. $1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4}$</p>
--	---

Multiply using an area model (not drawn to scale).

<p>5. $38(72)$</p>	
-------------------------------	--

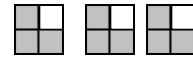
FRACTION MULTIPLICATION: REPEATED ADDITION

One way to interpret multiplication is using repeated addition.

That is, 2 groups of 3 can be written as: $2 \times 3 = 3 + 3 = 6$



This works for fractions as well: 3 groups of $\frac{3}{4}$ can be written as:



$$3 \times \frac{3}{4} = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$$

Write each statement as a product and as repeated addition. Then, draw a picture to represent the repeated addition.

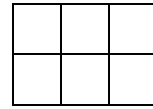
<p>1. 3 groups of 8 can be written as:</p> $3 \times 8 = \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$ <p>Picture:</p>	<p>2. 2 groups of $\frac{2}{5}$ can be written as:</p> $2 \times \frac{2}{5} = \frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$ <p>Picture:</p>
<p>3. 3 groups of $\frac{2}{7}$ can be written as:</p> $\square \times \frac{\square}{\square} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} = \frac{\square}{\square}$	<p>4. 4 groups of $\frac{2}{3}$ can be written as:</p>

Multiply using repeated addition.

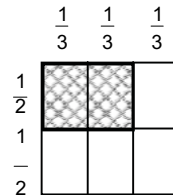
<p>5. $5 \times \frac{1}{6}$</p>	<p>6. $8 \times \frac{1}{4}$</p>	<p>7. $6 \times \frac{2}{3}$</p>
---	---	---

FRACTION MULTIPLICATION: AREA MODEL

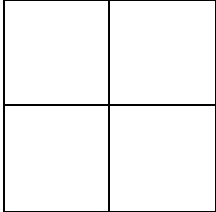
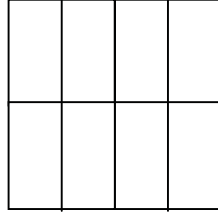
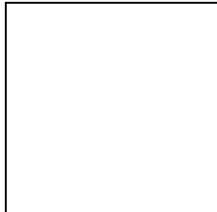
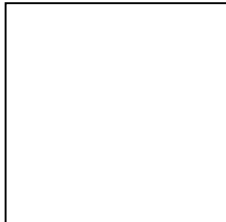
An area model is another way to explain multiplication. This 2 by 3 rectangle has an area of $2 \times 3 = 6$



An area model is also useful for multiplying proper fractions. This is a square whose side length is 1 unit. A rectangle that is $\frac{1}{2}$ by $\frac{2}{3}$ is shaded inside of it. The shaded area shows that $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6}$.



Use an area model to find each product.

<p>1. This is a 1 unit by 1 unit square. Mark the side lengths. Shade a rectangle that is $\frac{1}{2}$ by $\frac{1}{2}$</p> <div style="text-align: center;">  </div> <div style="margin-top: 20px;"> $\frac{1}{2} \times \frac{1}{2} = \frac{\square}{\square}$ </div>	<p>2. This is a 1 unit by 1 unit square. Mark the side lengths. Shade a rectangle that is $\frac{1}{2}$ by $\frac{1}{4}$</p> <div style="text-align: center;">  </div> <div style="margin-top: 20px;"> $\frac{1}{2} \times \frac{1}{4} = \frac{\square}{\square}$ </div>
<p>3. This is a 1 unit by 1 unit square. Mark the side lengths. Shade a rectangle that is $\frac{1}{4}$ by $\frac{3}{4}$</p> <div style="text-align: center;">  </div> <div style="margin-top: 20px;"> $\frac{1}{4} \times \frac{3}{4} = \frac{\square}{\square}$ </div>	<p>4. This is a 1 unit by 1 unit square. Mark the side lengths. Shade a rectangle that is $\frac{2}{3}$ by $\frac{3}{4}$</p> <div style="text-align: center;">  </div> <div style="margin-top: 20px;"> $\frac{2}{3} \times \frac{3}{4} = \frac{\square}{\square}$ </div>

FRACTION MULTIPLICATION: AREA MODEL (continued)

Multiply using an area model.

5. $\frac{1}{2} \times \frac{1}{6}$	6. $\frac{1}{2} \times \frac{2}{3}$	7. $\frac{2}{5} \times \frac{2}{3}$
-------------------------------------	-------------------------------------	-------------------------------------

8. Use the results of the shaded rectangles to state a multiply across rule.

$$\frac{a}{b} \times \frac{c}{d} = \frac{\boxed{}}{\boxed{}}$$

The numerator of the product represents _____

The denominator of the product represents _____

We will call this the “multiply across rule”.

Use an area model to find each product (rectangles are not drawn to scale).

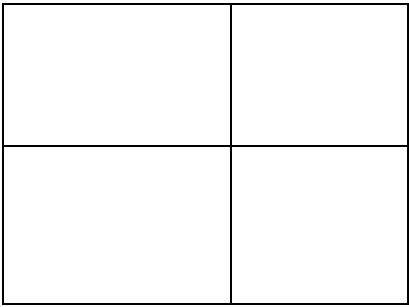
9. $5 \times 26 = 5 \times (20 + 6)$ <div style="display: flex; align-items: center; margin-left: 40px;"> <div style="margin-right: 10px;">20</div> <div style="margin-right: 10px;">+</div> <div style="margin-right: 10px;">6</div> </div> <div style="display: flex; align-items: center; margin-left: 40px; margin-top: 10px;"> <div style="margin-right: 5px;">5</div> <div style="border: 1px solid black; width: 200px; height: 40px; display: flex; border-collapse: collapse;"> <div style="border-right: 1px solid black; width: 150px; height: 40px;"></div> <div style="width: 50px; height: 40px;"></div> </div> </div>	10. $3 \times 2\frac{1}{2} = (3) \times 2 + 3 \times \frac{1}{2}$ <div style="display: flex; align-items: center; margin-left: 40px;"> <div style="margin-right: 10px;">2</div> <div style="margin-right: 10px;">+</div> <div style="margin-right: 10px;">$\frac{1}{2}$</div> </div> <div style="display: flex; align-items: center; margin-left: 40px; margin-top: 10px;"> <div style="margin-right: 5px;">3</div> <div style="border: 1px solid black; width: 200px; height: 40px; display: flex; border-collapse: collapse;"> <div style="border-right: 1px solid black; width: 150px; height: 40px;"></div> <div style="width: 50px; height: 40px;"></div> </div> </div>
Answer: _____ + _____ = _____	Answer: _____ + _____ = _____

MORE FRACTION MULTIPLICATION

Multiply.

1. $7 \times 2\frac{1}{2}$	2. $6 \times 1\frac{1}{8}$	3. $12 \times 3\frac{2}{5}$
----------------------------	----------------------------	-----------------------------

To multiply mixed numbers, use an area model diagram or use the multiply across rule (rectangles are not drawn to scale).


<p>4. This rectangle is $2\frac{1}{2}$ by $3\frac{3}{4}$. Find the area of each smaller rectangle.</p> <div style="text-align: center; margin-bottom: 10px;"> $3 \quad + \quad \frac{3}{4}$ </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;"> 2 $+$ $1\frac{1}{2}$ </div>  </div> <p style="text-align: center; margin-top: 10px;">Rectangle is not drawn to scale.</p> <p>This shows that</p> $2\frac{1}{2} \times 3\frac{3}{4} = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$ $= \underline{\hspace{2cm}}$	<p>5. To use the multiply across rule, change each mixed number to an improper fraction and then multiply.</p> $2\frac{1}{2} = \underline{\hspace{2cm}} \qquad 3\frac{3}{4} = \underline{\hspace{2cm}}$ $2\frac{1}{2} \times 3\frac{3}{4} =$ $\frac{\boxed{\quad}}{\boxed{\quad}} \times \frac{\boxed{\quad}}{\boxed{\quad}} = \frac{\boxed{\quad}}{\boxed{\quad}}$
---	--

SKILL BUILDER 1A

Find each product as instructed.

Use repeated addition.	Use the multiply across rule.	Use the multiply across rule with simplification.
<p>1. $2 \times \frac{3}{4}$</p> <p>= _____ + _____</p> <p>=</p>	<p>2. $2 \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{4}$</p> <p>= $\frac{2 \times 3}{1 \times 4}$</p> <p>= $\frac{6}{4} = \frac{\boxed{}}{\boxed{}}$</p>	<p>3. $2 \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{4}$</p> <p>= $\frac{\overset{1}{\cancel{2}} \times 3}{1 \times \underset{2}{\cancel{4}}}$</p> <p>= $\frac{3}{2}$</p>
<p>4. $6 \times \frac{5}{8}$</p>	<p>5. $6 \times \frac{5}{8}$</p>	<p>6. $6 \times \frac{5}{8}$</p>

Find each product as instructed.

Use an area model.	Use the multiply across rule.	Use the multiply across rule with simplification.
<p>7. $\frac{3}{5} \times \frac{5}{6}$</p> <div style="text-align: center; margin-top: 20px;">  </div>	<p>8. $\frac{3}{5} \times \frac{5}{6}$</p>	<p>9. $\frac{3}{5} \times \frac{5}{6}$</p>

SKILL BUILDER 1B

Find each product using repeated addition, an area model, or the multiply across rule as needed. Simplify when possible.

10. $4 \times \frac{5}{8}$	11. $\frac{3}{5} \times \frac{5}{12}$	12. $8 \times 2\frac{1}{3}$
13. $1\frac{1}{3} \times \frac{2}{9}$	14. $1\frac{1}{4} \times 1\frac{1}{15}$	15. $\frac{4}{9} \times \frac{3}{16}$
16. $\frac{2}{3} \times 3\frac{3}{4}$	17. $5\frac{1}{4} \times 5\frac{1}{3}$	18. $\frac{5}{6} \times \frac{24}{25}$

KNOWLEDGE CHECK 12

Show your work on a separate sheet of paper and write your answers on this page.

12.1 Inputs and Outputs 1

1. Use the rule to find each output number.
Rule: Multiply each input number by 4, and then add 2.

Input (x)	Output (y)
3	
10	
0	
11	
20	

2. Write an equation that fits the rule in #1. Use x for input and y for the output number.

$y =$ _____

12.2 Fractions: Multiplication 1

Find each product as instructed.

3. Use repeated addition: $4 \times \frac{3}{5}$

4. Use an area model: $1\frac{1}{3} \times \frac{3}{4}$

12.3 Fractions: Multiplication 2

Multiply.

5. Use the multiply across rule:
$$2\frac{3}{5} \times 1\frac{2}{3}$$

6. Use the multiply across rule with simplification:
$$\frac{4}{9} \times \frac{3}{20}$$

Highlighted Review: Factorization

7. Circle the prime numbers. 51 61 71 81 91

8. Circle the composite numbers. 29 39 49 59 69

HIGHLIGHTED REVIEW PRACTICE 12

Factorization

Find the prime factorization of each number.

1. 30	2. 64	3. 450
-------	-------	--------

4. What number has the prime factorization $2 \times 5 \times 5 \times 7$?
5. Circle the prime numbers. 10 5 39 21 53
6. Circle the composite numbers. 26 18 41 13 27
7. List all the factors of 52.

Choose the best answer.

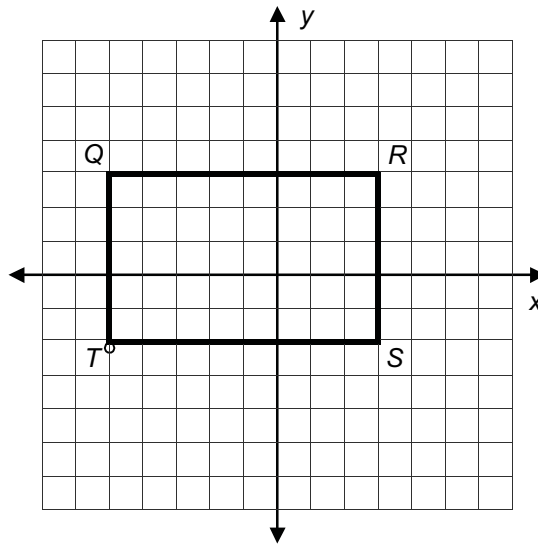
8. Which of these is a composite number?
A. 1 B. 2 C. 3 D. 4

RECTANGLES: FIXED AREA

Ready (Summary)	Set (Goals)
<p>We will review how to find perimeters and areas of rectangles. We will create different rectangles with a fixed area, record the data in a table, and then graph the data.</p>	<ul style="list-style-type: none"> • Find lengths of horizontal and vertical line segments on a coordinate system. • Identify and graph coordinates in four quadrants of the coordinate plane. • Find the perimeters of rectangles with fixed areas. • Use formulas for the perimeter and area of rectangles to solve problems. • Interpret the meaning of graphs.

Go (Warmup)

Find the coordinates of points Q , R , S , and T . Then, find the perimeter and area of the rectangle.

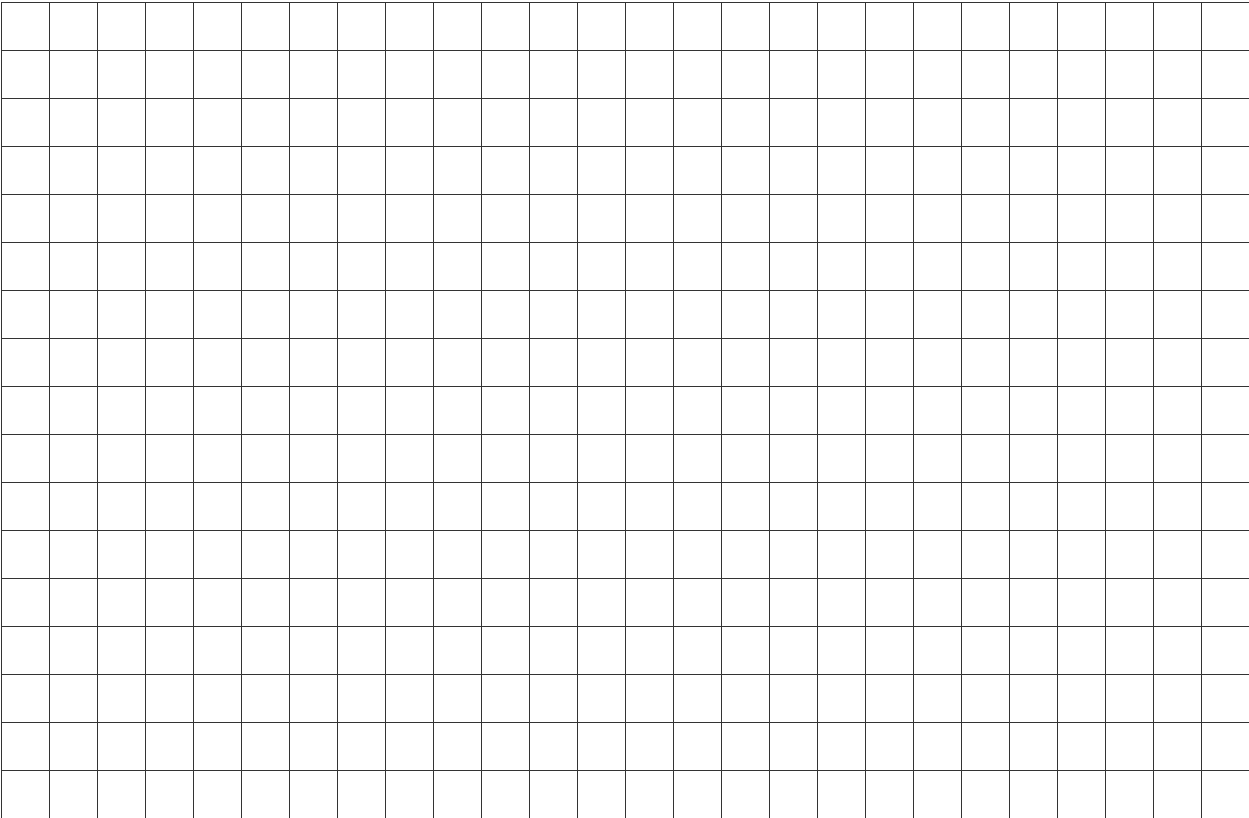


1. Point Q : (____, ____)
2. Point R : (____, ____)
3. Point S : (____, ____)
4. Point T : (____, ____)
5. Perimeter of rectangle $QRST$: _____
6. Area of rectangle $QRST$: _____

13.1 Rectangles: Fixed Area

AREA = 12 units²

Sketch rectangles on this grid paper with an area of 12 square units.

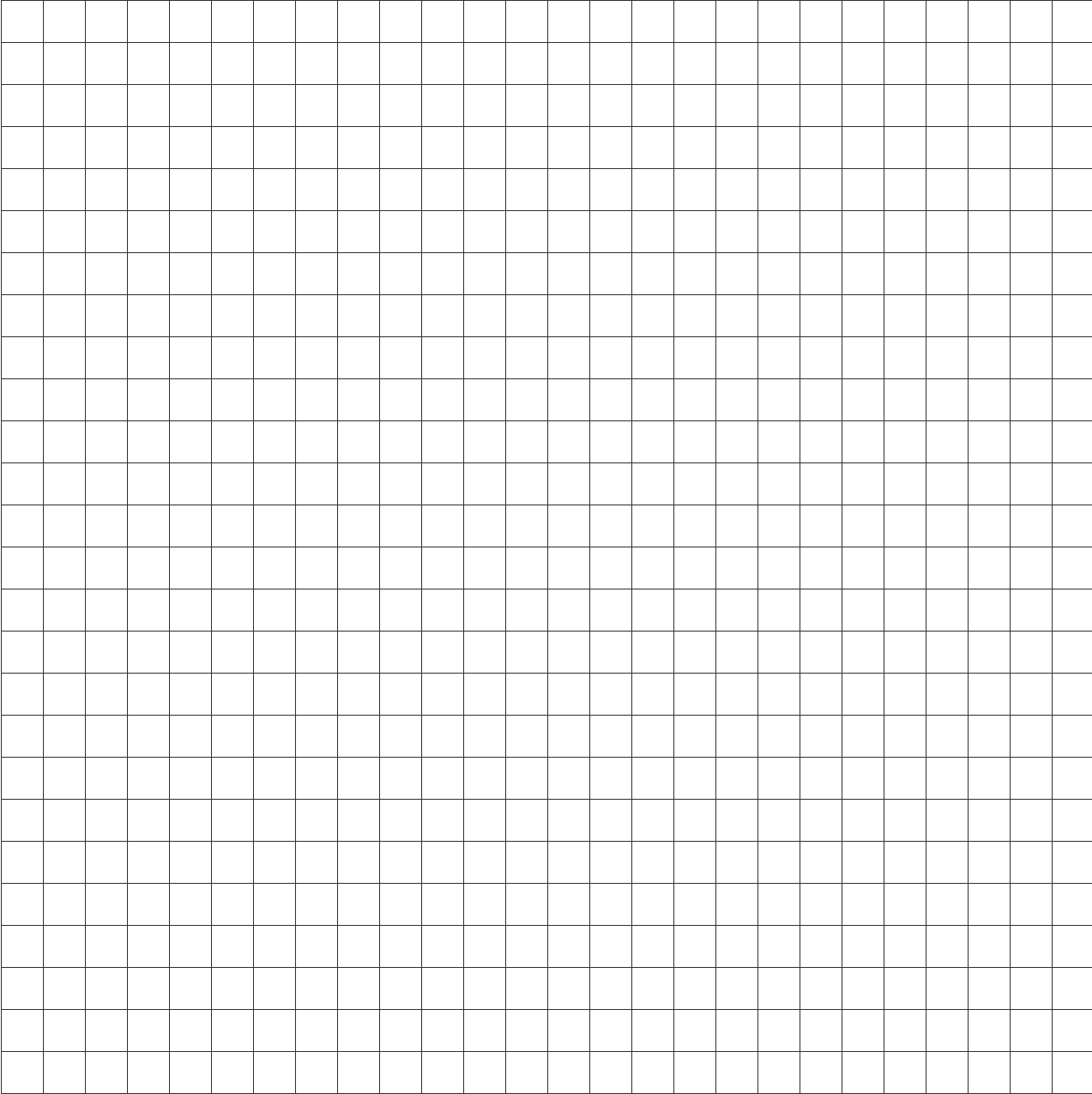


Record the dimensions of the rectangles you drew with the lengths in ascending order.

Length (linear units)	Width (linear units)	Perimeter (linear units)	Area (square units)

FIXED AREA RECTANGLES

Use square tiles to create all the rectangles that have an area of 24 square units and sketch them on this grid paper.



How many rectangles did you find? _____

How are the dimensions of the rectangles related to their areas?

FIXED AREA TABLES

Use the tables to record the information about the rectangles you found with an area of 24 square units. Let the horizontal distance be the length and let the vertical distance be the width.

Table 1	
Length	Width

Table 2	
Length	Perimeter

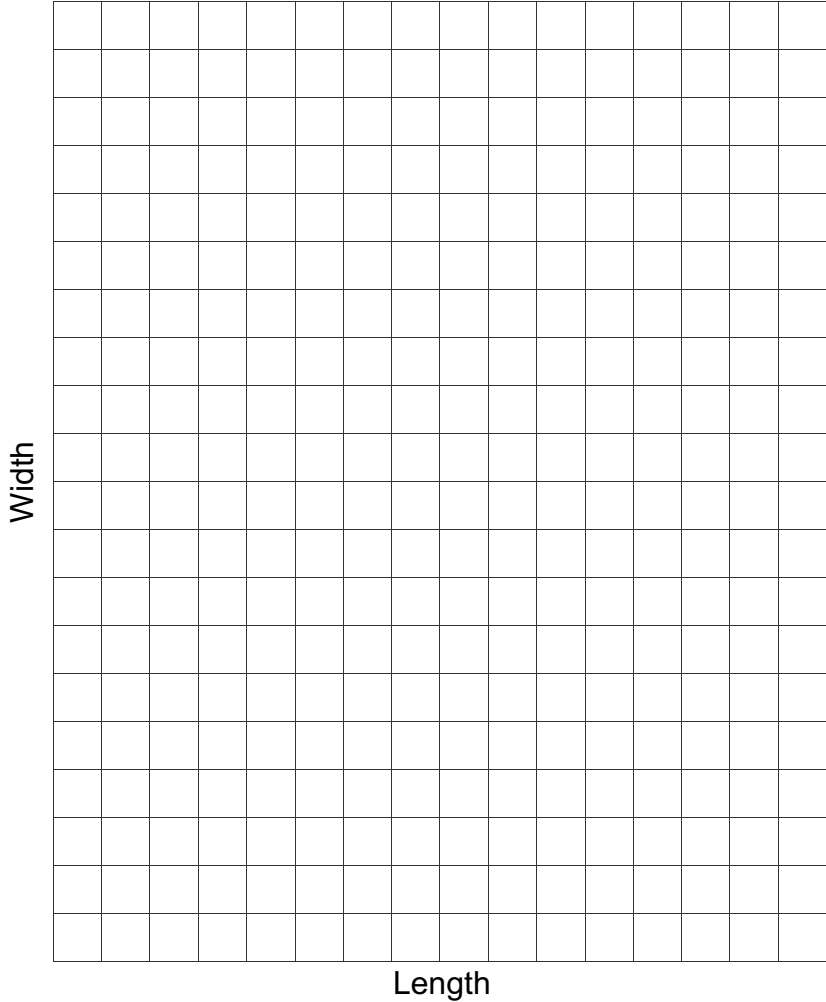
Table 3	
Length	Area

What conjectures can you make about the perimeters of rectangles with fixed areas?

FIXED AREA GRAPH 1: LENGTH vs. WIDTH

Use the information from Table 1 on SP4. Plot coordinates to show the relationship between length and width. Then, draw a trend line or curve by connecting the points on the graph.

Table 1	
Length	Width

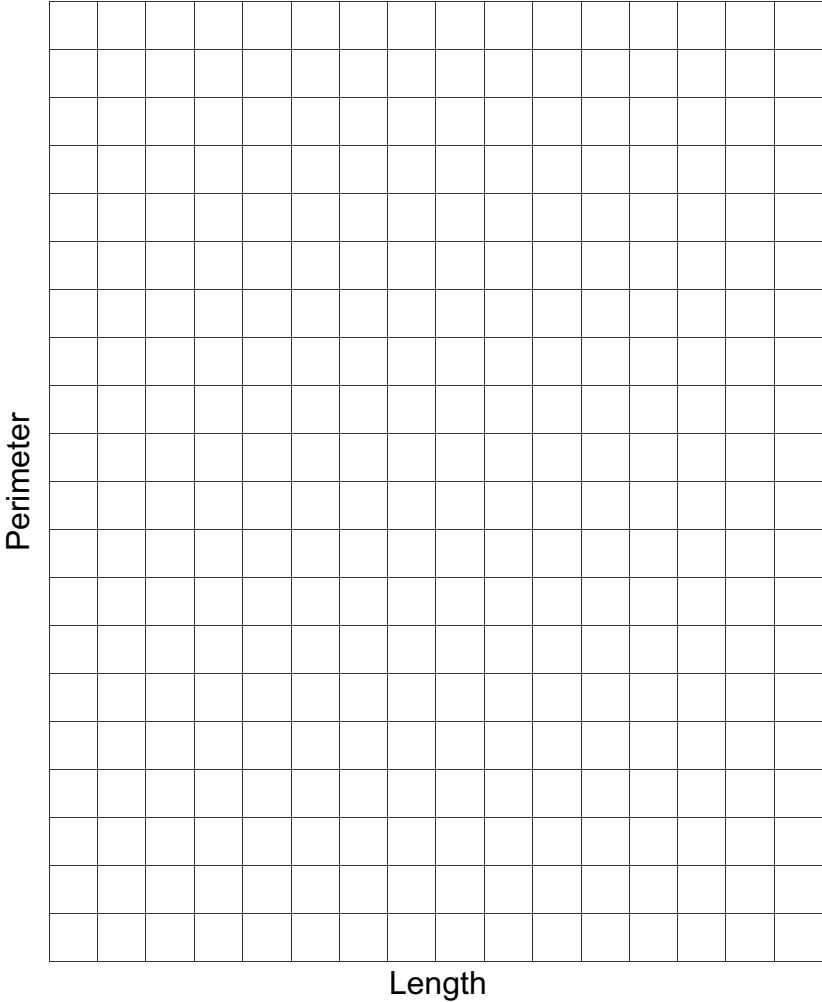


When the points are connected and the curve is extended, do you think the curve will ever cross the y -axis? What do you think this means?

FIXED AREA GRAPH 2: LENGTH vs. PERIMETER

Use the information from Table 2 on SP4. Plot coordinates to show the relationship between length and perimeter. Then, draw a trend line or curve by connecting the points on the graph.

Table 2	
Length	Perimeter

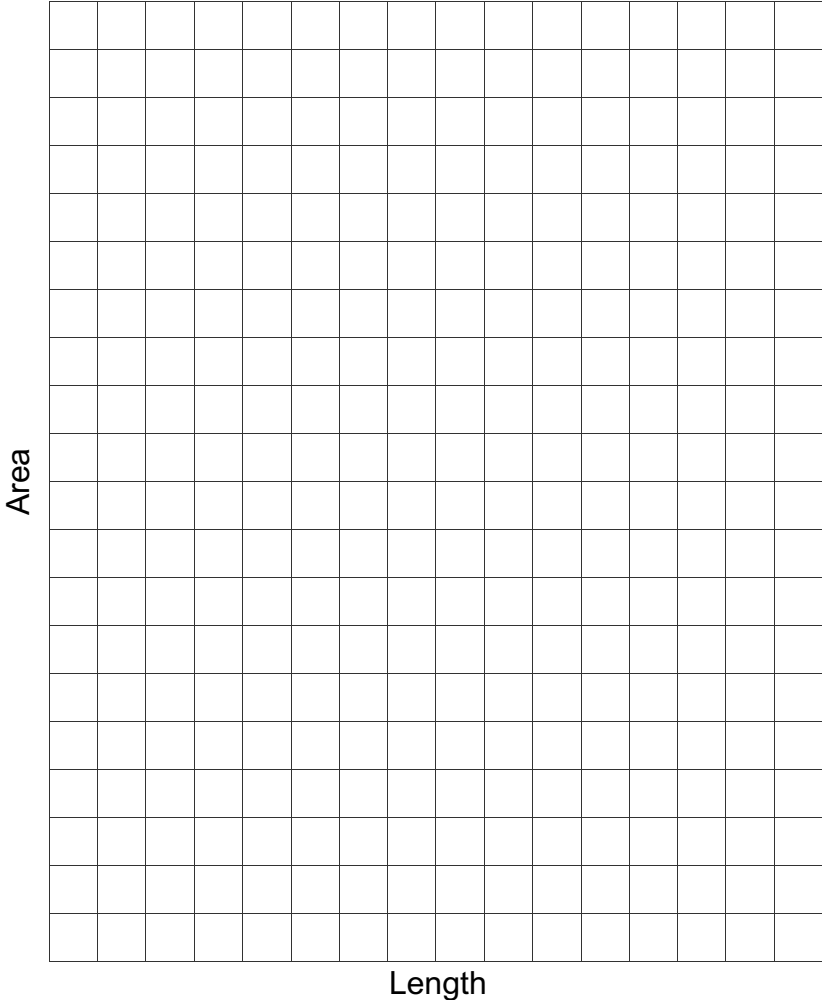


Locate the point on the graph that has the smallest y-value. (This is called a minimum point). What do you think this point means?

FIXED AREA GRAPH 3: LENGTH vs. AREA

Use the information from Table 3 on SP4. Plot coordinates to show the relationships between the length and area. Then, draw a trend line or curve by connecting the points on the graph.

Table 3	
Length	Area

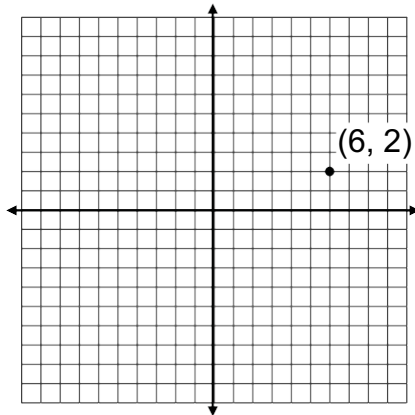


When the points are connected and the curve is extended, do you think the curve will ever cross the y-axis? What do you think this means?

GRAPHING RECTANGLES

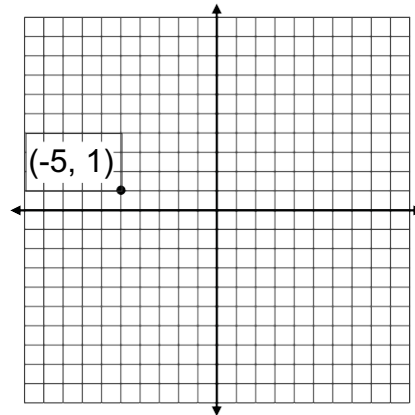
- Draw four different rectangles whose area is 18 square units. One of the vertices for each rectangle is given.
- Label the coordinates of the vertices.
- Find the perimeter for each rectangle.

1.



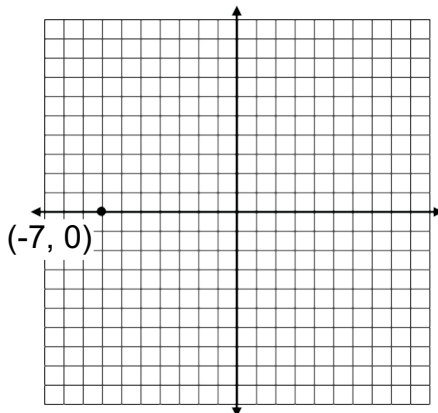
Perimeter = _____

2.



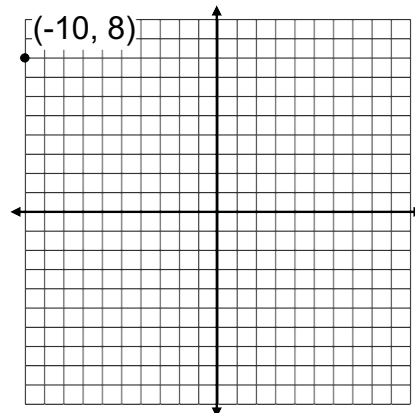
Perimeter = _____

3.



Perimeter = _____

4.



Perimeter = _____

5. Explain how to find the horizontal length in problem 1 using the coordinates of the vertices. _____

6. Explain how to find the vertical length in problem #2 using the coordinates of the vertices. _____

FRACTIONS: DIVISION 1

Ready (Summary)	Set (Goals)
<p>We will explore 2 ways to divide fractions, the “divide across” method and the “invert and multiply” method.</p>	<ul style="list-style-type: none"> • Explore the meaning of fraction division. • Understand why the fraction division algorithm works. • Understand and use fraction division procedures.

Go (Warmup)

Multiply using any method.

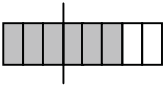
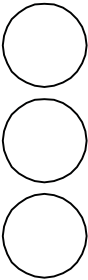
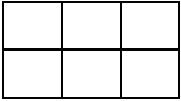
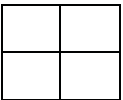
<p>1. $6 \times \frac{2}{3}$</p>	<p>2. $\frac{4}{5} \times \frac{15}{16}$</p>	<p>3. $1\frac{7}{8} \times 1\frac{1}{5}$</p>
---	---	---

How many groups of 2 can be made from 6 marbles?

<p>4. Draw a picture to justify your answer.</p>	<p>5. Write your answer in words.</p>	<p>6. Write a division problem that illustrates this relationship.</p>
--	---------------------------------------	--

FRACTION DIVISION: DIVIDE ACROSS

Complete the chart below.

Words	Draw a picture	Write a division problem	Solve with a “divide across” computation strategy
1. How many (groups of) $\frac{3}{8}$ s are in $\frac{6}{8}$?		$\frac{6}{8} \div \frac{3}{8} = \square$	Divide across: $\frac{6}{8} \div \frac{3}{8} = \frac{6 \div 3}{8 \div 8} = \frac{\square}{\square} = \square$
2. How many (groups of) $\frac{1}{2}$ s are in 3?		$3 \div \frac{1}{2} = \square$	(1) Find a common denominator $3 \div \frac{1}{2} = \frac{\square}{2} \div \frac{1}{2}$ (2) Divide across $= \frac{\square}{\square} \div \frac{\square}{\square} = \frac{\square}{\square} = \square$
3. How many $\frac{5}{6}$ s are in $\frac{1}{6}$?			
4. How many $\frac{1}{2}$ s are in $\frac{3}{4}$?			
5. These examples illustrate a rule for dividing fractions. When fractions have a common denominator: $\frac{a}{b} \div \frac{c}{b} = \frac{a \div c}{b \div b} = \frac{a \div c}{\square} = \square \text{ or } \frac{\square}{\square} \quad (b \neq 0, c \neq 0).$			
We will call this a “divide across” strategy.			

FRACTION DIVISION PRACTICE

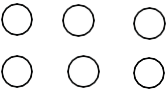
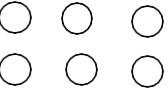
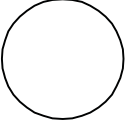
1. A 2-foot-long sandwich is cut into pieces that are $\frac{3}{4}$ feet long each. Find out how many pieces can be cut and what fraction of a piece is leftover.

a. Write a division problem.	b. Solve using a picture.
c. Solve using a “divide across strategy.”	d. How many pieces can be cut?
e. How long is the piece that is leftover?	f. What fraction of a piece is leftover?

2. A 4-foot-long board is cut into pieces that are $1\frac{1}{4}$ feet long each. Find out how many pieces can be cut and what fraction of a piece is leftover.

a. Write a division problem.	b. Solve using a picture.
c. Solve using a “divide across” strategy.	d. How many pieces can be cut?
e. How long is the piece that is leftover?	f. What fraction of a piece is leftover?

FRACTION DIVISION: MULTIPLY-BY-THE-RECIPROCAL

Words	Draw a picture	Complete the division equation	Complete the multiplication equation
1. If 6 apples are divided into groups of 3, how many groups will there be?		$6 \div \square = 2$	$6 \times \frac{\square}{\square} = 2$
Dividing by 3 gives the same result as multiplying by _____.			
Words	Draw a picture	Complete the division equation	Complete the multiplication equation
2. If 6 apples are divided into groups of $\frac{1}{2}$, how many groups will there be?		$6 \div \frac{\square}{\square} = 12$	$6 \times \square = 12$
Dividing by $\frac{1}{2}$ gives the same result as multiplying by _____.			
Words	Draw a picture	Complete the division equation	Complete the multiplication equation
3. If $\frac{3}{4}$ of an apple is divided into groups of $\frac{1}{4}$, how many groups will there be?		$\frac{3}{4} \div \frac{\square}{\square} = \square$	$\frac{3}{4} \times \square = 3$
Dividing by $\frac{1}{4}$ gives the same result as multiplying by _____.			
<p>4. These examples illustrate a rule for division: Dividing by a number gives the same result as multiplying by its _____.</p> <p>When applied to division of fractions, this rule says that</p> $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{\square}{\square} \quad (b \neq 0, c \neq 0, d \neq 0,).$			
We will call this the “multiply-by-the-reciprocal” strategy.			

SKILL BUILDER 1

Compute. Use a picture.

1. $6 \div \frac{2}{3}$	2. $3\frac{1}{2} \div \frac{5}{8}$
-------------------------	------------------------------------

Compute. Use a divide across strategy.

3. $\frac{5}{8} \div \frac{3}{8}$	4. $\frac{3}{16} \div \frac{1}{4}$	5. $\frac{5}{8} \div \frac{3}{4}$
-----------------------------------	------------------------------------	-----------------------------------

Compute. Use the invert and multiply strategy.

6. $1\frac{1}{8} \div \frac{3}{16}$	7. $2\frac{1}{3} \div 1\frac{1}{16}$	8. $4\frac{1}{5} \div 7$
-------------------------------------	--------------------------------------	--------------------------

KNOWLEDGE CHECK 13

Show your work on a separate sheet of paper and write your answers on this page.

13.1 Rectangles: Fixed Area

1. Sketch and label a rectangle with a length of 5 units and a width of 8 units.
2. Find the area and perimeter of the rectangle you have sketched.
3. Find a different rectangle with the same area but with a greater perimeter.

13.2 Fractions: Division 1

A rope is 4 yards long. It is cut into $\frac{1}{2}$ -yard pieces. How many pieces can be cut?

4. Solve the problem using a picture strategy.
5. Solve the problem using a “divide across” strategy.
6. Solve the problem using a “multiply-by-the-reciprocal” strategy.

13.3 Fractions: Division 2

Divide using a strategy of your choice.

7. $\frac{3}{4} \div \frac{1}{4}$

8. $\frac{1}{4} \div \frac{5}{8}$

9. $\frac{5}{8} \div \frac{1}{4}$

Highlighted Review: Decimals: Comparison, Addition and Subtraction

Compute.

10. $0.5 + 13 + 4.8$

11. $25.46 - 7.79$

12. Which is greater, 0.200 or 6.0? Explain.

HIGHLIGHTED REVIEW 13

Decimals: Comparison, Addition, and Subtraction

Compute.

1. $9.3 + 18 + 5.7$	2. $6.1 + 2 + .5$	3. $8.3 - 2.66$
4. $\begin{array}{r} 95.1 \\ - 7.04 \\ \hline \end{array}$	5. $\begin{array}{r} 0.807 \\ + 0.319 \\ \hline \end{array}$	6. $\begin{array}{r} 50.6 \\ - 1.844 \\ \hline \end{array}$

Use $>$, $<$, or $=$ to make each statement true.

7. $2.1 \underline{\hspace{1cm}} 2.13$	8. $61.5 \underline{\hspace{1cm}} 65.1$	9. $-0.47 \underline{\hspace{1cm}} .407$
--	---	--

Choose the best answer.

10. Marco wants to raise money for the "Save the Otters" club. His goal is to raise \$300. If Marco already has \$177.81, how much money does he need to collect in order to meet his goal?

- A. \$63.60 B. \$111.19 C. \$112.19 D. \$122.19

RECTANGULAR PRISMS: VOLUME AND SURFACE AREA

Ready (Summary)	Set (Goals)
We will compute the surface area and volume for rectangular solids.	<ul style="list-style-type: none">• Visualize and create two-dimensional nets for three-dimensional figures.• Find the surface area and volume of rectangular prisms.• Derive and use formulas for the surface area and volume of rectangular prisms.• Use appropriate units of measure for length, area, and volume.• Write expressions in different forms using properties of arithmetic.

Go (Warmup)

Your teacher will show you two containers filled with different objects. Estimate the number of objects in each container.

Container 1

Estimate the number of objects. _____

Explain your strategy for finding your estimate. _____

Container 2

Estimate the number of objects. _____

Explain your strategy for finding your estimate. _____

FIXED VOLUME

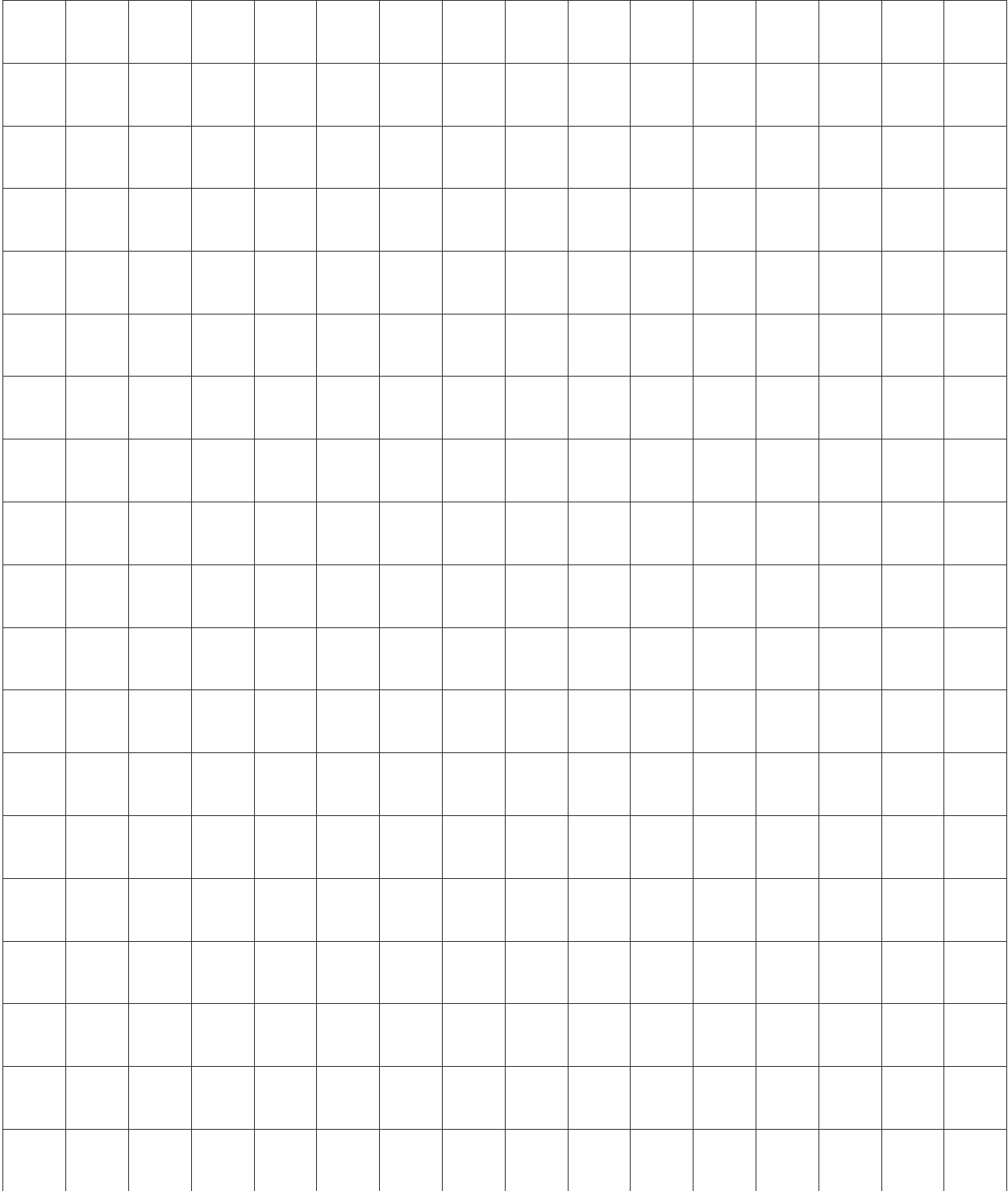
Use 12 cubes to make different rectangular prisms.
Use the grid paper on the next page to draw some nets for the prisms.
Record the dimensions for length, width, and height in the table below.
Find the volume and surface area for each rectangular prism.

Length	Width	Height	Volume	Surface Area

- 1. Explain how you found each surface area. _____

- 2. Which prism has the greatest surface area? _____
- 3. Which prism has the least surface area? _____

GRID PAPER



DECIMALS: MULTIPLICATION 1

Ready (Summary)	Set (Goals)
<p>We will use three methods to help us understand multiplication of decimals, repeated addition, an area model, and decimal-fraction equivalence.</p>	<ul style="list-style-type: none"> • Explore various models for decimal multiplication. • Understand the procedure for decimal multiplication. • Multiply decimal numbers.

Go (Warmup)

<p>1. Multiply $5 \times \frac{3}{8}$ using repeated addition.</p> <p>Then, check using the fraction multiplication rule.</p>	<p>2. Multiply $\frac{3}{4} \times \frac{1}{3}$ using an area model.</p> <p>Then, check using the fraction multiplication rule.</p>
--	--

Compute each sum.

<p>3. $0.4 + 0.4$</p>	<p>4. $0.6 + 0.6 + 0.6$</p>	<p>5. $1.4 + 1.4 + 1.4$</p>
----------------------------------	--	--

DECIMAL MULTIPLICATION: THREE MODELS

One way to interpret the product of a whole number and a decimal is by using repeated addition.

Use repeated addition to find each product.

<p>1. 2×0.3</p> <div style="display: flex; align-items: center; gap: 20px;"> <div style="text-align: right;"> $\begin{array}{r} 0.3 \\ + 0.3 \\ \hline 0.6 \end{array}$ </div> <div style="text-align: left;"> </div> </div>	<p>2. 3×0.4</p> <div style="display: flex; align-items: center; gap: 20px;"> <div style="text-align: right;"> $\begin{array}{r} 0.4 \\ 0.4 \\ +0.4 \\ \hline \end{array}$ </div> <div style="text-align: left;"> </div> </div>	<p>3. 2×1.7</p> <div style="text-align: left;"> </div>
<p>4. 5×3.035</p>	<p>5. 4×2.6</p>	<p>6. 4×0.64</p>

Another way to interpret multiplication of decimals is by using an area model.

Use an area diagram to illustrate each product.

<p>7. 0.2×0.4</p> <div style="text-align: center;"> </div>	<p>8. 0.2×0.3</p> <div style="text-align: center;"> </div>	<p>9. 0.4×0.6</p> <div style="text-align: center;"> </div>
--	--	--

DECIMAL MULTIPLICATION: THREE MODELS (continued)

Here is another way to interpret decimal multiplication by using fraction equivalents.

Multiply 0.03×0.2 :

The fraction equivalent for 0.03 is $\frac{3}{100}$.

The fraction equivalent for 0.2 is $\frac{2}{10}$.

So 0.03×0.2 can be written as $\frac{3}{100} \times \frac{2}{10}$.

Multiplying across the numerator and the denominator gives $\frac{3}{100} \times \frac{2}{10} = \frac{6}{1,000}$.

Since $\frac{6}{1,000} = 0.006$, $0.03 \times 0.2 = 0.006$.

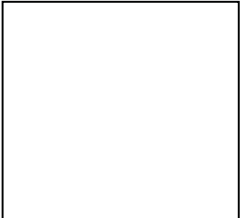
Look closely at the number of digits to the right of the decimal point in the previous problems.

10. For problem #3	2	\times	1.7	$=$ _____
number of digits to right of decimal point	0 digit(s)		1 digit	1 digit
11. For problem #7	0.2	\times	0.4	$=$ _____
number of digits to right of decimal point	__ digit(s)		__ digit(s)	__ digit(s)
12. For the example above	0.2	\times	$.03$	$=$ _____
number of digits to right of decimal point	__ digit(s)		__ digit(s)	__ digit(s)
13.	When Multiplying Decimals			
The number of digits to the right of the decimal point in the product				
is equal to the _____ of the number of digits to the right of each factor.				
14. Multiply using the rule stated above:				
2.6×0.03				

STRIPS AND GRIDS

SKILL BUILDER 1

Find each product as instructed.

<p>1. Use repeated addition.</p> 6×0.4	<p>2. Use the decimal multiplication rule.</p> 6×0.4
<p>3. Use an area model.</p> 0.6×0.4 	<p>4. Use the decimal multiplication rule.</p> 0.6×0.4
<p>5. Change decimals to fractions before multiplying. Then, change the product back to a decimal.</p> 0.06×0.4	<p>6. Use the decimal multiplication rule.</p> 0.06×0.4

14.3 Decimals: Multiplication 2

KNOWLEDGE CHECK 14

Show your work on a separate sheet of paper and write your answers on this page.

14.1 Rectangular Prisms: Volume and Surface Area

The length of a rectangular prism is 9 cm.
The height is one-third of the length.
The width is 4 less than the length.

1. Sketch and label the rectangular prism.
2. Find the surface area and volume of the rectangular prism.

14.2 Decimals: Multiplication 1

3. Use repeated addition to compute 3×0.46 .
4. Use an area model to compute $(0.5)(0.6)$.

14.3 Decimals: Multiplication 2

Compute.

5. 0.9×6.3

6. 0.11×0.04

Highlighted Review: Fractions: Addition and Subtraction

Compute.

7. $11 - \frac{11}{21}$

8. $2\frac{2}{3} + \frac{1}{5}$

HIGHLIGHTED REVIEW PRACTICE 14

Fraction Addition and Subtraction

Compute mentally.

1. $\frac{7}{13} + \frac{11}{13}$	2. $4 - \frac{2}{3}$	3. $2\frac{1}{6} + 1\frac{2}{5} + \frac{5}{6}$
-----------------------------------	----------------------	--

Compute. Show your work.

4. $5\frac{5}{8} + 3\frac{3}{4}$	5. $9\frac{5}{6} + 2\frac{3}{8}$	6. $6\frac{3}{10} - 2\frac{2}{5}$
----------------------------------	----------------------------------	-----------------------------------

7. In a 26 mile bicycle relay race, Fredrico biked $3\frac{1}{5}$ miles, Gregorio biked $6\frac{1}{10}$ miles. How far did Herman bike to finish the race?

Choose the best answer.

8. Compute $8\frac{1}{3} - 3\frac{1}{8}$.			
A. $5\frac{5}{24}$	B. $5\frac{1}{24}$	C. $5\frac{1}{5}$	D. $-5\frac{1}{5}$

CIRCLES: CIRCUMFERENCE

Ready (Summary)	Set (Goals)
We will explore the relationship between a circle's diameter and its circumference.	<ul style="list-style-type: none">• Explore the relationship between the diameter and the circumference of a circle using multiple representations.• Understand the concept of π.• Solve circumference application problems.

Go (Warmup)

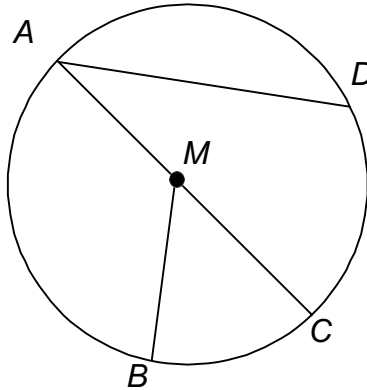
Start at point M below. Measure 1 inch north of (above) M and draw a point. Measure 1 inch south of (below) M and draw another point. Draw many more points, all of which are 1 inch away from M in every direction you can think of (east, west, northeast, southwest, etc). What is this collection of points starting to look like?

•
 M

In a plane, the closed curve consisting of all points that are the same distance from a fixed point is called a _____.

WHAT DO YOU KNOW ABOUT CIRCLES?

Use the figure to answer the questions below.



1. Points on a circle are all equidistant from its _____.

In the picture, this is represented by _____.

2. A line segment from the center of a circle to any point on the circle is called a _____.

In the picture, this is represented by _____.

3. A line segment with both endpoints on the circle is called a _____.

In the picture, this is represented by _____.

4. A chord that goes through the center of the circle is called a _____.

In the picture, this is represented by _____.

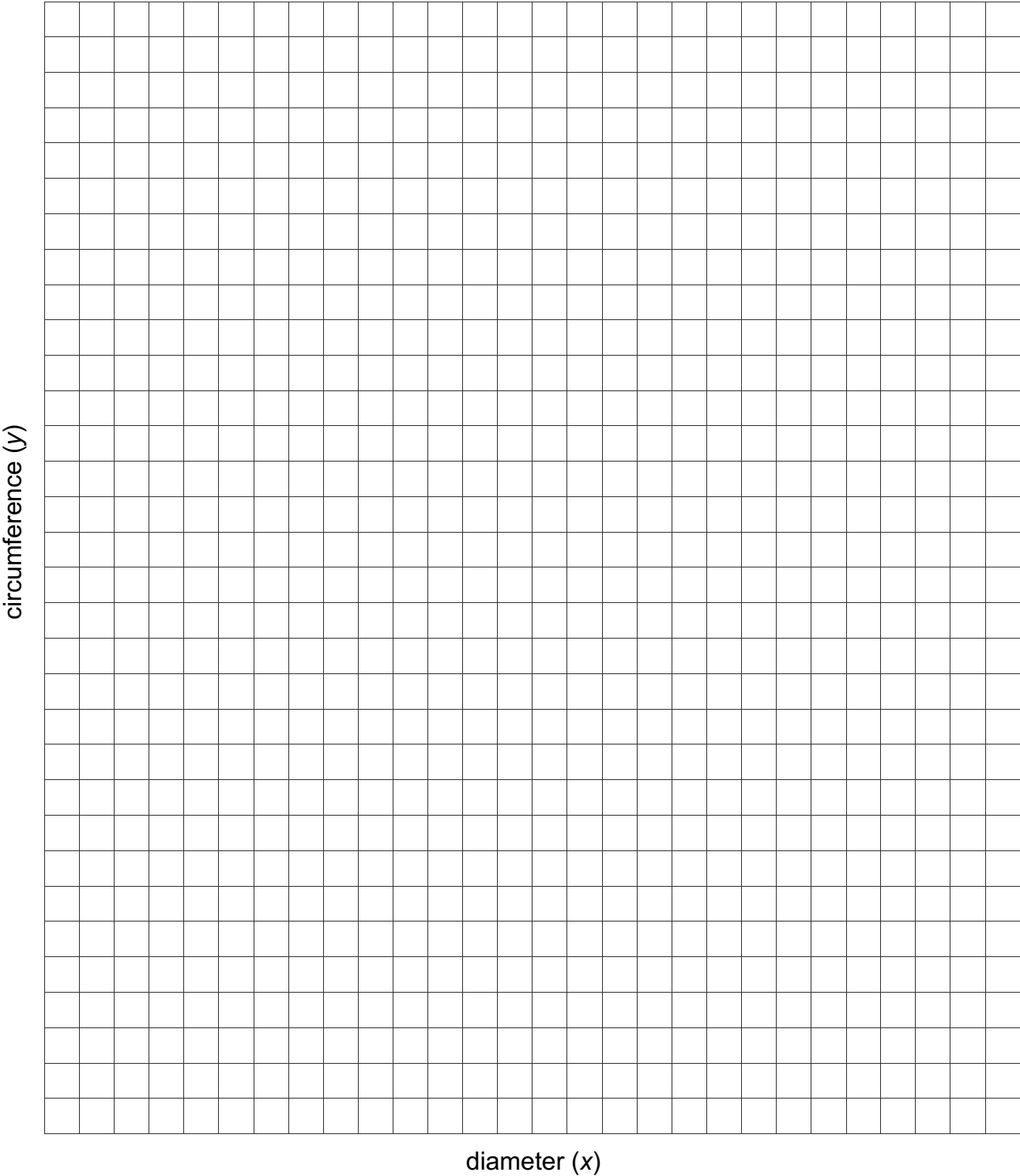
MEASURING CIRCLES: TABLE

Use the table to record the diameter and circumference of objects measured in class.

Object	Diameter (x)	Circumference (y)	$\frac{\text{Circumference } (y)}{\text{Diameter } (x)}$
A.			
B.			
C.			
D.			
E.			
F.			
G.			
H.			

MEASURING CIRCLES: GRAPH

Graph the circumference and diameter data you collected on the previous page.



DECIMALS: DIVISION 1

Ready (Summary)	Set (Goals)
We will learn how to divide decimals, and explore why the rule works.	<ul style="list-style-type: none"> • Explore decimal division. • Understand the procedure for decimal division. • Divide decimals.

Go (Warmup)

1. In the division statement $\frac{30}{6} = 5$, which is ...

the dividend? _____ the divisor? _____ the quotient? _____

Divide.

2. $10 \div 2$	3. $2 \div 10$	4. $10 \div \frac{1}{2}$
----------------	----------------	--------------------------

5. Circle the numbers that are equivalent to 7.2.

0.072 0.72 07.2 7.02 7.20 7.200

Use mental math to multiply.

6. 0.25×100	7. 0.3×10	8. 1.1×1000
----------------------	--------------------	----------------------

DECIMAL DIVISION

1. In the division statement $8 \overline{)4.0}^{\cdot 5}$, which is ...
 the dividend? _____ the divisor? _____ the quotient? _____

2. Circle the numbers that are equivalent to 14.3.
 014.3 104.3 140.3 14.30 14.300 14.3000

3. Choose one of the circled numbers above. How do you know it is equivalent to 14.3?

4. Choose one of the numbers not circled above. How do you know it is not equivalent to 14.3?

5. How many quarters are in \$2? Draw a picture to show the solution to this problem.

<p>6. How many groups of 0.25 are in 2?</p>	<p>7. $\begin{array}{r} 2 \square 100 \square \\ 0.25 \square 100 \square \\ \square \quad \square \end{array}$</p>	<p>8. $0.25 \overline{)2}$</p>
---	--	---

DECIMAL DIVISION (continued)

<p>8. How many dimes are in \$1.80? Draw a picture to show the solution to this problem.</p>	<p>9. How many groups of 0.10 are in 1.80?</p>	
<p>10. Compute $\frac{1.80}{0.10}$.</p>	<p>11. Compute $1.80 \div 0.10$.</p>	
<p>12. How many groups of 0.2 are in ...</p> <p>1? _____ 10? _____ 100? _____ 300? _____</p>		
<p>13. How many groups of 0.02 are in ...</p> <p>1? _____ 10? _____ 100? _____ 300? _____</p>		
<p>15. Compute.</p> $\frac{35.8}{0.02}$	<p>16. Divide.</p> $0.02 \overline{)35.8}$	<p>17. Write $\frac{3}{20}$ as a decimal.</p> $\frac{3}{20} = \frac{\boxed{}}{100} = \underline{\hspace{2cm}}$
<p>18. Dee Harmon thinks that division makes things smaller. Is this always true, sometimes true, or never true? Explain.</p>		

DECIMAL DIVISION PRACTICE 1

Write division equations for each problem.

Words	Numbers	
1. How many groups of 0.2 are in 1?	$1 \div 0.2 = \boxed{5}$	$\begin{array}{r} \boxed{5} \\ 0.2 \overline{)1} \end{array}$
2. How many groups of 2 are in 10?		
3. How many groups of 20 are in 100?		
4. How many groups of 0.02 are in 0.1?		
5. How are the statements above the same?		
6. How are the statements above different?		
7. Write three division equations that are equivalent to $2 \div 0.4 = 5$.		

Rewrite each expression so that (1) it is equivalent to the original expression and (2) the divisor is a whole number. Then, find each quotient.

8. $6 \div 0.2$	9. $0.8 \div 0.4$	10. $0.016 \div 0.08$
-----------------	-------------------	-----------------------

SKILL BUILDER 1

Write division equations for each problem.

Words	Numbers	
1. How many groups of 0.3 are in 1.8?	$1.8 \div 0.3 = \boxed{6}$	$\begin{array}{r} \boxed{6} \\ 0.3 \overline{)1.8} \end{array}$
2. How many groups of 3 are in 18?		
3. How many groups of 30 are in 180?		
4. How many groups of 0.03 are in 0.18?		
5. How are the statements above the same?		
6. How are the statements above different?		
7. Write three division equations that are equivalent to $0.5 \div 0.25 = 2$.		

Rewrite each expression so that (1) it is equivalent to the original expression and (2) the divisor is a whole number. Then, find each quotient.

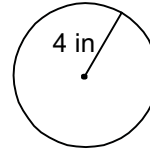
8. $20 \div 0.4$	9. $0.09 \div 0.003$	10. $0.042 \div 0.6$
------------------	----------------------	----------------------

KNOWLEDGE CHECK 15

Show your work on a separate sheet of paper and write your answers on this page.

15.1 Circles: Circumference

1. Find the circumference of the circle to the nearest tenth.



2. Find the diameter of a dinner plate whose circumference is about 19 inches.

15.2 Decimals: Division 1

Write division equations for each problem.

Words	Numbers	
3. How many groups of 0.6 are in 1.8?	$1.8 \div 0.6 = \square$	$\begin{array}{r} \square \\ 0.6 \overline{)1.8} \end{array}$
4. How many groups of 6 are in 18?		
5. How many groups of 60 are in 180?		

15.3 Decimals: Division 2

Compute.

6. $0.18 \div 0.02$

7. $2.4 \div 0.6$

Highlighted Review: Evaluating Algebraic Expressions

Evaluate each expression for $x = -6$ and $y = -3$.

8. $\frac{1}{4}y + 7x$

9. $18 - 2xy$

HIGHLIGHTED REVIEW PRACTICE 15

Evaluating Algebraic Expressions

Evaluate each expression for $a = 1$, $b = 3$, and $c = 7$.

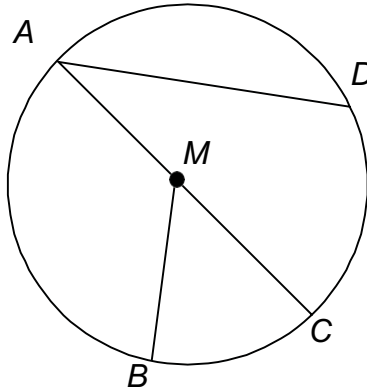
1. $8c - 5$	2. $4(a + 6)$
3. $(5 - b)(c + 4)$	4. $\frac{c}{a + b}$
5. $bc - 2a$	6. $\frac{1}{3}b + ac$

Choose the best answer.

7. Evaluate $\frac{3x + y}{3(x + y)}$ for $x = 5$ and $y = -3$.
A. 1 B. 2 C. 3 D. 6

WHAT DO YOU KNOW ABOUT CIRCLES?

Use the figure to answer the questions below.



1. Points on a circle are all equidistant from its _____.

In the picture, this is represented by _____.

2. A line segment from the center of a circle to any point on the circle is called a _____.

In the picture, this is represented by _____.

3. A line segment with both endpoints on the circle is called a _____.

In the picture, this is represented by _____.

4. A chord that goes through the center of the circle is called a _____.

In the picture, this is represented by _____.

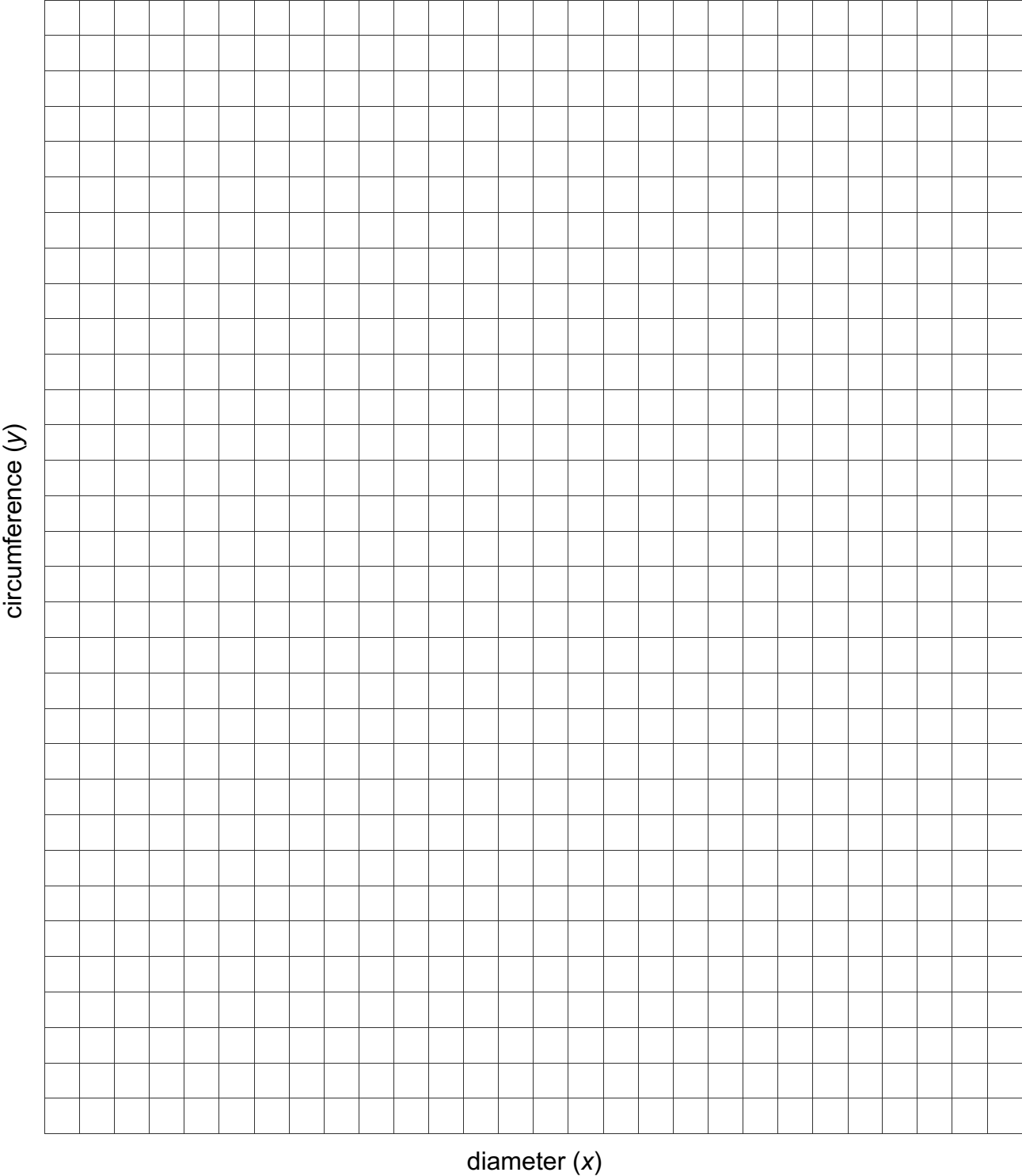
MEASURING CIRCLES: TABLE

Use the table to record the diameter and circumference of objects measured in class.

Object	Diameter (x)	Circumference (y)	$\frac{\text{Circumference } (y)}{\text{Diameter } (x)}$
A.			
B.			
C.			
D.			
E.			
F.			
G.			
H.			

MEASURING CIRCLES: GRAPH

Graph the circumference and diameter data you collected on the previous page.



DECIMALS: DIVISION 1

Ready (Summary)	Set (Goals)
We will learn how to divide decimals, and explore why the rule works.	<ul style="list-style-type: none"> • Explore decimal division. • Understand the procedure for decimal division. • Divide decimals.

Go (Warmup)

1. In the division statement $\frac{30}{6} = 5$, which is ...
 the dividend? _____ the divisor? _____ the quotient? _____

Divide.

2. $10 \div 2$	3. $2 \div 10$	4. $10 \div \frac{1}{2}$
----------------	----------------	--------------------------

5. Circle the numbers that are equivalent to 7.2.

0.072 0.72 07.2 7.02 7.20 7.200

Use mental math to multiply.

6. 0.25×100	7. 0.3×10	8. 1.1×1000
----------------------	--------------------	----------------------

DECIMAL DIVISION

1. In the division statement $8 \overline{)4.0}^{\cdot 5}$, which is ...
 the dividend? _____ the divisor? _____ the quotient? _____

2. Circle the numbers that are equivalent to 14.3.
 014.3 104.3 140.3 14.30 14.300 14.3000

3. Choose one of the circled numbers above. How do you know it is equivalent to 14.3?

4. Choose one of the numbers not circled above. How do you know it is not equivalent to 14.3?

5. How many quarters are in \$2? Draw a picture to show the solution to this problem.

<p>6. How many groups of 0.25 are in 2?</p>	<p>7. $\begin{array}{r} 2 \{ 100 \square \\ 0.25 \overline{)100} \\ \square \quad \square \end{array}$</p>	<p>8. $0.25 \overline{)2}$</p>
---	---	---

DECIMAL DIVISION (continued)

<p>8. How many dimes are in \$1.80? Draw a picture to show the solution to this problem.</p>	<p>9. How many groups of 0.10 are in 1.80?</p>	
<p>10. Compute $\left\{ \begin{array}{l} 1.80 \square \{ 100 \square \\ 0.10 \square \square \{ 100 \square \} \cdot \end{array} \right.$</p>	<p>11. Compute $1.80 \div 0.10$.</p>	
<p>12. How many groups of 0.2 are in ...</p> <p style="text-align: center;">1? _____ 10? _____ 100? _____ 300? _____</p>		
<p>13. How many groups of 0.02 are in ...</p> <p style="text-align: center;">1? _____ 10? _____ 100? _____ 300? _____</p>		
<p>15. Compute.</p> <p style="text-align: center;">$\left\{ \begin{array}{l} 35.8 \{ 100 \square \\ 0.02 \{ 100 \square \} \end{array} \right.$</p>	<p>16. Divide.</p> <p style="text-align: center;">$0.02 \overline{)35.8}$</p>	<p>17. Write $\frac{3}{20}$ as a decimal.</p> <p style="text-align: center;">$\left\{ \begin{array}{l} 3 \{ 5 \square \\ 20 \{ 5 \square \} \end{array} \right. = \frac{\square}{100} = \underline{\hspace{2cm}}$</p>
<p>18. Dee Harmon thinks that division makes things smaller. Is this always true, sometimes true, or never true? Explain.</p>		

DECIMAL DIVISION PRACTICE 1

Write division equations for each problem.

Words	Numbers	
1. How many groups of 0.2 are in 1?	$1 \div 0.2 = \boxed{5}$	$\begin{array}{r} \boxed{5} \\ 0.2 \overline{)1} \end{array}$
2. How many groups of 2 are in 10?		
3. How many groups of 20 are in 100?		
4. How many groups of 0.02 are in 0.1?		
5. How are the statements above the same?		
6. How are the statements above different?		
7. Write three division equations that are equivalent to $2 \div 0.4 = 5$.		

Rewrite each expression so that (1) it is equivalent to the original expression and (2) the divisor is a whole number. Then, find each quotient.

8. $6 \div 0.2$	9. $0.8 \div 0.4$	10. $0.016 \div 0.08$
-----------------	-------------------	-----------------------

SKILL BUILDER 1

Write division equations for each problem.

Words	Numbers	
1. How many groups of 0.3 are in 1.8?	$1.8 \div 0.3 = \boxed{6}$	$\begin{array}{r} \boxed{6} \\ 0.3 \overline{)1.8} \end{array}$
2. How many groups of 3 are in 18?		
3. How many groups of 30 are in 180?		
4. How many groups of 0.03 are in 0.18?		
5. How are the statements above the same?		
6. How are the statements above different?		
7. Write three division equations that are equivalent to $0.5 \div 0.25 = 2$.		

Rewrite each expression so that (1) it is equivalent to the original expression and (2) the divisor is a whole number. Then, find each quotient.

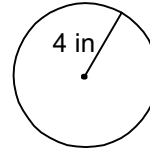
8. $20 \div 0.4$	9. $0.09 \div 0.003$	10. $0.042 \div 0.6$
------------------	----------------------	----------------------

KNOWLEDGE CHECK 15

Show your work on a separate sheet of paper and write your answers on this page.

15.1 Circles: Circumference

1. Find the circumference of the circle to the nearest tenth.



2. Find the diameter of a dinner plate whose circumference is about 19 inches.

15.2 Decimals: Division 1

Write division equations for each problem.

Words	Numbers	
3. How many groups of 0.6 are in 1.8?	$1.8 \div 0.6 = \square$	$\begin{array}{r} \square \\ 0.6 \overline{)1.8} \end{array}$
4. How many groups of 6 are in 18?		
5. How many groups of 60 are in 180?		

15.3 Decimals: Division 2

Compute.

6. $0.18 \div 0.02$

7. $2.4 \div 0.6$

Highlighted Review: Evaluating Algebraic Expressions

Evaluate each expression for $x = -6$ and $y = -3$.

8. $\frac{1}{4}y + 7x$

9. $18 - 2xy$

HIGHLIGHTED REVIEW PRACTICE 15

Evaluating Algebraic Expressions

Evaluate each expression for $a = 1$, $b = 3$, and $c = 7$.

1. $8c - 5$	2. $4(a + 6)$
3. $(5 - b)(c + 4)$	4. $\frac{c}{a + b}$
5. $bc - 2a$	6. $\frac{1}{3}b + ac$

Choose the best answer.

7. Evaluate $\frac{3x + y}{3(x + y)}$ for $x = 5$ and $y = -3$.
A. 1 B. 2 C. 3 D. 6

CIRCLE: AREA

Ready (Summary)	Set (Goals)
<p>We will use formulas for the area of a rectangle and the circumference of a circle to help us find a formula for the area of a circle.</p>	<ul style="list-style-type: none">• Establish the area formula for a circle.• Apply the area formula for a circle to realistic problems.• Demonstrate understanding of the area of a circle with symbols, tables, graphs, and words.

Go (Warmup)

The diameter of a dinner plate is 12 cm. Find its radius and circumference.

Picture:	Numbers/Symbols:
Words:	

THE AREA OF A CIRCLE

1. What is the formula for the circumference of a circle in terms of its radius r ?

2. Your teacher will give you a piece of paper with a circle on it. Cut out the circle and fold it in half. Fold it in half a second time. Fold it in half a third time.
3. Unfold your circle and cut along the folds to make 8 wedges. (You may want to try more than 8 wedges, like 16, but don't do less.)
4. Arrange the wedges in a row. Alternate the tips up and down to form a shape that resembles a rectangle or parallelogram. Tape, glue stick, or sketch the shape here.

Use your knowledge of the area of a rectangle and circumference of a circle to find the area of this shape. (Remember, it began as a circle and is becoming closer to resembling a rectangle. The more wedges you make, the closer it gets to becoming a rectangle.)

5. The width of the "rectangle" is the _____ of the circle.
6. The length of the "rectangle" is _____ of the circle.
7. Write an equation for the approximate area of the "rectangle."

8. Substitute the expression for the circumference of the circle from #1 above into your formula and simplify.

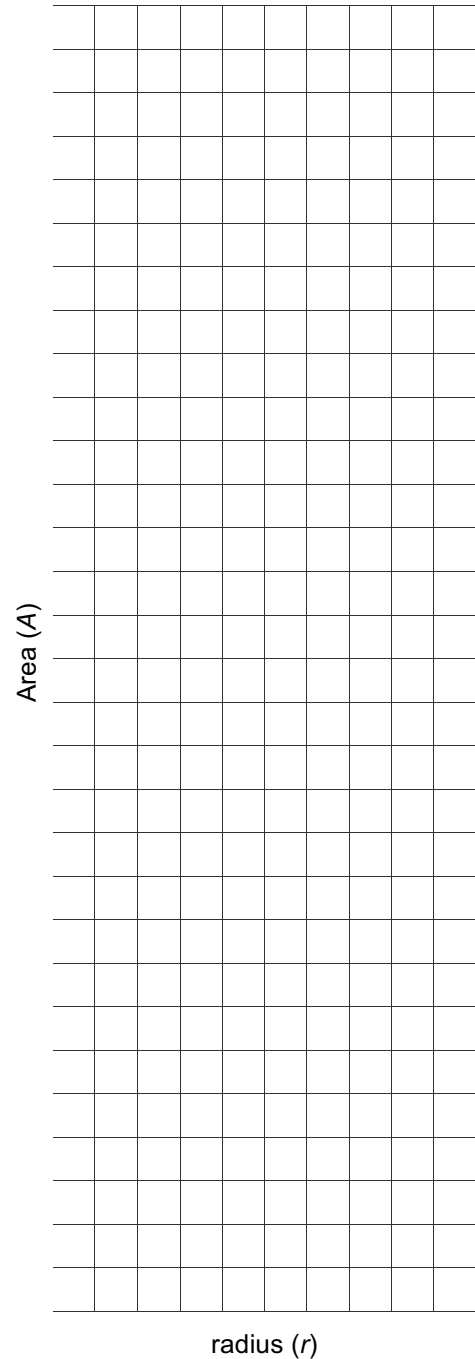
9. What is the formula for the area of a circle, in terms of the radius?

AREA OF A CIRCLE: THE FOURFOLD WAY

1. **Symbols:** What is a formula for finding the area of a circle?

2. **Table:** Use the formula to calculate the area of a circle with the given radius.

Length of radius (r)	(show work)	Area of circle (A)
0		
1		
2		
3		
4		
5		
6		



3. **Graph:** Make a graph that compares area (A) and radius (r).
4. **Words:** Explain how you would find the area of a circle if you knew the **diameter**.

CYLINDERS: VOLUME AND SURFACE AREA

Ready (Summary)	Set (Goals)
We will make sense of the formulas for the surface area and volume of cylinders and apply them to solve problems.	<ul style="list-style-type: none">• Derive the formulas for surface area and volume of cylinders.• Compute the surface area and volume of cylinders.

Go (Warmup)

1. The formula for finding the circumference of a circle is: _____

2. The formula for finding the area of a circle is: _____

A circle has circumference $C = 37.68$ inches.

3. Find the radius of the circle.	4. Find the area of the circle.
-----------------------------------	---------------------------------

A rectangular prism measures $2 \text{ ft.} \times 5 \text{ ft.} \times 6 \text{ ft.}$

5. Find the surface area of the prism.	6. Find the volume of the prism.
--	----------------------------------

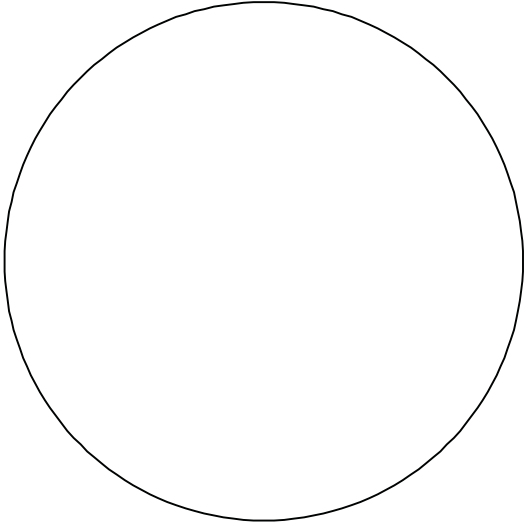
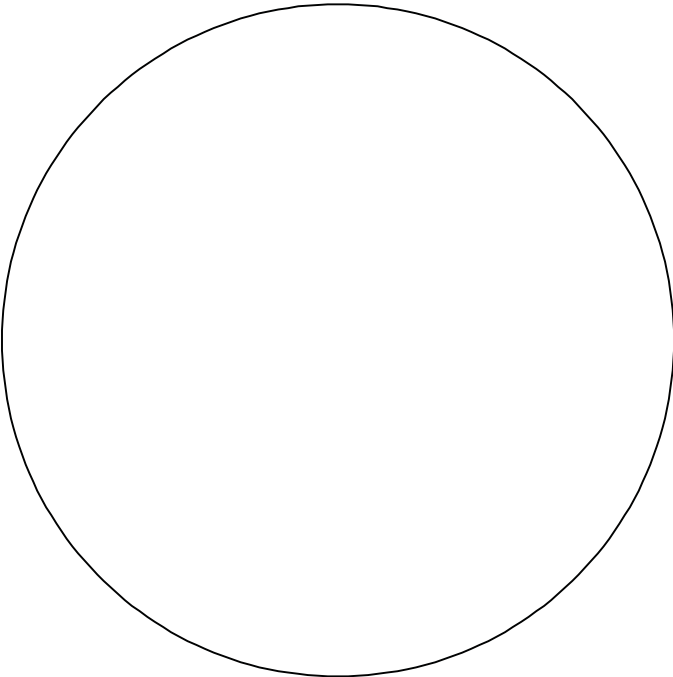
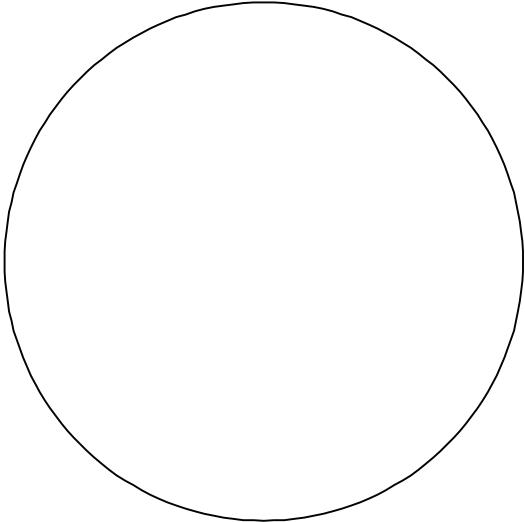
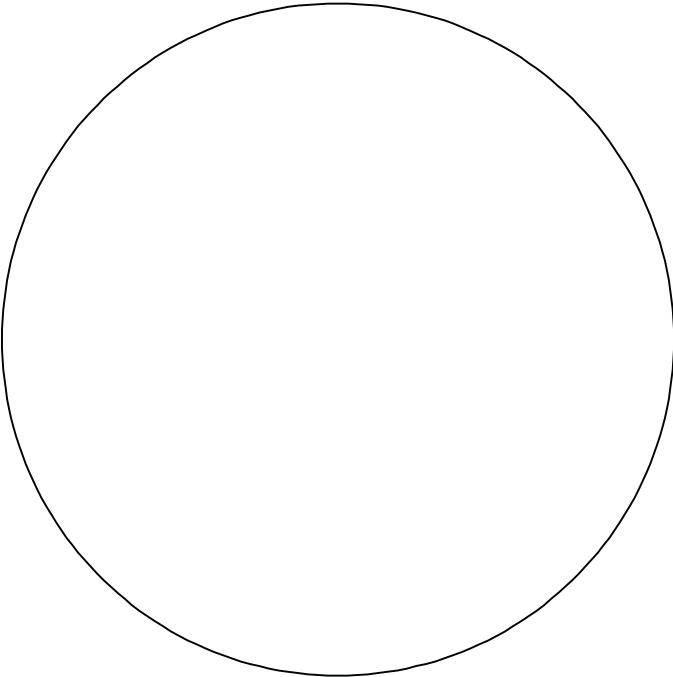
A PAPER CYLINDER

Roll a letter-size piece of paper parallel to the $8\frac{1}{2}$ -inch sides to make a cylinder. Tape the two $8\frac{1}{2}$ -inch edges together. Imagine your cylinder has two circular bases, or cut out two circular bases and tape them to the top and bottom of the cylinder.

<p>1. Sketch a net of the cylinder and label its dimensions.</p>	<p>2. Sketch the cylinder and label its dimensions.</p>
<p>3. Find the surface area rounded to the nearest hundredth.</p> <p>Formula: $SA =$ _____</p> <p>Substitute:</p> <p>Answer: _____ sq. in.</p>	<p>4. Find the volume rounded to the nearest hundredth.</p> <p>Formula: $V =$ _____</p> <p>Substitute:</p> <p>Answer: _____ cu. in.</p>

CIRCULAR BASES FOR PAPER CYLINDERS

Cut out the circles below and use them as bases for your cylinders.



SKILL BUILDER 1

Show your work on a separate sheet of paper and choose the best answer.

1. Which properties of arithmetic are illustrated in the equation $(15 + 32) + 78 = 15 + (32 + 78)$?

- A. commutative property of addition B. associative property of addition
C. distributive property D. all of the above
-

2. What does the 8 represent in 45,389,011?

- E. 8,000 F. 80,000 G. 800,000 H. 10,000
-

3. Which properties of arithmetic are illustrated in the equation $18 \times 24 = 24 \times 18$?

- A. commutative property of multiplication B. associative property of multiplication
C. distributive property D. all of the above
-

4. Compute $582 - 387$.

- E. 205 F. 105 G. 195 H. 295
-

5. Compute 142×24 .

- A. 3,408 B. 3,308 C. 852 D. 752
-

6. $45 \div (3 \times 5)$

- E. 75 F. 135 G. 3 H. $\frac{1}{3}$
-

7. What are the prime factors of 24?

- A. $2 \cdot 2 \cdot 2 \cdot 3$ B. $2 \cdot 2 \cdot 3$ C. $4 \cdot 2 \cdot 3$ D. $8 \cdot 3$
-

8. Evaluate the expression $3x + 7$ for $x = 6$.

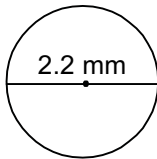
- E. 25 F. 60 G. 39 H. 24
-

KNOWLEDGE CHECK 16

Show your work on a separate sheet of paper and write your answers on this page.

16.1 Circles: Area

1. Find the area of a circular tabletop with a radius of 2.5 feet.
2. Find the area of the circle rounded to the nearest tenth of a square unit.



16.2 Cylinders: Volume and Surface Area

A cylinder has a base with a diameter of 5 ft. and a height of 16 ft.

3. Sketch a net for the cylinder and label the dimensions.
4. Find the surface area of the cylinder.

Highlighted Review: Solving Equations

Solve for x .

5. $13 - 6x = 25$	6. $4(x - 1) = 16$	7. $8 = 2(x + 6)$
-------------------	--------------------	-------------------

HIGHLIGHTED REVIEW PRACTICE 16

Solving Equations

Solve for x .

1. $3x + 4 = 7$	2. $3(x - 2) = 5(x + 2)$
3. $2x - 16 = 6(x - 2)$	4. $-x - 8 = 2x + 7$
5. $4(x + 2) = -2(x - 1)$	6. $7x - 4 = 3(3 + x) - 1$

Choose the best answer.

7. Solve $5(x - 3) = 2x + 6$ for x .

A. $x = 3$

B. $x = -3$

C. $x = 7$

D. $x = -7$

STATISTICS: ANALYZING NAME SCORES

Ready (Summary)	Set (Goals)
We will find our “name scores” using Scrabble → tile values. Then we will create a human number line to help us organize the data. We will calculate the five-number summary and observe measures of center and spread for the name score data.	<ul style="list-style-type: none"> • Collect and organize numerical data. • Find the range, mean, median, and mode of a data set. • Understand how potential outliers affect measures of center. • Find the five-number summary.

Go (Warmup)

Complete each problem. Fill in the correct vocabulary words in the blank spaces.

range	mean	median	mode
-------	------	--------	------

Here is a list of 15 student quiz scores from Ms. Garcia’s math grade class:

5	10	8	7	7	6	5	5	8	5	8	10	8	8	8
---	----	---	---	---	---	---	---	---	---	---	----	---	---	---

1. Rewrite the list of quiz scores in order from least to greatest.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

2. Circle the number in the middle of the list. For problem #1, what number did you circle? _____ This is called the _____.

3. Find the sum of all of the quiz scores, and then divide that sum by 15.

What is your answer? _____ This is called the _____.

4. What score(s) occurs most frequently? _____ This is called the _____.

5. Subtract the lowest score from the highest score. What is your answer? _____

This is called the _____.

NAME SCORES

Complete the questions below.

A = 1	F = 4	K = 5	P = 3	U = 1	Z = 10
B = 3	G = 2	L = 1	Q = 10	V = 4	
C = 3	H = 4	M = 3	R = 1	W = 4	
D = 2	I = 1	N = 1	S = 1	X = 8	
E = 1	J = 8	O = 1	T = 1	Y = 4	

- Use the scores above to determine the value of your first name.

What is your name score? _____

- List, in numerical order, the name scores for the first name of everyone in your class.

- List the five-number summary. (_____ , _____ , _____ , _____ , _____)

min Q_1 Q_2 Q_3 max

4. Find the median. _____

5. Find the mode. _____

6. Calculate the mean. _____

STATISTICS: DATA DISPLAYS

Ready (Summary)	Set (Goals)
<p>We will find our name scores using Scrabble[®] tile values. We will analyze the data using a five-number summary. We will display the data using a box-and-whisker plot and a stem-and-leaf plot.</p>	<ul style="list-style-type: none"> • Use the five-number summary to construct box-and-whisker plots. • Construct stem-and-leaf plots. • Find the mean, median, and mode of a data set.

Go (Warmup)

Complete the questions below.

The data set below shows the number of video games owned by each person in a group of friends.

12 16 8 25 7 15

1. Find the mean and median of this data set.

mean = _____

median = _____

2. Add the number of video games owned by two more friends to the list so that the mean changes, but the median remains the same.

12 16 8 25 7 15 _____ _____

3. What is the new mean? _____

NAME SCORES DISPLAYS

A = 1	F = 4	K = 5	P = 3	U = 1	Z = 10
B = 3	G = 2	L = 1	Q = 10	V = 4	
C = 3	H = 4	M = 3	R = 1	W = 4	
D = 2	I = 1	N = 1	S = 1	X = 8	
E = 1	J = 8	O = 1	T = 1	Y = 4	

1. Use the scores above to determine the value of your first name.

What is your name score? _____

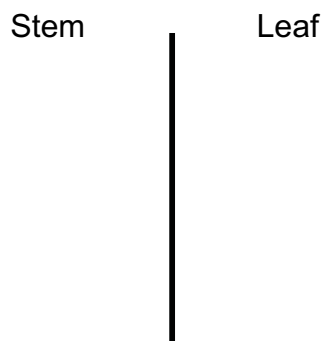
2. List, in numerical order, the name scores for the first name of everyone in your class.

3. List the five-number summary. (_____ , _____ , _____ , _____ , _____)
min Q₁ Q₂ Q₃ max

4. Construct a box-and-whisker plot for the class name score data.

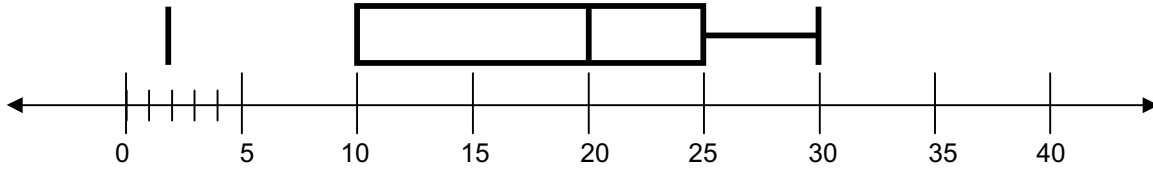


5. Construct a stem-and-leaf plot for the class name score data.



INTERPRETING DISPLAYS

BOX-AND-WHISKER PLOTS:



1. What is the range of the data on the box and whisker plot? _____
 2. Find the median for the data. _____
 3. What is a number that might be in the third quartile? _____
 4. Is the median in the center of the box and whisker plot? _____ What does this tell you about the distribution of the data? _____
-

STEM-AND-LEAF PLOTS:

Stem	Leaf
0	3 3 7 8
1	0 1 4 4 4 7 9
2	1 3 5 6 8
3	2 3 6 6 7 9
4	2 4 5
5	7
6	
7	
8	
9	0

5. What is the range of the stem and leaf data? _____
6. Find the median of the data. _____
7. Find the mode(s) of the data. _____
8. Does the data appear to have any outliers? _____
If so, name them. _____

KNOWLEDGE CHECK 00

Show your work on a separate sheet of paper and write your answers on this page.

00.1 Statistics: Analyzing Name Scores

The data set below represents the number of hours that ten students spent reading in one week.

4 1 1 1 3 5 2 2 1 2

1. List, in numerical order, the number of hours that the students spent reading in one week.

2. Determine the mean, median, mode, and range for the data set.

Mean = _____ Median = _____ Mode = _____ Range = _____

00.2 Statistics: Data Displays

The data set below shows the number of words spelled correctly on the last spelling test by each person in a group of students.

7 8 8 7 10 6 5 9 9 9 9

3. List the five-number summary. (_____ , _____ , _____ , _____ , _____)

min Q₁ Q₂ Q₃ max

4. Construct a box-and-whisker plot for the data set.

PROPORTIONAL REASONING

Ready (Summary)	Set (Goals)
We will use sense-making strategies to solve proportional reasoning problems.	<ul style="list-style-type: none">• Use sense-making strategies to solve proportional reasoning problems.• Solve problems that involve whole numbers and decimals.• Use measurement expressed as a product to solve problems.

Go (Warmup)

Solve each pencil problem in two ways. Show your work.

<p>1. If 1 pencil costs \$0.17, then what is the cost of 4 pencils?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer: 4 pencils cost \$_____.</p>	<p>2. If 5 pencils cost \$1.15, then what is the cost of 1 pencil?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer: 1 pencil costs \$_____.</p>
--	---

PENCIL PROBLEMS

Solve each pencil problem in two ways. Show your work.

<p>1. If 3 pencils cost \$0.57, then what is the cost of 6 pencils?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>	<p>2. If 4 pencils cost \$1.08, then what is the cost of 10 pencils?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>
<p>3. How much will 4 pencils cost if 6 pencils cost \$1.68?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>	<p>4. How much will 2 pencils cost if 7 pencils cost \$1.82?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>

PENCIL PROBLEMS (continued)

Solve each pencil problem in two ways. Show your work.

<p>5. If it costs \$1.89 for 9 pencils, then how many pencils can be purchased for \$2.52?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>	<p>6. How many pencils can be purchased for \$0.48 if the cost of 6 pencils is \$1.44?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>
<p>7. How much will 5 pencils cost if 8 pencils cost \$4.40?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>	<p>8. If 18 pencils cost \$3.24, then how much do 12 pencils cost?</p> <p>Method 1:</p> <p>Method 2:</p> <p>Answer:</p>

UNDERSTANDING PERCENTS

Ready (Summary)	Set (Goals)
We will learn sense-making strategies for finding percents of numbers.	<ul style="list-style-type: none"> • Convert fractions to decimals and percents. • Find percents of numbers.

Go (Warmup)

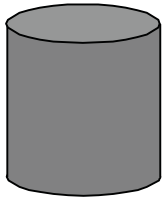
Complete the table. Use mental math when possible. If another method is used, show the work clearly. Be prepared to explain your methods.

	Fraction	Decimal	Percent
1.	$\frac{1}{2}$		
2.	$\frac{7}{10}$		
3.		0.06	
4.		0.333333...	
5.			25%
6.			40%

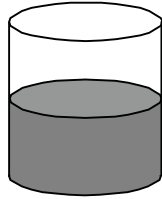
PERCENTS OF CONTAINERS

Complete the problems below.

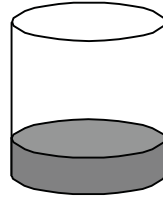
1. About how full is each container? Give estimates using percents.



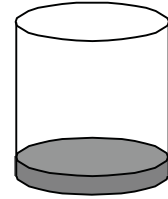
Container A



Container B



Container C



Container D

2. You are now given the information that, when full, each container holds 800 ounces of liquid. How many ounces do you estimate to be in each container?

3. A correction is made to the above information. These containers actually hold 900 ounces of liquid. Now how many ounces do you estimate to be in each container?

The container below holds 600 ounces of liquid when full.
Determine how much liquid would make it:

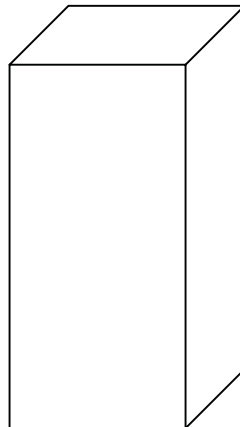
4. 50% full _____

5. 25% full _____

6. 75% full _____

7. 10% full _____

8. 20% full _____



PERCENTS OF OTHER ITEMS 1

Complete each sentence.

A dollar is _____ cents. Find the following percents of a dollar.

1. 5% of a dollar is _____ cents.
2. 34% of a dollar is _____ cents.
3. 10% of a dollar is _____ cents.
4. 76% of a dollar is _____ cents.
5. A meter is _____ centimeters. The rectangle below represents a meter stick. Write some numbers on the meter stick to represent centimeters. The left edge of the meter stick represents 0 centimeters.



Going from left to right, write the letter on the meter stick above that represents each of the following:

- | | |
|--------------------|-------------------|
| A. 100% of the way | F. 10% of the way |
| B. 50% of the way | G. 20% of the way |
| C. 25% of the way | H. 0% of the way |
| D. 75% of the way | I. 80% of the way |
| E. 5% of the way | J. 55% of the way |

6. How are finding percents and finding centimeters on a meter stick related?

PERCENTS OF OTHER ITEMS 2

Complete each sentence.

1. Finding 100% of something is the same as finding _____ of it.
So 100% of \$40 is _____.

2. Finding 50% of something is the same as finding _____ of it.
This is the same as dividing by _____. So 50% of \$40 is _____.

3. Finding 25% of something is the same as finding _____ of it.
This is the same as dividing by _____. So 25% of \$40 is _____.

4. Finding 10% of something is the same as finding _____ of it.
This is the same as dividing by _____. So 10% of \$40 is _____.

5. Finding 10% can help with finding other percents as well. Use your answer for 10% of \$40 to find 20% of \$40. Explain your strategy.

6. Find 5% of \$40. Explain your strategy.

SKILL BUILDER 1A

Complete the problems.

1. A ratio is a comparison of _____.

Here are some stars and squares: 

Show each ratio in three different ways.

2.	Number of stars to number of squares.	to	:	—
3.	Number of squares to total number of figures.	to	:	—
4.	Number of stars to number of stars.	to	:	—

Express each ratio as a fraction.

5. 2 to 3 _____	6. 7 to 10 _____	7. 5:5 _____
-----------------	------------------	--------------

8. A rate is a special ratio that compares _____.

9. We generally include the _____ when writing rates.

Use fractions to express each rate.

10. You earned \$3 in one day. What is the rate per day? _____
11. You read 5 books in 2 weeks. What is the rate per week? _____
12. You grew 3 inches in 11 weeks. What is the rate per week? _____

SKILL BUILDER 1B

Complete the problems.

13. A proportion is _____.

14. $\frac{2}{5} = \frac{4}{10}$ may be written as 2:5 = _____ : _____

Find the missing number in the proportions.

15. $\frac{4}{5} = \frac{n}{35}$	16. $\frac{n}{12} = \frac{3}{4}$	17. $\frac{16}{n} = \frac{4}{5}$
18. $\frac{5}{15} = \frac{n}{3}$	19. $\frac{5}{9} = \frac{30}{n}$	20. $\frac{3}{11} = \frac{n}{33}$

21. The ratio of boys to girls is 5:4. If there are 12 girls in the class, how many boys are there?

22. Cynthia wrote the following on her paper.

$$\frac{6}{10} = \frac{6+6}{10+6} = \frac{12}{16}$$

Explain what is wrong with her work, and correct her work.

KNOWLEDGE CHECK 17

Show your work on a separate sheet of paper and write your answers on this page.

17.1 Proportional Reasoning

Solve each pencil problem in two ways. Show your work.

- How much will 4 pencils cost if 6 pencils cost \$1.74?
- If it costs \$3.24 for 9 pencils, then how many pencils can be purchased for \$6.48?

17.2 Understanding Percents

Find the following percents.

	Amount	Find 10%	Find 5%	Find 15%	Find 20%
3.	\$60				
4.	40 pencils				

17.3 Ratios, Rates, and Proportions

Find the missing number (n) in each proportion.

$$5. \quad \frac{n}{25} = \frac{3}{5}$$

$$6. \quad \frac{30}{n} = \frac{3}{10}$$

Highlighted Review: Fractions: Multiplication and Division

Compute.

$$7. \quad \frac{2}{5} \times 3 \frac{1}{2}$$

$$8. \quad 1 \frac{3}{7} \div 5$$

HIGHLIGHTED REVIEW PRACTICE 17

Fractions: Multiplication and Division

Compute.

1. $4 \times \frac{3}{8}$	2. $\frac{1}{3} \times \frac{4}{5}$
3. $2\frac{2}{7} \times 5\frac{3}{5}$	4. $4 \div \frac{3}{8}$
5. $\frac{3}{5} \div \frac{7}{10}$	6. $1\frac{5}{6} \div \frac{2}{9}$

Choose the best answer.

7. One serving of cashews is $\frac{7}{10}$ oz. How many servings are in $3\frac{3}{8}$ oz. of cashews?			
A. $4\frac{1}{21}$	B. $2\frac{6}{7}$	C. $\frac{15}{28}$	D. $\frac{3}{7}$

PERCENT INCREASE AND DECREASE

Ready (Summary)	Set (Goals)
<p>We will learn how to find percent increases and decreases. We will learn some common vocabulary related to percents.</p>	<ul style="list-style-type: none"> • Find percentages of numbers. • Understand how to increase and decrease amounts by certain percents. • Use sense-making strategies and procedures to find percents of numbers, and determine when one method might be more useful than another.

Go (Warmup)

Use mental sense-making strategies and procedures to find the following:

Amount	50%	10%	1%	15%	17%
1. \$240					
2. \$68					
3. \$15					
4. \$2					

18.1 Percent Increase and Decrease

TIPS

1. Many people provide services for which they receive tips. Better service oftentimes gets the worker a better tip. List some jobs for which workers might receive tips.

Calculate the tips for each amount below.

Amount	10% Tip	20% Tip	5% Tip	15% Tip
2. \$40				
3. \$20				
4. \$80				
5. \$60				
6. \$90				
7. \$25				
8. \$12				
9. \$28				
10. Suppose you paid someone \$40 for their service plus a 10% tip. How much have you given them in all?				
11. Suppose you paid someone \$60 for their service plus a 20% tip. How much have you given them in all?				

18.1 Percent Increase and Decrease

FINDING PERCENT INCREASES AND DECREASES

Determine the amount of the percent increase and the final amount.

	Original Amount	% of Increase	Amount of Increase	Final Amount
1.	\$100	10%		
2.	\$100	15%		
3.	\$50	10%		
4.	\$50	20%		
5.	\$20	10%		
6.	\$20	5%		
7.	\$70	10%		
8.	\$70	30%		
9.	\$65	27%		

Find the amount of the percent decrease and the final amount.

	Original Amount	% of Decrease	Amount of Decrease	Final Amount
10.	\$60	50%		
11.	\$60	25%		
12.	\$48	10%		
13.	\$48	30%		
14.	\$22	20%		
15.	\$22	5%		
16.	\$75	10%		
17.	\$75	40%		
18.	\$26	14%		

SIMPLE INTEREST

Ready (Summary)	Set (Goals)
We will learn what simple interest means, why it is important, and how it is used.	<ul style="list-style-type: none">• Solve interest problems.• Understand and use simple interest vocabulary.

Go (Warmup)

It is common for a clothing store to buy merchandise from a manufacturer, and then mark up the price by 100% when selling it.

1. What does it mean to mark up a pair of jeans by 100%?

2. If a clothing store buys jeans for \$25, what will be the price of these jeans after a 100% markup?

3. When you buy these jeans, you also have to pay an 8% sales tax. What is the total you must pay for these jeans?

SIMPLE INTEREST

Interest is an amount paid to use money.

1. When you borrow money from a bank (get a loan), why does the bank charge you interest?

2. When you put your money into the bank to save it (make an investment), why does the bank pay you interest?

Match each term to its meaning as it relates to borrowing or investing money.

- | | |
|---------------------------------|--|
| ___ 3. I nterest | a. The amount of time of the investment or loan, which is typically measured annually. |
| ___ 4. P rincipal | b. The percent paid or charged to use money, typically given annually (yearly). |
| ___ 5. R ate of interest | c. An amount paid or charged for the use of money. |
| ___ 6. T ime | d. The sum of the principal and the interest. |
| ___ 7. Total A mount | e. The initial amount of money borrowed or invested. |

Suppose you borrow \$50 at 10% simple interest for two years.

8. What is the **P**rincipal? _____
9. What is the annual **R**ate of interest? _____
10. What is the **T**ime of the loan? _____
11. How much is the **I**nterest paid per year? _____
12. How much is the total **A**mount repaid for the loan? _____

18.2 Simple Interest

THE SIMPLE INTEREST FORMULA

- You borrow \$100 from a bank.
- The bank charges an annual interest rate of 10%.
- You have 4 years to repay the loan and simple interest.

1. How much interest will you repay the bank per year? _____

2. How much interest will you have repaid the bank in 4 years? _____
Use the simple interest formula to verify your answer

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$I = P \times R \times T \text{ (also written } I = PRT)$$

$$I = \underline{\hspace{2cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{2cm}}$$

$$I = \underline{\hspace{2cm}}$$

3. What is the total amount of money will you have to repay? _____

Use the total amount formula to verify your answer.

$$\text{Total Amount} = \text{Principal} + \text{Interest}$$

$$A = P + I$$

$$A = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$A = \underline{\hspace{2cm}}$$

You borrow \$250 at 5% annual interest rate for 4 years.

4. How much simple interest will you pay?

$$I = PRT$$

5. What is the total amount you will repay?

$$A = P + I$$

SIMPLE INTEREST PRACTICE

Interest = **Principal** × **Rate** × **Time** OR _____ = _____ × _____ × _____

Total **A**mount = **P**rincipal + **I**nterest OR _____ = _____ + _____

Compute.

You invest \$500 at a 7% annual interest rate for 5 years.

<p>1. How much simple interest will you earn?</p> <p style="text-align: center;">$I = PRT$</p>	<p>2. What is the total amount you will get back?</p> <p style="text-align: center;">$A = P + I$</p>
---	---

You borrow \$4,000 at a 5% annual interest rate and will pay \$2,000 in simple interest.

<p>3. For how many years is the loan?</p>	<p>4. What is the total amount you will repay?</p>
---	--

You invest some money at a 10% annual interest rate. The total amount that you get back is \$9,000, which includes \$3,000 in interest.

<p>5. How much was the principal?</p> <p style="text-align: center;">$A = P + I$</p>	<p>6. How long was the investment?</p> <p style="text-align: center;">$I = PRT$</p>
---	--

SIMPLE INTEREST PRACTICE (continued)

Compute.

You pay 6% simple interest per year for 8 years on a loan, and you pay \$960 in interest.

7. How much is the principal?	8. What is the total amount you will repay?
-------------------------------	---

You invest \$1,600 for 3 years and earn \$576 in simple interest.

9. What is the annual interest rate?	10. What is the total amount you will get back?
--------------------------------------	---

You borrow money for 4 years. The total amount that you repay is \$7,840, which includes \$840 in simple interest.

11. How much was the principal?	12. What was the annual interest rate?
---------------------------------	--

SKILL BUILDER 1A

1. Compute the following percents.

Amount	100%	50%	5%	0.5%	500%
200					

Compute each problem.

<p>2. Find 37% of \$26.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>	<p>3. Find 4.6% of \$110.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>
<p>4. Find 130% of \$40.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>	<p>5. Increase \$120 by 160% and give the total.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>

SKILL BUILDER 1B

Compute each problem.

<p>6. Original Price: \$55 Markup: 8.5% Find the new price.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>	<p>7. Original price: \$46 Markdown: 33% How much is the markdown?</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>
<p>8. Find the simple interest on a loan of \$750 at an annual rate of 6.5% for 3 years.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>	<p>9. Find the total amount to repay a bank for a loan of \$3,000 at an annual simple interest rate of 7.2% for 8 years.</p> <p>Estimate:</p> <p>Calculate:</p> <p>Did your calculation agree with your estimate? Explain.</p>

KNOWLEDGE CHECK 18

Show your work on a separate sheet of paper and write your answers on this page.

18.1 Percent Increase and Decrease

For each beginning amount, find the amount of increase and the final amount.

	Beginning Amount	% of Increase	Amount of Increase	Final Amount
1.	\$128	10%		
2.	\$360	15%		

18.2 Simple Interest

Thi wants to buy a mountain bike that costs \$2,300. She has \$500 saved, so she must borrow the rest from a bank. The bank charges a 7% simple interest rate per year. Thi will repay the loan in 3 years.

3. What is the loan amount?
4. What is the amount of the total interest?
5. What is the total amount Thi must repay?

18.3 Percent Problems

6. Find 85% of 20.
7. Decrease \$735 by 14%.

Highlighted Review: Decimals: Multiplication and Division

Compute.

8. 5×1.3
9. $8.05 \div 0.7$

HIGHLIGHTED REVIEW PRACTICE 18

Decimals: Multiplication and Division

Compute.

1. 6.4×5.2	2. 2×0.4
3. 2.01×0.01	4. $504 \div 0.02$
5. $36.9 \div 3$	6. $21.54 \div 0.6$

Choose the best answer.

7. $1.88 \div 4$ equals which value? A. 47 B. 0.47 C. 4.7 D. 0.047
--

LINKING PERCENTS AND PROPORTIONS

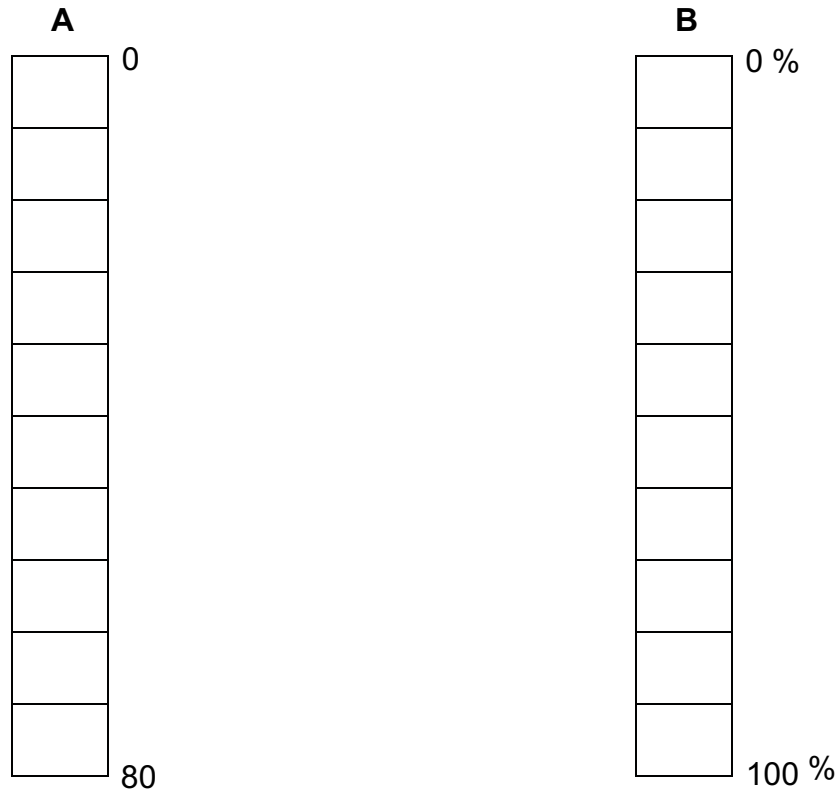
Ready (Summary)	Set (Goals)
Solve percent problems using a visual model and sense-making strategies.	<ul style="list-style-type: none">• Use a linear model to solve percent problems.• Set up ratios and proportions to represent percent problems.• Practice sense-making strategies for solving percent problems.

Go (Warmup)

Use two methods to solve each problem. Be prepared to share your strategies. Remember to include units in your answer.

1. What is 30% of 100 cm?	2. What is 30% of 50 cm?
3. What is 30% of 20 cm?	4. What is 30% of 10 cm?

UNDERSTANDING PERCENTS AND PROPORTIONS

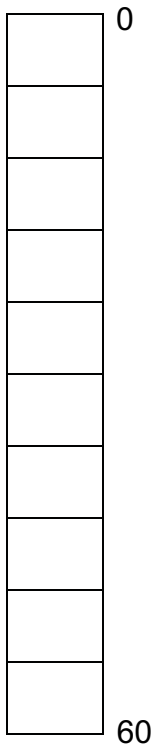


Complete the chart.

	Words	Proportion (Equation)
1.	30% of 80 is 24	
2.		$\frac{48}{80} = \frac{60}{100}$
3.	40% of 80 is _____	
4.		$\frac{25}{100} = \frac{x}{80}$

FINDING 20%

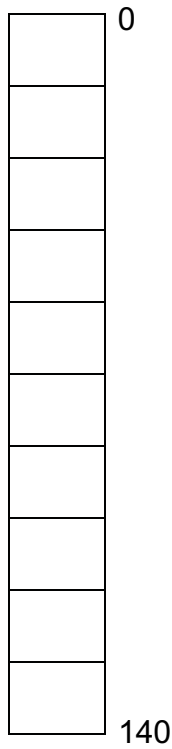
Cut off and use the strip at the bottom of the page to set up proportions to represent each percent problem and find the answers.



1. What is 20% of 60?

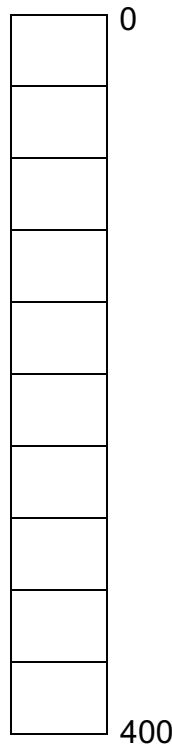
$$\frac{\text{part}}{\text{whole}} = \frac{20}{100} = \frac{x}{60}$$

$x = \underline{\hspace{2cm}}$

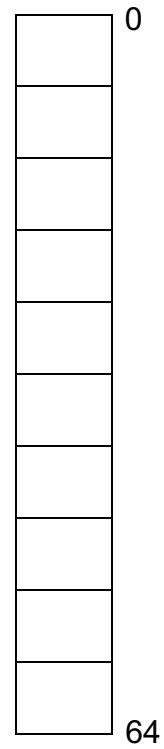


2. What is 20% of 140?

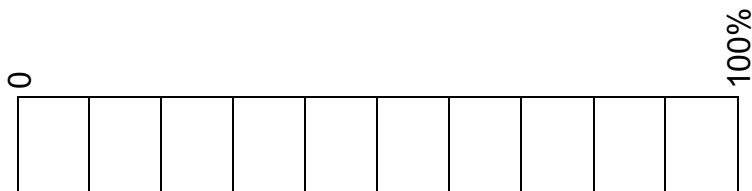
$$\frac{\text{part}}{\text{whole}} = \frac{\hspace{1cm}}{100} = \underline{\hspace{1cm}}$$



3. What is 20% of 400?

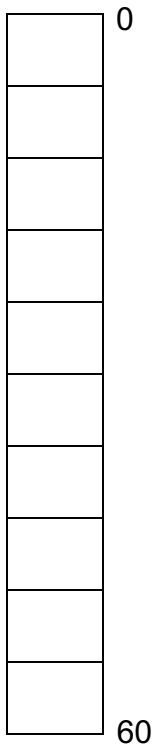


4. What is 20% of 64?



FINDING 85%

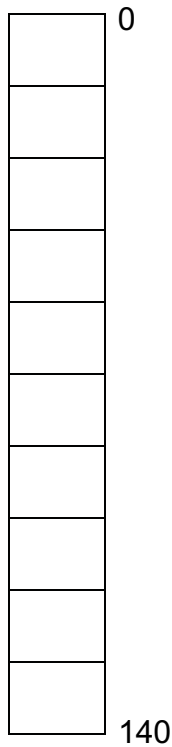
Cut off and use the strip at the bottom of the page to set up proportions to represent each percent problem and find the answers.



1. What is 85% of 60?

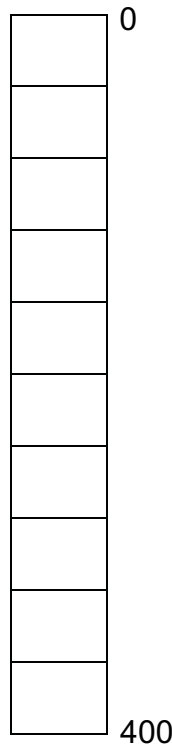
$$\frac{\text{part}}{\text{whole}} = \frac{85}{100} = \frac{x}{60}$$

$x =$ _____

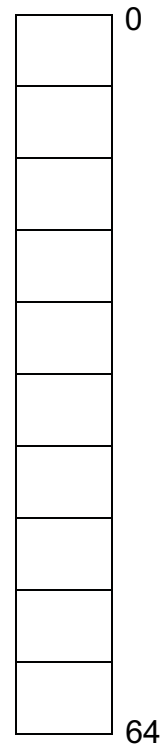


2. What is 85% of 140?

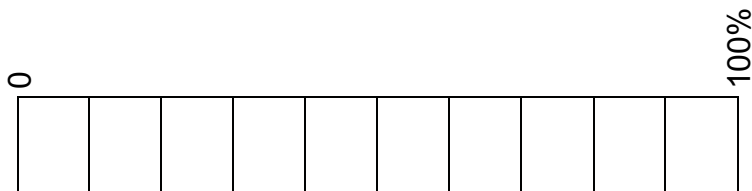
$$\frac{\text{part}}{\text{whole}} = \frac{\quad}{100} = \frac{\quad}{\quad}$$



3. What is 85% of 400?

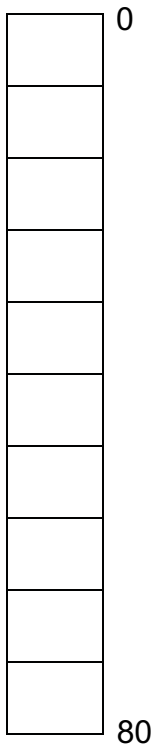


4. What is 85% of 64?



MORE STRIPS AND PROPORTIONS

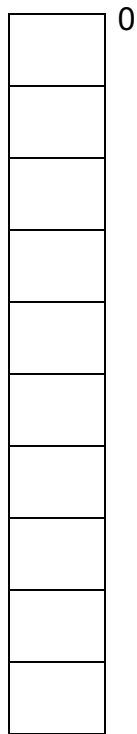
Cut off and use the strip at the bottom of the page to set up proportions to represent each percent problem and find the answers.



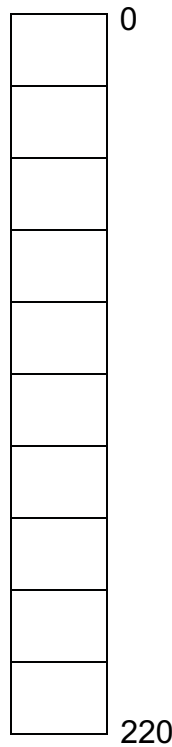
1. What percent of 80 is 32?

$$\frac{\text{part}}{\text{whole}} = \frac{\quad}{100} = \frac{\quad}{\quad}$$

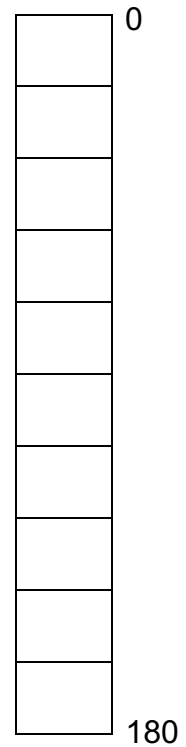
$$x = \underline{\quad}$$



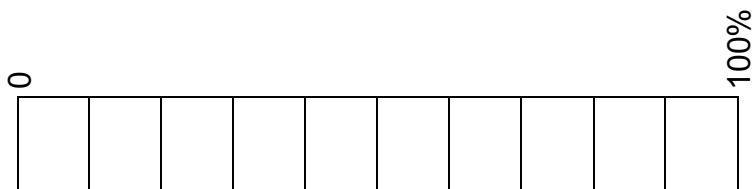
2. 30% of what amount is 15?



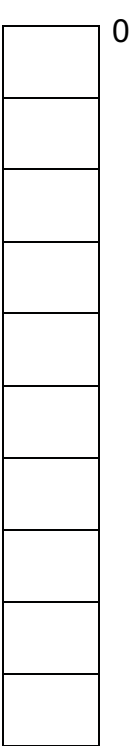
3. What % of 220 is 11?



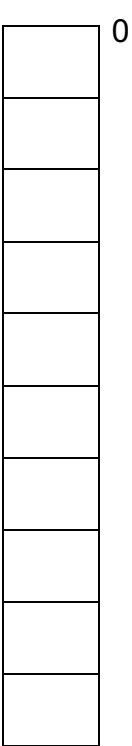
4. 60% of 180 is what amount?



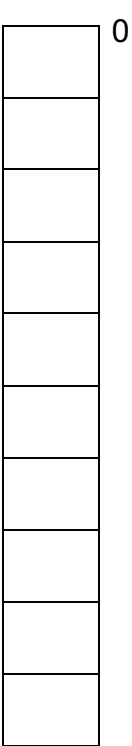
MORE STRIPS AND PROPORTIONS (continued)



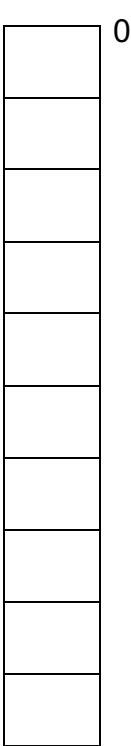
5. What is 40% of 50?



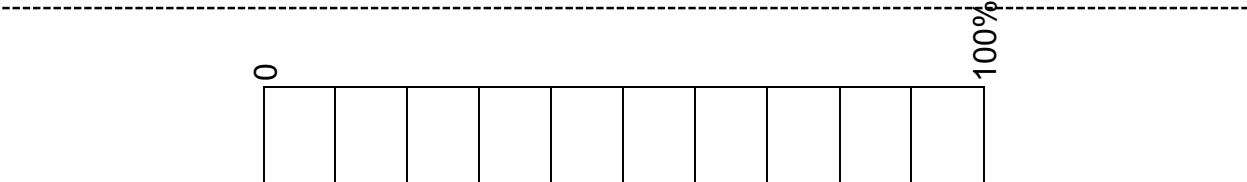
6. 50 is 25% of what?



7. What is 15% of 400?



8. 100 is 20% of what?



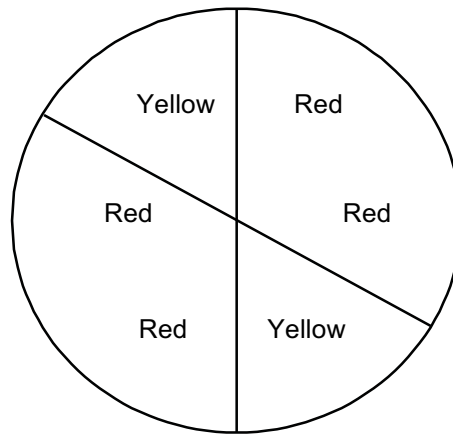
PERCENT STRIPS

<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>
<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>	<div style="border: 1px solid black; height: 100px; width: 50px; margin: 0 auto;"></div>

PROBABILITY: SPINNER PUZZLES

Ready (Summary)	Set (Goals)
<p>Review probability concepts using spinners. Use logical reasoning to determine the probability of different events.</p>	<ul style="list-style-type: none"> • Perform operations with rational numbers. • Use fractions, decimals, and percents to represent probabilities. • Use logical reasoning to find probabilities of events.

Go (Warmup)

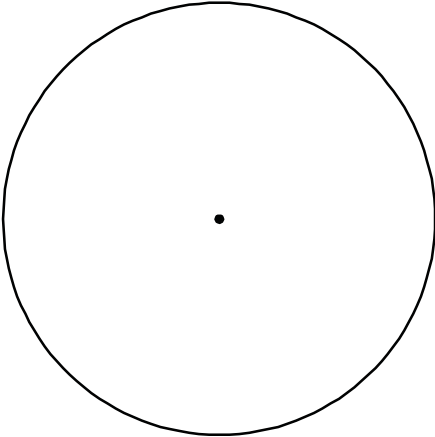
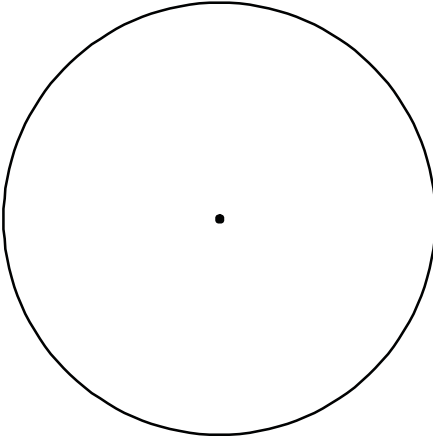
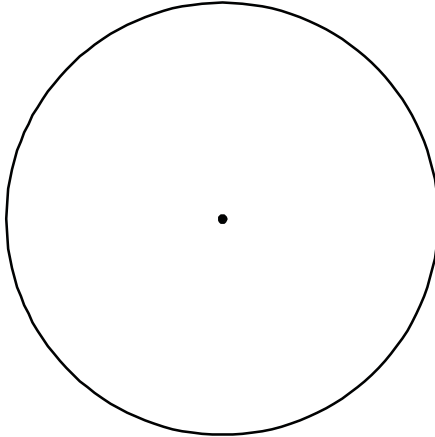
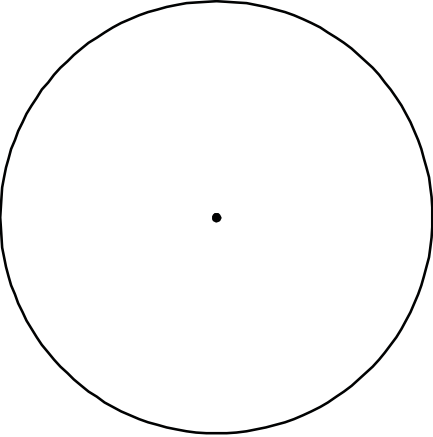


Write each answer as a fraction. What is the probability of:

1. Landing on red?	2. Landing on yellow?
3. Landing on green?	4. Landing on a primary color?

SPINNER PUZZLES

Use the clues provided by your teacher to create each spinners.

<p style="text-align: center;">Spinner Puzzle A</p> 	<p style="text-align: center;">Spinner Puzzle B</p> 
<p style="text-align: center;">Spinner Puzzle C</p> 	<p style="text-align: center;">Spinner Puzzle D</p> 

SPINNER PUZZLE A

SPINNER PUZZLE A

The pet palace is giving away turtles, hamsters and goldfish as prizes. The probability of getting a goldfish is twice the probability of getting a turtle.

SPINNER PUZZLE A

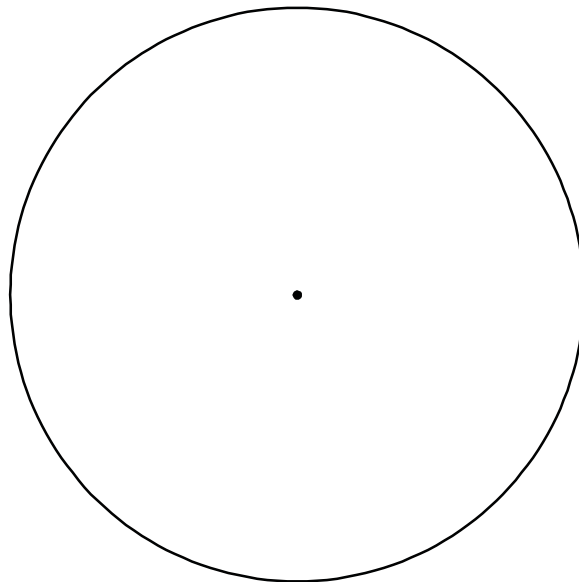
The probability of getting a hamster is $\frac{1}{4}$.

SPINNER PUZZLE A

In 8 spins you will probably get a turtle twice.

SPINNER PUZZLE A

It is more likely you will get a goldfish than a turtle.



ANOTHER SPINNER PUZZLE

SPINNER PUZZLE E

The spinner is divided into three colors.

SPINNER PUZZLE E

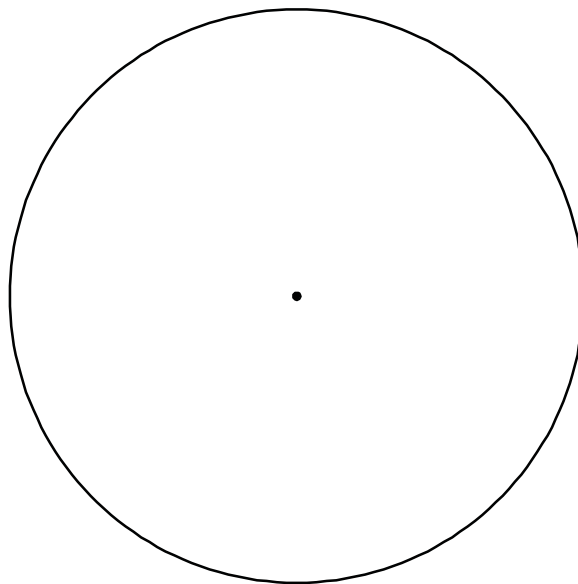
In 24 spins you will probably get red 6 times.

SPINNER PUZZLE E

You are twice as likely to get blue as red.

SPINNER PUZZLE E

$$P(\text{Green}) = \frac{1}{2}$$





SKILL BUILDER 1A

Dimensional analysis is a method of manipulating unit measures algebraically to determine the proper units for a quantity. In the physical world, these units are often units of distance, mass (or weight), and time.

You drive 4 hours at a rate of 65 miles per hour. How far will you go?

$$4 \text{ hr} \times \frac{65 \text{ miles}}{1 \text{ hours}} = \frac{4 \text{ ~~hours~~}}{1} \times \frac{65 \text{ miles}}{1 \text{ ~~hours~~}} = 260 \text{ miles}$$

Draw a  around the given quantity. Draw a  around the given rate.

Underline the units in the answer. Notice that $\frac{\text{hour}}{\text{hour}}$ behaves as $\frac{a}{a} = 1$.

Solve the rate problems.

1. A car gets 24 miles per gallon. How many gallons would the car need to travel 108 miles?

$$\left(\boxed{} \text{ } \right) \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}}$$

=

=

2. A worker earns \$50 every 4 hours. How much would the worker earn in 42 hours?

$$\left(\boxed{} \text{ } \right) \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}}$$

=

=

SKILL BUILDER 1B

Use dimensional analysis to perform each unit conversion.

3. Find the number of years in 1,825 days.

$$\left(\boxed{} \text{ } \right) \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}}$$

=

=

4. Find the number of yards in 4 miles. (hint: 1 mile = 5,280 feet)

$$\left(\boxed{} \text{ } \right) \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}} \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}}$$

=

=

5. Find the number of ounces in 3 gallons.
(hints: 8 ounces = 1 cup; 4 cups = 1 quart; 4 quarts = 1 gallon)

$$\left(\boxed{} \text{ } \right) \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}} \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}} \times \frac{\boxed{} \text{ } \underline{\hspace{1cm}}}{\boxed{} \text{ } \underline{\hspace{1cm}}}$$

=

=

KNOWLEDGE CHECK 19

Show your work on a separate sheet of paper and write your answers on this page.

19.1 Linking Percents and Proportions

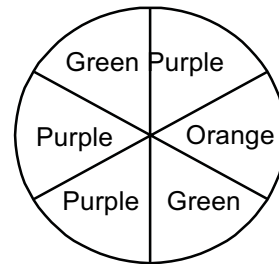
Use paper strips if needed. Write a proportion to solve each problem.

1. What is 30% of 80?
2. What percent of 90 is 36?

19.2 Probability: Spinner Puzzles

Use the spinner to the right to find each probability expressed as a fraction, a decimal, and a percent.

3. What is the probability of landing on orange?
4. What is the probability of landing on purple or green?



19.3 Dimensional Analysis

5. A car travels 32 miles per gallon of gas. Use dimensional analysis to determine how many miles the car will travel with 7 gallons of gas.
6. Use dimensional analysis to determine the number of minutes in 6 days.

Highlighted Review: Integers Revisited

Solve the following problems.

7. What must -32 be divided by to get an answer of 4?
8. What must be added to -7 to get 13?

HIGHLIGHTED REVIEW PRACTICE 19

Integers Revisited

Compute.

1. $-(34 - 12)$	2. $-9 - (-23)$
3. $\frac{-45}{-5}$	4. $\frac{-84}{7}$
5. $8 \cdot (-10)$	6. $-7 \cdot (-4)$
7. $-33 + 12$	8. $-40 + (-15)$
9. At 4 a.m., the temperature was -7°F . At 10 p.m., the temperature was 14°F . How many degrees did the temperature rise?	

Choose the best answer.

10. Which statement is TRUE?	
A. $\frac{-24}{8} = 3$	B. $42 \div (-6) = 7$
C. $-5 \cdot 4 = -20$	D. $7 \cdot (-14) = -20$

SOLVING PROPORTIONS 1

Ready (Summary)	Set (Goals)
We will learn more computational procedures for solving proportions, and we will learn why the cross multiplication property for solving proportions works.	<ul style="list-style-type: none">• Add, subtract, multiply, and divide rational numbers.• Use rates and proportions to solve problems.• Use cross multiplication to solve proportions.

Go (Warmup)

Solve each pencil problem. Show your work.

1. If 5 pencils cost \$0.45, then what is the cost of 4 pencils?

2. How many pencils can be purchased with \$0.51 if the cost of 8 pencils is \$1.36?

Find the missing value to make each statement true.

3. $\frac{2}{3} = \frac{10}{\square}$

4. $\frac{20}{24} = \frac{\square}{6}$

SOME IMPORTANT PROPERTIES

Write the rule and give an example for each property of arithmetic or equality.

Property	Rule	Example
Symmetric property of equality		
Multiplication property of equality		
Multiplication property of 1		
Fraction inverse property		
Numerator equality property		

HOW TO FIND x IN A PROPORTION

1. Here is one way to find x in a proportion. For each step, state the reason or property used.

Step	Statement	Reason
1	$\frac{2}{3} = \frac{10}{x}$	Original problem
2	$\frac{3}{2} = \frac{x}{10}$	Fraction inverse property
3	$\frac{3}{2} \cdot \frac{10}{10} = \frac{x}{10} \cdot \frac{2}{2}$	
4	$\frac{30}{20} = \frac{2x}{20}$	
5	$30 = 2x$	
6	$2x = 30$	
7	$\frac{1}{2} \cdot 2x = \frac{1}{2} \cdot 30$	
8	$1 \cdot x = 15$	
9	$x = 15$	

2. How can you get from step #1 to step #6 in one step?

The cross multiplication property states that if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$ ($b \neq 0$, $d \neq 0$).

This can be remembered with the diagram: $\frac{a}{b} = \frac{c}{d}$. It is another way to solve proportions. Use the cross multiplication property to solve for x :

<p>3. $\frac{2}{3} = \frac{x}{21}$</p>	<p>4. $\frac{x}{9} = \frac{5}{7}$</p>
---	--

PRACTICE SOLVING PROPORTIONS

Write a rate for each problem. Then use the numerator equality property or cross multiplication property to solve each proportion.

Problem	Rate	Proportion
1. If 5 pencils cost \$0.45, then what is the cost of 4 pencils?	$\frac{\text{\# of pencils}}{\text{cost}}$	$\frac{5 \text{ pencils}}{\$0.45} = \frac{4 \text{ pencils}}{x}$
2. How many pencils can be purchased with \$0.51 if the cost of 8 pencils is \$1.36?		
3. You drive at a rate of 65 miles per hour for 4 hours. How far will you go?		
4. If you drive 25 miles at a rate of 50 miles per hour. How long will this take?		
5. If the cost of making 1 copy is \$0.055, how much will 10 copies cost?		

PAPER PROBLEMS

Write a rate for each problem. Then use the numerator equality property or cross multiplication property to solve each proportion.

Problem	Rate	Proportion
1. How much will 50 copies cost if it costs \$4.50 to make 100 copies?		
2. If the cost of making 20 copies is \$1.30, how much will 1 copy cost?		
3. What will it cost to make 1,000 copies if the cost of 1 copy is \$0.041?		
4. If the cost of 100 copies is \$3.10, how many copies can be made for \$155?		
5. How many copies can be made for \$30.50 if the cost of 10 copies is \$0.61?		

PROBABILITY: FLIP AND ROLL

Ready (Summary)	Set (Goals)
<p>We will explore probability concepts as we flip a coin and roll a number cube. We will learn techniques for organizing the collected data and then analyze the experiment by comparing experimental probabilities to the theoretical probability.</p>	<ul style="list-style-type: none"> • Represent the sample space of a probability experiment using lists, outcome grids, and tree diagrams. • Represent probabilities as fractions, decimals, and percents. • Record and analyze outcomes from a probability experiment.

Go (Warmup)

Suppose that slips of paper, each with the name of a student in your class, are placed in a box. Your teacher takes out a slip of paper from the box.

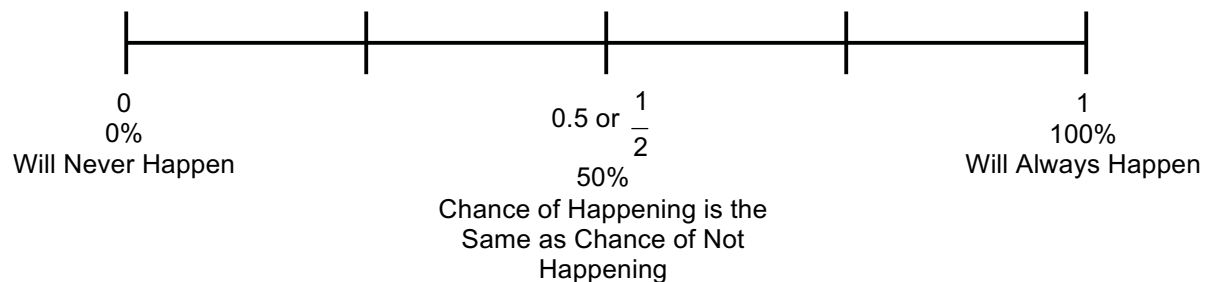
Predict the chances of each event by placing them on the line below.

- A. The name taken from the box is a student in this class.

- B. The name taken from the box is a girl.

- C. The name taken from the box is a student wearing ice skates.

- D. The name taken from the box is your name.



FLIP AND ROLL EXPERIMENT

You are going to flip a coin and roll a number cube twenty times. You win if the coin shows heads and the number on the cube is divisible by two OR if the coin shows tails and the number on the cube is divisible by three. Otherwise you lose.

Trial #	1	2	3	4	5	6	7	8	9	10
Heads or Tails?										
Number Rolled?										
Win or Loss?										

Trial #	11	12	13	14	15	16	17	18	19	20
Heads or Tails?										
Number Rolled?										
Win or Loss?										

Estimate of probability of winning = $\frac{\text{number of wins}}{\text{number of trials}}$ = proportion of wins

Estimate of probability of losing = $\frac{\text{number of losses}}{\text{number of trials}}$ = proportion of losses

	Your Totals	As Fraction	As Decimal	As Percent	Class totals
Win					
Loss					

Which do you think is more accurate: your individual estimates of the probabilities or the class's estimates of the probabilities? Why?

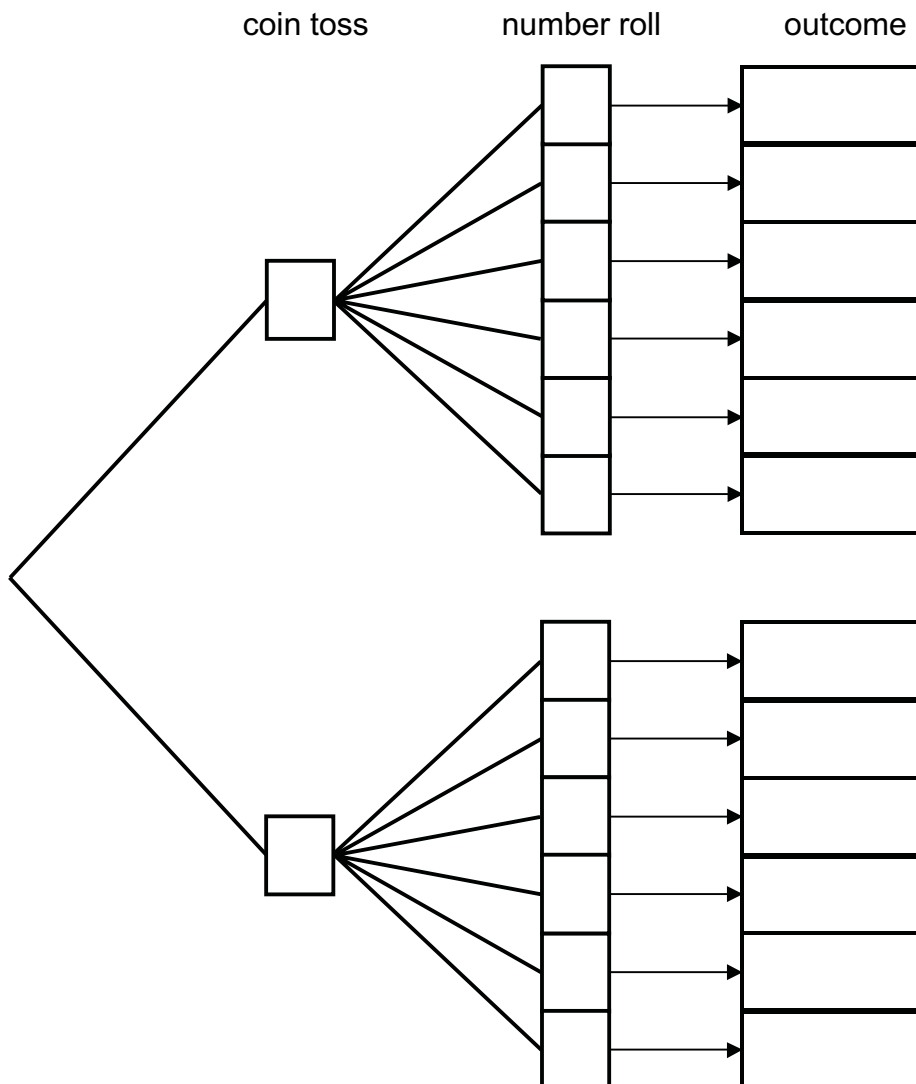
DISPLAYING THE SAMPLE SPACE

Show all the outcomes of the flip and roll experiment in a grid and in a tree diagram.
Circle all the outcomes that result in a win.

1. Outcome Grid:

	1	2	3	4	5	6
H	H, 1					
T						

2. Tree Diagram:



CALCULATING THEORETICAL PROBABILITY

When all outcomes are equally likely, the probability P of an event E is the ratio:

$$P(E) = \frac{\text{Number of Outcomes in } E}{\text{Number of Possible Outcomes}}$$

1. Use your tree or outcome grid to calculate the theoretical probabilities for the flip and roll experiment.

	As Fraction	As Decimal	As Percent
P (Win)			
P (Loss)			

2. What was the class estimate of the probability of winning from the previous page?

3. How does the theoretical probability for winning and the estimate from the class experiment compare?

4. How do you think the empirical probability for one million trials would compare to our class estimate? How might it compare to the theoretical probability?

SKILL BUILDER 1A

Solve each problem two ways. Show your work.

Set up a proportion and use the cross multiplication property	Another strategy
--	-------------------------

1. Olivia's favorite shade of purple comes from mixing 2 parts blue with 5 parts red. How many gallons of blue paint should she mix with 8 gallons of red paint to get her favorite shade of purple?

--	--

2. While working at the charity car wash, the football team washes vehicles at a ratio of 2 cars to 3 SUVs. If they washed 16 cars, how many SUVs did they wash in all?

--	--

SKILL BUILDER 1B

Solve each problem two ways. Show your work.

Set up a proportion and use the cross multiplication property	Another strategy
--	-------------------------

3. The neighborhood children have a lemonade stand. When making the lemonade, they use 1 gallon of water to 3 cups of lemon juice. How many cups of lemon juice are needed for 10 quarts of water? (Hint: There are $\frac{4 \text{ cups}}{\text{quart}}$ and $\frac{4 \text{ quarts}}{\text{gallon}}$.)

--	--

4. The ratio of boys to girls in Mrs. Chang's class is 3:4. If we know there are 15 boys, how many students are in the class?

--	--

KNOWLEDGE CHECK 20

Show your work on a separate sheet of paper and write your answers on this page.

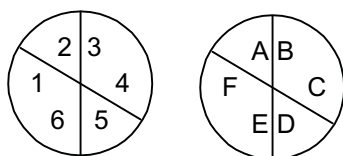
20.1 Solving Proportions 1

Use a proportion to solve each problem.

- If 8 pencils cost \$2.48, then what is the cost of 5 pencils?
- How much will 65 copies cost if it costs \$8 for 100 copies?

20.2 Probability: Flip and Roll

There are two spinners. One spinner is labeled with numbers 1-6 and the other spinner is labeled letters A-F. You will spin each spinner once.



- Make a list to show all the possible outcomes.
- What is the probability of spinning an even number and a letter?

20.3 Solving Proportions 2

- A racecar can travel 2 laps in 5 minutes. How long will it take the racecar to complete 50 laps?

6. Use cross multiplication to solve $\frac{5}{7} = \frac{35}{x}$.

Highlighted Review: Fraction, Decimal, Percent Equivalences

- Complete the table.

Fraction	Decimal	Percent
	0.42	
		36%

HIGHLIGHTED REVIEW PRACTICE 20

Fraction, Decimal, and Percent Equivalences

Complete the table.

	Fraction	Decimal	Percent
1.	$\frac{23}{50}$		
2.		0.26	
3.			19%
4.	$\frac{17}{20}$		
5.		0.125	
6.			7.12%

Choose the best answer.

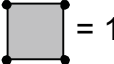
7. Which of the following is equivalent to 34%?
A. $\frac{3}{4}$ B. $\frac{1}{34}$ C. $\frac{17}{50}$ D. $\frac{8}{25}$
8. Which of these fractions does not convert to a terminating decimal?
E. $\frac{2}{10}$ F. $\frac{3}{4}$ G. $\frac{22}{50}$ H. $\frac{1}{7}$

AREAS OF POLYGONS

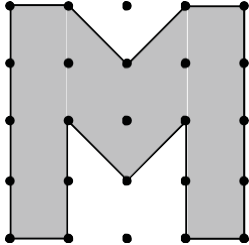
Ready (Summary)	Set (Goals)
<p>We will use logical reasoning and our knowledge about areas of rectangles to derive formulas for areas of parallelograms and triangles. We will find areas of complex figures. We will apply area and perimeter formulas to solve problems.</p>	<ul style="list-style-type: none"> • Derive the formula for the area of a parallelogram and a triangle. • Find the areas of irregular polygons. • Use area and perimeter formulas to solve problems.

Go (Warmup)

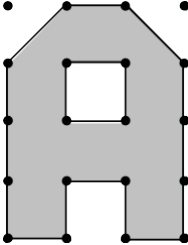
Find the shaded area of each figure.



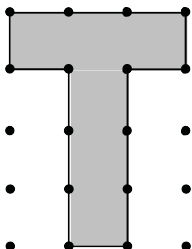
= 1 square unit

1. 

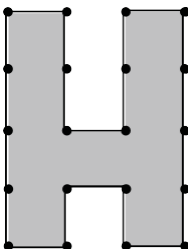
Area = _____

2. 

Area = _____

3. 

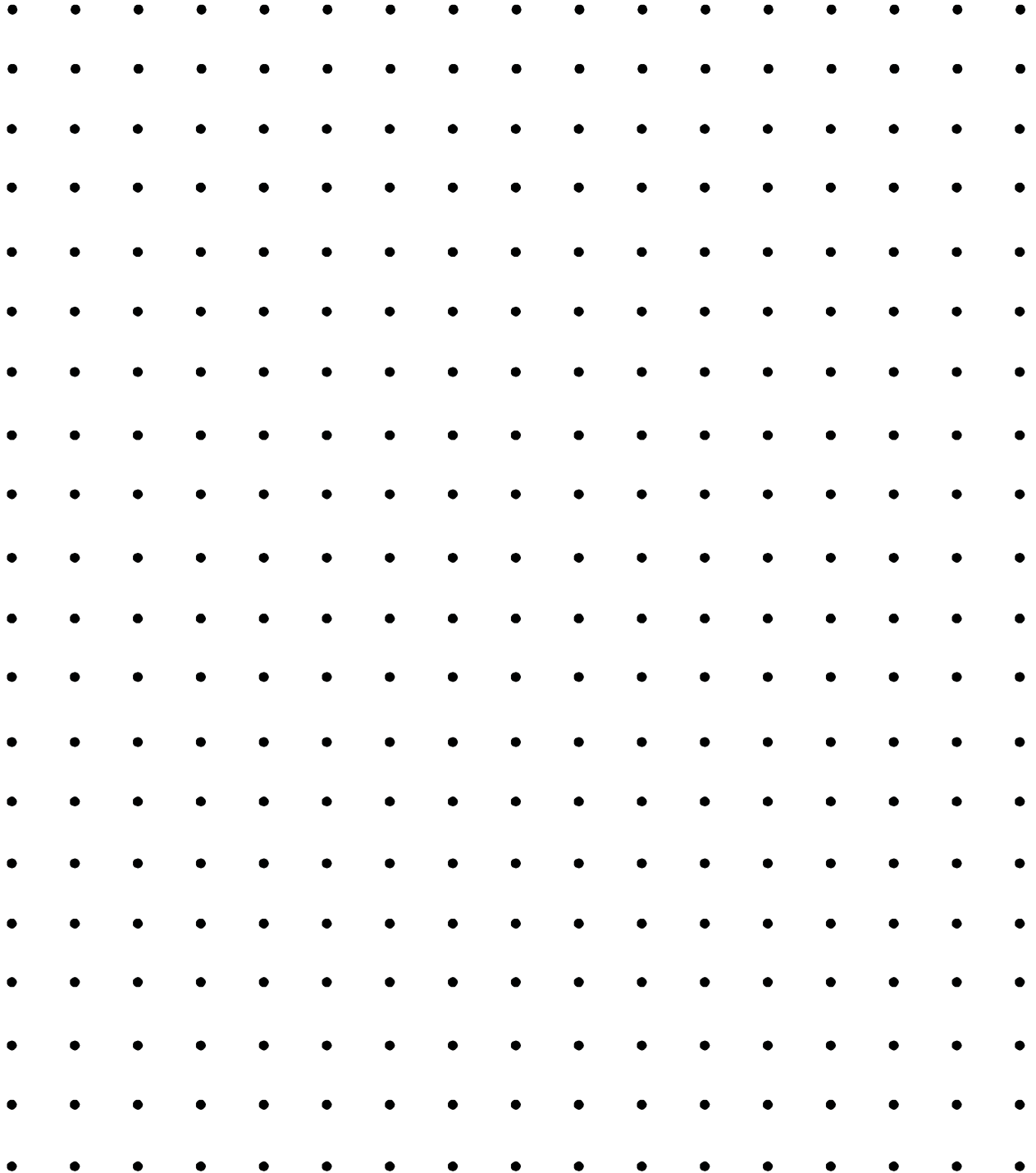
Area = _____

4. 

Area = _____

DOT PAPER

Use this page to duplicate or dissect shapes and cut them out.



SUMMARIZING FORMULAS

Fill in the chart below and use for reference.

Shape/Definition	Sketch	Perimeter	Area
1. Rectangle a quadrilateral with four right angles		$P = 2(b + h)$ $P = 2b + 2h$	$A = bh$
2. Square a rectangle with four equal sides			
3. Parallelogram a quadrilateral with opposite sides parallel			
4. Rhombus a quadrilateral with four equal sides			
5. Triangle a three-sided polygon			
6. Circle the set of all points in a plane that are equidistant from a given point		(Circumference)	

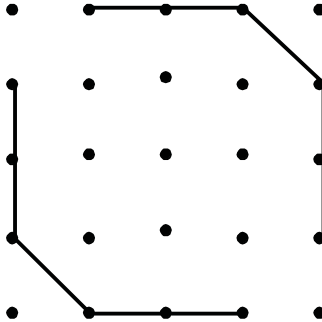
FIND THE AREA

Find the **exact** area of each figure. Be prepared to justify your answers.



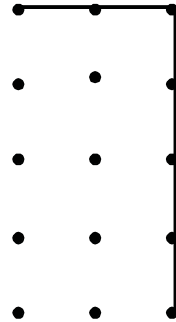
= 1 square unit

1.



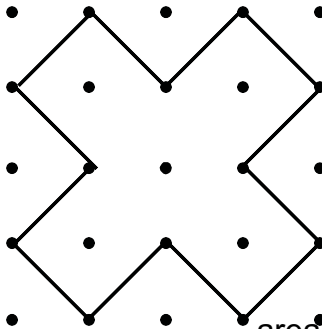
area = _____

2.



area = _____

3.



area = _____

4.



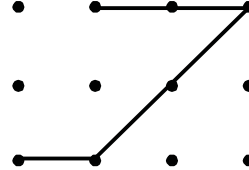
area = _____

5.



area = _____

6.



area = _____

SQUARES AND SQUARE ROOTS

Ready (Summary)	Set (Goals)
<p>We will find squares and square roots of numbers, and approximate square roots that are not perfect squares.</p>	<ul style="list-style-type: none">• Understand geometrically and numerically the connection between squaring a number and finding the square root of a number.• Approximate a square root by locating it between two consecutive integers.• Use fractions and decimals to approximate square roots.

Go (Warmup)

Draw several squares of different sizes on the grid paper. Record the side length and area for each.

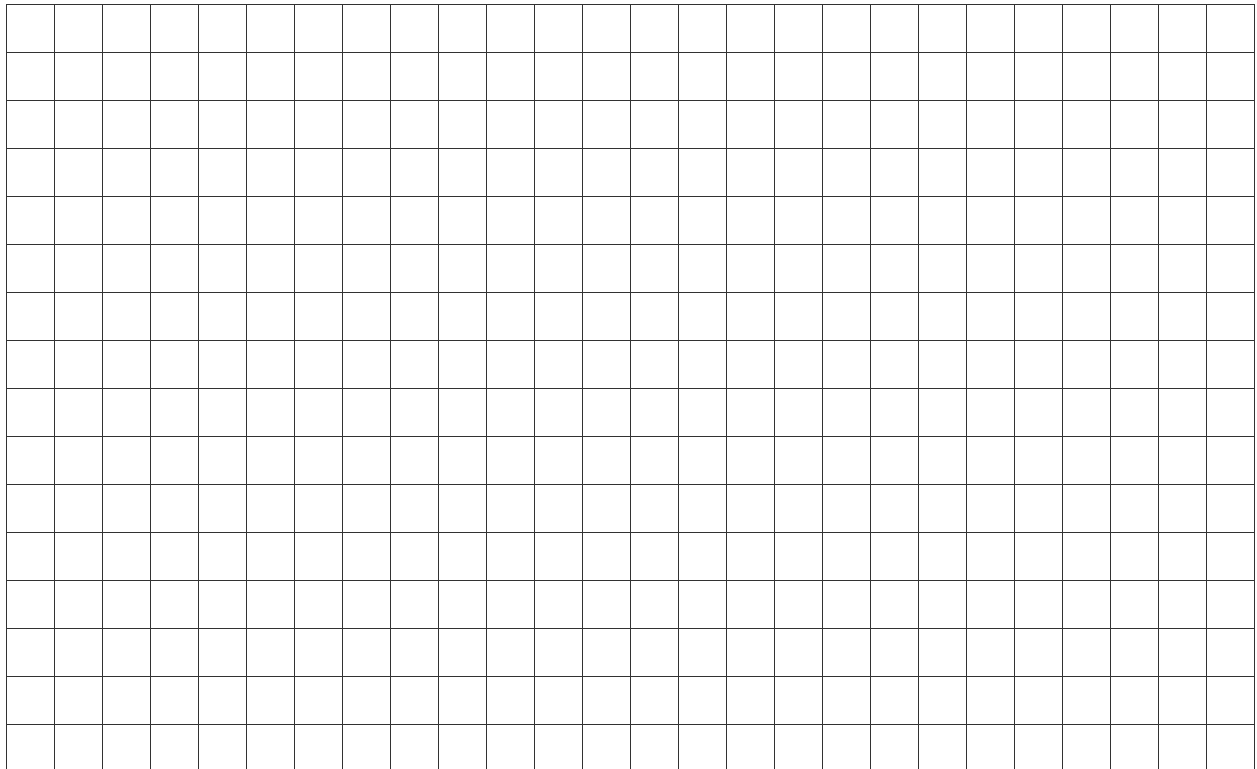


TABLE OF SQUARES

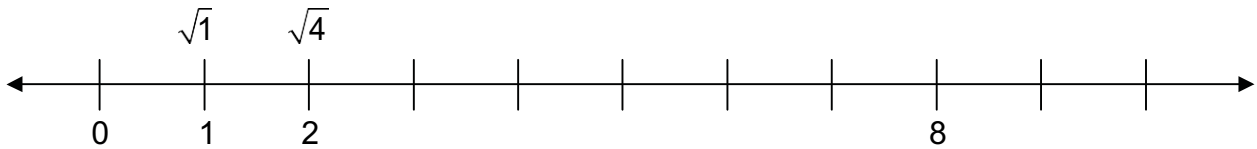
Complete the table.

$1^2 = \underline{\hspace{2cm}}$	$2^2 = \underline{\hspace{2cm}}$	$3^2 = \underline{\hspace{2cm}}$	$4^2 = \underline{\hspace{2cm}}$	$5^2 = \underline{\hspace{2cm}}$
$6^2 = \underline{\hspace{2cm}}$	$7^2 = \underline{\hspace{2cm}}$	$8^2 = \underline{\hspace{2cm}}$	$9^2 = \underline{\hspace{2cm}}$	$10^2 = \underline{\hspace{2cm}}$
$11^2 = \underline{\hspace{2cm}}$	$12^2 = \underline{\hspace{2cm}}$	$13^2 = \underline{\hspace{2cm}}$	$14^2 = \underline{\hspace{2cm}}$	$15^2 = \underline{\hspace{2cm}}$
$16^2 = \underline{\hspace{2cm}}$	$17^2 = \underline{\hspace{2cm}}$	$18^2 = \underline{\hspace{2cm}}$	$19^2 = \underline{\hspace{2cm}}$	$20^2 = \underline{\hspace{2cm}}$
$21^2 = \underline{\hspace{2cm}}$	$22^2 = \underline{\hspace{2cm}}$	$23^2 = \underline{\hspace{2cm}}$	$24^2 = \underline{\hspace{2cm}}$	$25^2 = \underline{\hspace{2cm}}$

ESTIMATING SQUARE ROOTS

1. Locate the following numbers on the number line below:

$$\sqrt{0} \quad \sqrt{1} \quad \sqrt{4} \quad \sqrt{9} \quad \sqrt{16} \quad \sqrt{25} \quad \sqrt{36} \quad \sqrt{49} \quad \sqrt{64} \quad \sqrt{81} \quad \sqrt{100}$$



2. Use the values on your number line to estimate the location of $\sqrt{27}$.

$$\underline{\sqrt{25}} < \sqrt{27} < \underline{\sqrt{36}}, \text{ but } \sqrt{27} \text{ is closer to } \underline{\hspace{2cm}}.$$

$$\underline{5} < \sqrt{27} < \underline{\hspace{2cm}}, \text{ but } \sqrt{27} \text{ is closer to } \underline{\hspace{2cm}}.$$

Estimate the decimal part of $\sqrt{27}$ as a fraction. $\frac{27 - 25}{36 - 25} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}}$

Therefore, $\sqrt{27}$ is about $5 \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}}$. (calculator check: $\underline{\hspace{2cm}}$)

3. Use the values on your number line to estimate the location of $\sqrt{40}$.

$$\underline{\hspace{2cm}} < \sqrt{40} < \underline{\hspace{2cm}}, \text{ but } \sqrt{40} \text{ is closer to } \underline{\hspace{2cm}}.$$

$$\underline{\hspace{2cm}} < \sqrt{40} < \underline{\hspace{2cm}}, \text{ but } \sqrt{40} \text{ is closer to } \underline{\hspace{2cm}}.$$

Estimate the decimal part of $\sqrt{40}$ as a fraction. $\frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}} = \frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}}$

Therefore, $\sqrt{40}$ is about $\underline{\hspace{2cm}}$. (calculator check: $\underline{\hspace{2cm}}$)

ESTIMATING SQUARE ROOTS (continued)

4. Use the values on your number line to estimate the location of $\sqrt{30}$.

_____ $< \sqrt{30} <$ _____, but $\sqrt{30}$ is closer to _____.

_____ $< \sqrt{30} <$ _____, but $\sqrt{30}$ is closer to _____.

Estimate the decimal part of $\sqrt{30}$ as a fraction.

$$\frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

Therefore, $\sqrt{30}$ is about _____. (calculator check: _____)

5. Use the values on your number line to estimate the location of $\sqrt{77}$.

_____ $< \sqrt{77} <$ _____, but $\sqrt{77}$ is closer to _____.

_____ $< \sqrt{77} <$ _____, but $\sqrt{77}$ is closer to _____.

Estimate the decimal part of $\sqrt{77}$ as a fraction.

$$\frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

Therefore, $\sqrt{77}$ is about _____. (calculator check: _____)

SKILL BUILDER 1A

Complete the problems below.

1. In the expression 3^2 , what represents the base? _____

What represents the exponent? _____

2. In the expression x^5 , what represents the base? _____

What represents the exponent? _____

3. Five to the second power is written _____, which is equal to _____ \bullet \square = _____

4. Three squared is written _____, which is equal to _____ \bullet \square = _____

5. Two cubed is written _____, which is equal to _____ \bullet \square \bullet \square = _____

6. x cubed is written _____, which is equal to _____ \bullet \square \bullet \square = _____

7. The square of negative 4 is written _____, which is equal to _____ \bullet \square = _____

8. The opposite of the square of 4 is written _____, which is equal to _____ \bullet \square = _____

SKILL BUILDER 1B

Complete each problem.

$$9. \quad 2^3 \cdot 2^5 = \underline{\hspace{1cm}} \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square = \underline{\hspace{1cm}}$$

$$10. \quad x^3 \cdot x^5 = \underline{\hspace{1cm}} \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square = \underline{\hspace{1cm}}$$

$$11. \quad 5^2 = \underline{\hspace{1cm}}$$

$$12. \quad (-5)^2 = \underline{\hspace{1cm}}$$

$$13. \quad -5^2 = \underline{\hspace{1cm}}$$

$$14. \quad (8^2)^3 = (\underline{\hspace{1cm}})(\underline{\hspace{1cm}})(\underline{\hspace{1cm}}) = (\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}})(\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}})(\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}}) = \underline{\hspace{1cm}}$$

$$15. \quad (x^2)^3 = (\underline{\hspace{1cm}})(\underline{\hspace{1cm}})(\underline{\hspace{1cm}}) = (\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}})(\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}})(\underline{\hspace{1cm}} \cdot \underline{\hspace{1cm}}) = \underline{\hspace{1cm}}$$

$$16. \quad (3^4)^2 = \underline{\hspace{1cm}}$$

$$17. \quad (x^4)^2 = \underline{\hspace{1cm}}$$

KNOWLEDGE CHECK 21

Show your work on a separate sheet of paper and write your answers on this page.

21.1 Areas of Polygons

Use pictures, symbols, numbers, and words to solve each problem.

1. Find the base of a rectangle whose area is 21 square meters and whose height is 3.5 meters.
2. Find the area of a triangle with a base of $2\frac{1}{2}$ feet and a height of 18 feet.

21.2 Squares and Square Roots

Use fractions and decimals to express each square root approximation.

3. $\sqrt{39}$

4. $\sqrt{105}$

21.3 Defining Exponents

Simplify each expression.

5. $(3^2)^4$

6. x^5ix^2

Highlighted Review: Direct Variation

There are 2 cups in 1 pint.

7. How many pints are there in 30 cups?
8. How many cups are there in 30 pints?

HIGHLIGHTED REVIEW PRACTICE 21

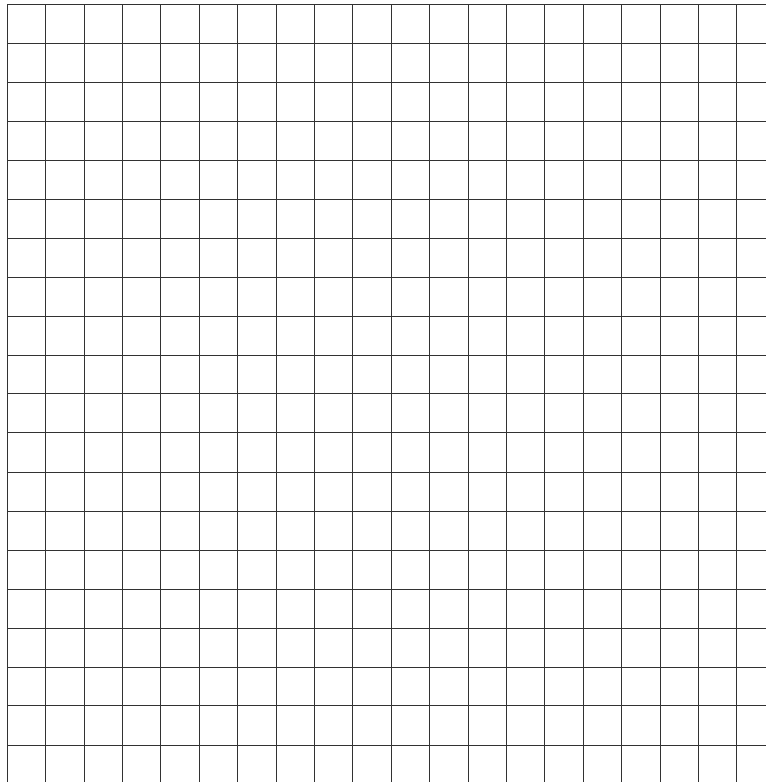
Direct Variation

There are approximately $\frac{3.8 \text{ liters}}{\text{gallon}}$.

- Complete the table of values.

Liters (x)	Gallons (y)
0	0
3.8	1
7.6	
	3
15.2	
x	

- Sketch the graph of gallons (y) vs. liters (x).



HIGHLIGHTED REVIEW PRACTICE 21 (continued)

Direct Variation

3. Find the number of gallons in 95 liters.

4. Find the number of liters in 95 gallons.

5. Describe the relationship between liters (x) and gallons (y) in words.

Choose the best answer.

6. Which of these rules describes the relationship between liters (x) and gallons (y)?

- A. $y = x - 3.8$ B. $y = 3.8x$ C. $y = \frac{x}{3.8}$ D. $y = \frac{3.8}{x}$

CONJECTURES ABOUT EXPONENTS 1

Ready (Summary)	Set (Goals)
We will use patterns to make conjectures about rules for multiplying expressions involving exponents.	<ul style="list-style-type: none">• Use the definition of exponents to make conjectures about multiplying using exponents.• Use exponent rules to simplify expressions involving exponents.

Go (Warmup)

1. Evaluate each expression.

$2^1 = \underline{\hspace{2cm}}$

$2^2 = \underline{\hspace{2cm}}$

$2^3 = \underline{\hspace{2cm}}$

$2^4 = \underline{\hspace{2cm}}$

$2^5 = \underline{\hspace{2cm}}$

$2^6 = \underline{\hspace{2cm}}$

$2^7 = \underline{\hspace{2cm}}$

$2^8 = \underline{\hspace{2cm}}$

2. Evaluate the expression $2^3 + 2^4$.

Can this value be written as 2 raised to a whole number power? Use some examples to justify your answer.

EXPONENT EXPRESSIONS 1

Complete the problems below.

Expression	Conclusion
<p>1.</p> <div style="text-align: center;"> </div> $(3^2)(3^4) = (\square \cdot \square)(\square \cdot \square \cdot \square \cdot \square) = 3^6$ <p>Exponent relationship: <input type="text"/></p>	$(3^2)(3^4) = 3^{\square} = 3^6$
<p>2.</p> <div style="text-align: center;"> </div> $(2^3)(2^4) = (\square)(\square) = 2^{\square}$ <p>Exponent relationship: <input type="text"/></p>	$(2^3)(2^4) = 2^{\square}$
<p>3.</p> $(4)(4^5) = (\square)(\square) = 4^{\square}$ <p>Exponent relationship: <input type="text"/></p>	$(4)(4^5) = 4^{\square}$
<p>4.</p> $(x^2)(x^5) = (\square)(\square) = x^{\square}$ <p>Exponent relationship: <input type="text"/></p>	$(x^2)(x^5) = x^{\square}$
<p>5. Make a conjecture:</p> $(x^a)(x^b) = x^{\square}$	
<p>6. Write this conjecture in words:</p>	

EXPONENT EXPRESSIONS 2

Complete the problems below.

Expression	Conclusion
<p>1.</p> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">exponents</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="text-align: left;"> $(3^2)^4 = (3^2)$ $= (\square \cdot \square)(\square \cdot \square)(\square \cdot \square)(\square \cdot \square) = 3^8$ </div> <div style="text-align: right;"> (\square) (\square) $(\square) = 3$ </div> </div> <div style="margin-top: 20px;"> $(3^2)^4 = 3$ $= 3^8$ </div> </div> <p style="text-align: center; margin-top: 20px;">Exponent relationship: </p>	<div style="text-align: center;"> $(3^2)^4 = 3$ $= 3^8$ </div>
<p>2.</p> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">exponents</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="text-align: left;"> $(2^3)^4 = (2^3)$ $= (\square \cdot \square \cdot \square)(\square \cdot \square \cdot \square)(\square \cdot \square \cdot \square)(\square \cdot \square \cdot \square) = 2$ </div> <div style="text-align: right;"> (\square) (\square) $(\square) = 2$ </div> </div> <div style="margin-top: 20px;"> $(2^3)^4 = 2$ $= 2$ </div> </div> <p style="text-align: center; margin-top: 20px;">Exponent relationship: </p>	<div style="text-align: center;"> $(2^3)^4 = 2$ $= 2$ </div>
<p>3.</p> <div style="text-align: center;"> $(x^2)^5 = (\square) (\square) (\square) (\square) (\square) = x$ $= (\square \cdot \square)(\square \cdot \square)(\square \cdot \square)(\square \cdot \square)(\square \cdot \square) = x$ </div> <p style="text-align: center; margin-top: 20px;">Exponent relationship: </p>	<div style="text-align: center;"> $(x^2)^5 = x$ $= x$ </div>
<p>4. Make a conjecture:</p> <div style="text-align: center; margin-top: 20px;"> $(x^a)(x^b) = x$ </div>	
<p>5. Write this conjecture in words:</p>	

TIME-DISTANCE GRAPHS

Ready (Summary)	Set (Goals)
We will use information about friends going to a park after school to help us understand time, distance, and rate of speed relationships using numbers and graphs.	<ul style="list-style-type: none"> • Solve time-distance problems. • Interpret time-distance graphs. • Explore rates of change on a graph. • Understand the meaning of the points of intersection of two graphs.

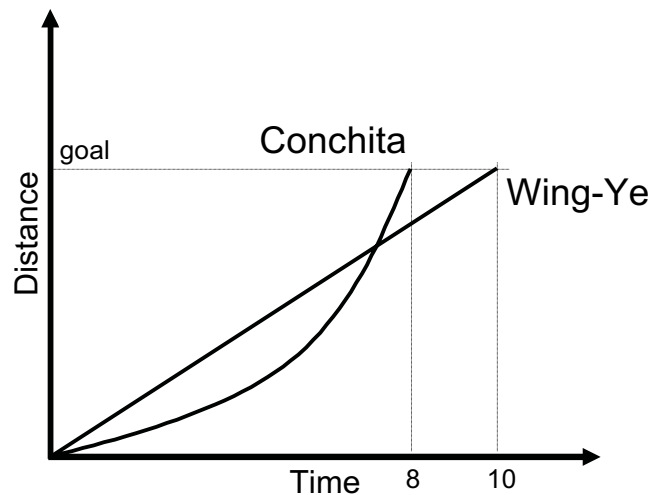
Go (Warmup)

Wing-Ye and Conchita are racing. Use the graph below to answer the following questions.

1. Who starts out faster? _____
 How do you know? _____

2. Who starts out slower? _____ Does she ever catch up? _____
 How do you know? _____

3. Who wins the race? _____
 How do you know? _____



GOING TO THE PARK: PART 1

Complete the problem below.

INTRODUCTION

A group of friends are going to meet at the park after school. They will all travel 90 meters straight down Euclid Street from the school to the park.

Zoë got a new digital camera and wants to use it to take pictures of her friends' journey. She will monitor their progress by taking pictures at six-second intervals from a building high above Euclid Street. She will then lay the pictures down side-by-side, in order from the first picture to the last. She will then graph these images and analyze their movements.

Approximately how far is 90 meters? _____

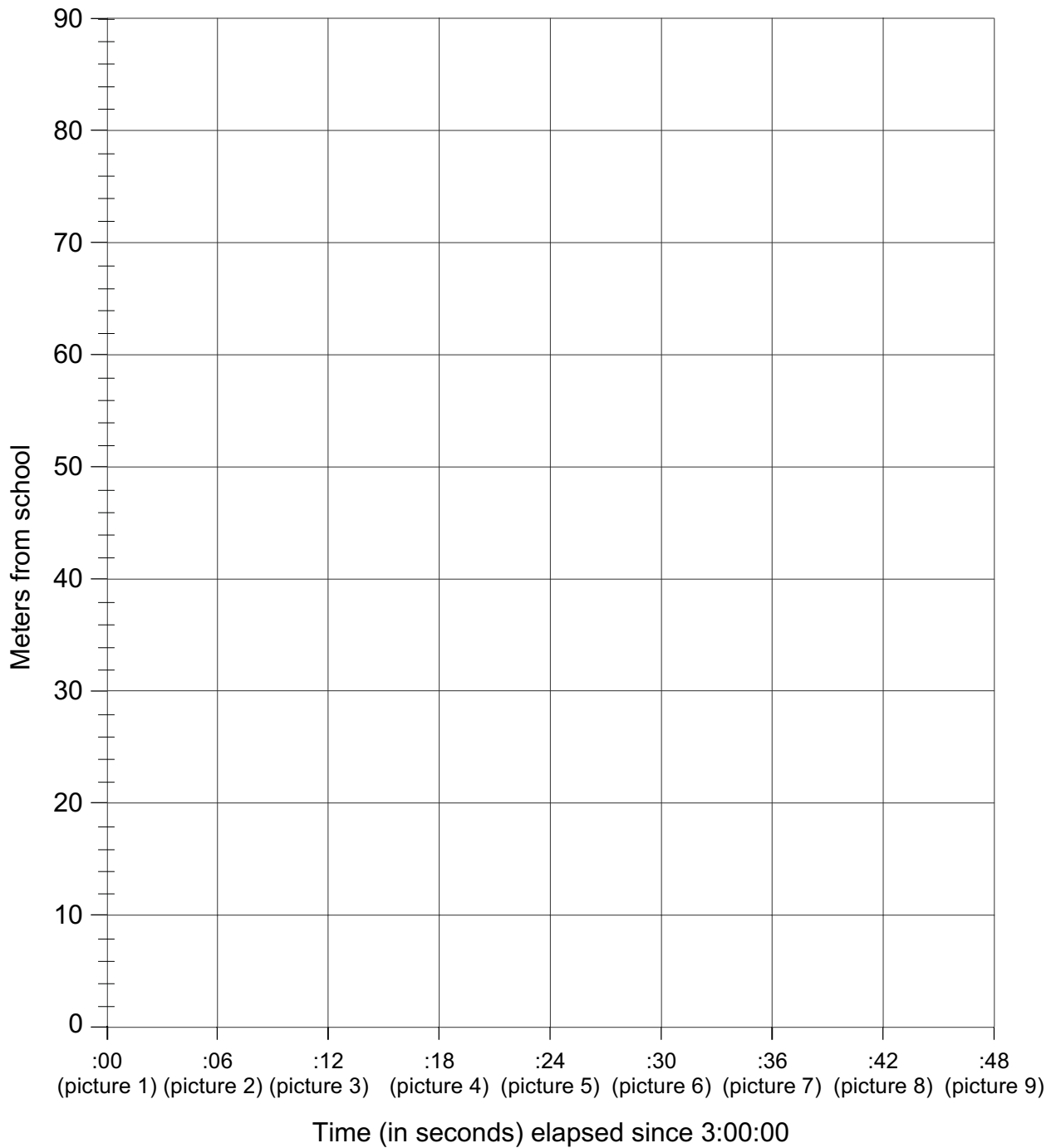
The girls will get started first. Zoë starts to take pictures at exactly 3:00:00. Amy is walking and got a head start. At 3:00 she is already 36 meters from school. Brandy is jumping rope. She leaves the school at 3:00:00.

Graph the information from the table about Amy and Brandy.

Name	Picture #								
	(Picture 1 starts at 0 seconds. Zoë took a picture every 6 seconds.)								
	1	2	3	4	5	6	7	8	9
Amy's distance from school	36m	42m	48m	54m	60m	66m	72m	78m	84m *
Brandy's distance from school	0m	12m	24m	36m	48m				

*Not yet 90m from school

RECORDING SHEET: PART 1



BRANDY'S JOURNEY

Suppose that Brandy continues to jump rope, through all 9 of Zoë's pictures. Complete the following information about Brandy's journey.

1.

Time (in seconds)	0	6	12	18	24				
Distance (in meters)	0	12	24						
Picture #	1	2	3	4	5	6	7	8	9

2. Write a rule that describes the relationship between Brandy's time and distance.

In words: Distance = _____

In symbols: $D =$ _____

3. Use the information about Brandy's journey in question #1 to complete the table below.

Pictures	Change in Distance (in meters)	Elapsed Time (in seconds)	Rate of change $\frac{\text{meters}}{\text{second}}$
1 to 2	$12\text{m} - 0\text{m} = 12\text{m}$	$6\text{ sec} - 0\text{ sec} = 6\text{ sec}$	$\frac{12\text{m}}{6\text{ sec}} = \frac{2\text{m}}{1\text{ sec}}$
1 to 3			
1 to 4			
2 to 4			
3 to 4			

4. What do you notice about the rates of change between each pair of pictures? How is this shown on the graph?

GOING TO THE PARK: PART 2

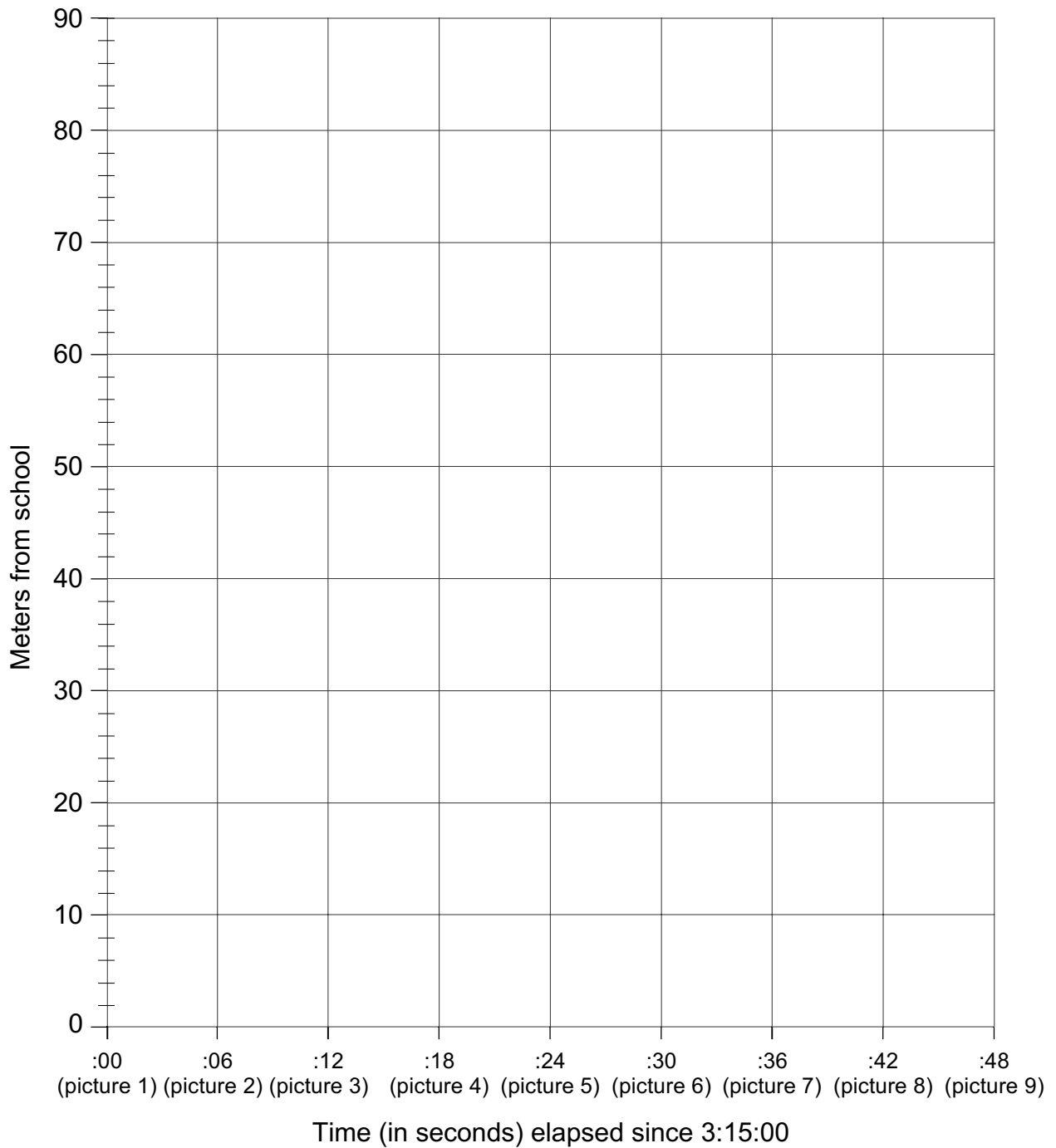
Now, Zoë will take pictures of Charlie and Diego starting at 3:15:00. Charlie had left earlier and is waiting 60 meters from the school. Diego is already at the park at 3:15:00. He leaves the park on his roller skates to go back to school for soccer practice.

Graph the information from the table about the two boys.

Name	Picture # (Picture 1 starts at 0 seconds. Zoë took a picture every 6 seconds.)								
	1	2	3	4	5	6	7	8	9
Charlie's distance from school	60m	60m	60m	60m	60m	60m	60m	60m	60m
Diego's distance from school	90m	72m	54m	36m	18m	0m **	/	/	/

** 90m from park

RECORDING SHEET: PART 2



SKILL BUILDER 1A

Scientific notation is a system for writing numbers that uses exponents and powers of 10. In scientific notation, a number is written as a number that is greater than or equal to 1 and less than 10, multiplied by a power of 10.

	Standard notation	Product of a number between 1 and 10, and a multiple of 10	Scientific notation
	5,200	$5.2 \times 1,000$	5.2×10^3
1.	479,000,000	$4.79 \times 100,000,000$	$4.79 \times 10^{\square}$
2.	2,000	$2 \times \square$	$2 \times 10^{\square}$
3.	68,000,000	$\square \times \square$	$\square \times 10^{\square}$
4.		$4.58 \times 10,000$	
5.		$2.6 \times 1,000,000$	
6.			5.1×10^4
7.			3.07×10^5

SKILL BUILDER 1B

Compute.

8. $6^8 \cdot 6^{12}$	9. $x^9 \cdot x^7$	10. $(4^7)^3$
11. $(x^5)^6$	12. $x^m \cdot x^n$	13. $(x^m)^n$
14. $2^6 + 6^2$	15. $2^6 + 2^6$	16. $6^2 + 6^2$
17. Avi said that $3^4 + 3^2 = 3^6$. Is Avi correct? Explain.		

KNOWLEDGE CHECK 22

Show your work on a separate sheet of paper and write your answers on this page.

22.1 Conjectures About Exponents 1

Use $<$, $>$, or $=$ to make each statement true.

1. 4^5 _____ $(4^3)^2$

2. $(x^5)^6$ _____ $(x^3)^{10}$

22.2 Time-Distance Graphs

Jamal starts rollerblading at 8:00 am. The table below shows the distance Jamal travels at four-second intervals past after 8:00 am.

3. Complete the table using the established pattern.

Time (seconds past 8:00am)	0	4	8	12	16	20	24	28
Distance (meters traveled)	0	20	40	60				

4. Write a rule about the relationship between Jamal's time and distance.

In words: Distance = _____

In symbols: $D =$ _____

22.3 Rules for Exponents 1

Complete the table.

	Standard form	Product of a number between 1 and 10, and a multiple of 10	Scientific notation
5.	38,700	$3.87 \times 10,000$	
6.	9,700,000		9.7×10^6

Highlighted Review: Percent Applications

7. What is \$1,200 decreased by 40%?

8. Calculate the simple interest on a loan of \$800 at 7.5% for 2 years.

HIGHLIGHTED REVIEW PRACTICE 22

Percent Applications

1. Find 30% of 410.	2. Find 15% of 410.
3. Find 45% of 410.	4. What is 410 increased by 15%?
5. What is 410 increased by 45%?	6. What is 410 decreased by 30%?
7. Find the total amount to repay a bank for a loan of \$1,880 at 4.5% simple interest per year for 2 years.	

Choose the best answer.

8. What is the simple interest on a loan of \$9,500 at 7.2% per year for 4 years? A. \$684 B. \$2,736 C. \$6,840 D. \$27,360
--

CONJECTURES ABOUT EXPONENTS 2

Ready (Summary)	Set (Goals)
<p>We will use patterns to make more conjectures about exponent rules.</p>	<ul style="list-style-type: none"> • Make conjectures about exponent rules for division based on recognizing patterns. • Use the definition of exponents, and exponent rules, to simplify expressions. • Understand the meaning of zero and negative exponents.

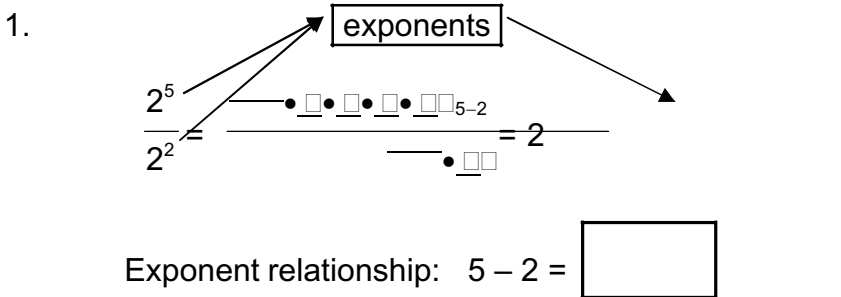
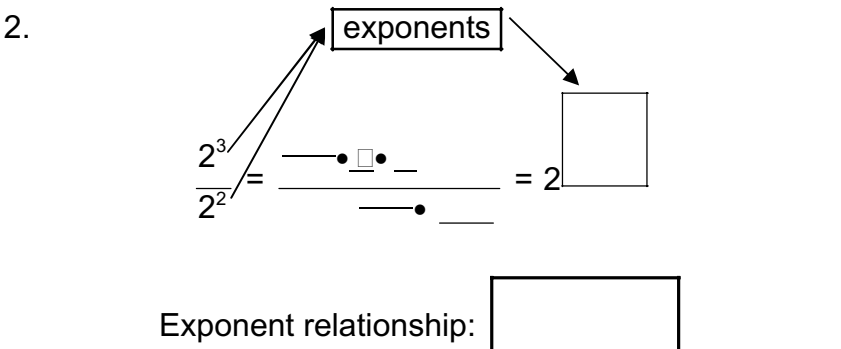
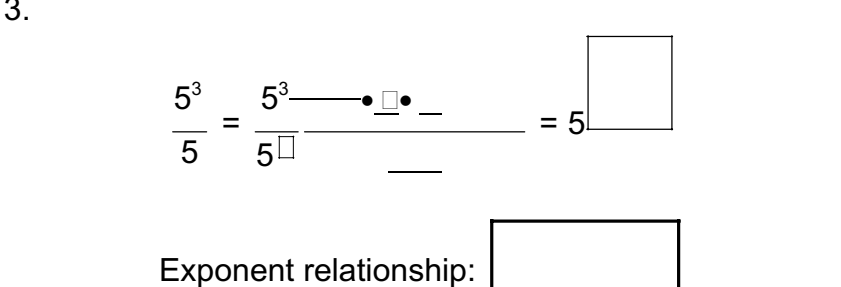
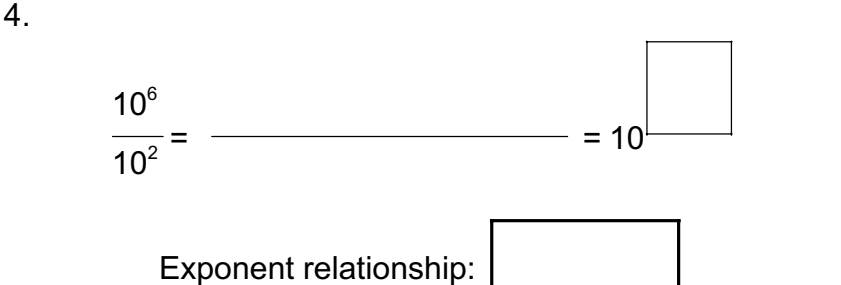
Go (Warmup)

Simplify each expression.

1. $5^3 \cdot 5^2$	2. $(5^3)^2$	3. $x^3 \cdot x^2$	4. $(x^3)^2$
5. $\frac{5^3}{5^2}$	6. $\frac{5^2}{5^3}$	7. $\frac{x^3}{x^2}$	8. $\frac{x^2}{x^3}$

EXPONENT DIVISION 1

Write each result using a **positive** exponent.

Expression	Conclusion
<p>1.</p>  <p>Exponent relationship: $5 - 2 =$ <input type="text"/></p>	$\frac{2^5}{2^2} = 2 \square$
<p>2.</p>  <p>Exponent relationship: <input type="text"/></p>	$\frac{2^3}{2^2} = 2 \square$
<p>3.</p>  <p>Exponent relationship: <input type="text"/></p>	$\frac{5^3}{5} = 5 \square$
<p>4.</p>  <p>Exponent relationship: <input type="text"/></p>	$\frac{10^6}{10^2} = 10 \square$
<p>5. Make a conjecture: If $x > 0$ and $a > b$, then</p> $\frac{x^a}{x^b} = x \square$	

EXPONENT DIVISION 2

Write each result using a **positive** exponent.

Expression	Conclusion
<p>1.</p> $\frac{5^2}{5^5} = \frac{5^2}{5^{\cdot \square \cdot \square \cdot \square \cdot \square \cdot \square}} = \frac{5^2}{5^{5-2}} = \frac{\square \square 1}{5^{5-2}}$ <p style="text-align: center;">Exponent relationship: $5 - 2 = \square$</p>	$\frac{5^2}{5^5} = \frac{1}{\quad}$
<p>2.</p> $\frac{10^3}{10^7} = \frac{1}{10^{\square}}$ <p style="text-align: center;">Exponent relationship: \square</p>	$\frac{10^3}{10^7} = \frac{1}{\quad}$
<p>3.</p> $\frac{3}{3^5} = \frac{3^{\square}}{3^5} = \frac{1}{3^{\square}}$ <p style="text-align: center;">Exponent relationship: \square</p>	$\frac{3}{3^5} = \frac{1}{\quad}$
<p>4.</p> $\frac{13^4}{13^6} = \frac{1}{13^{\square}}$ <p style="text-align: center;">Exponent relationship: \square</p>	$\frac{13^4}{13^6} = \frac{1}{\quad}$
<p>5. Make a conjecture: If $x > 0$ and $a < b$, then</p> $\frac{x^a}{x^b} = \frac{1}{\quad}$	

PAPER FOLDING EXPERIMENT

Record the results from folding a piece of paper.

	Number of Folds	Number of Sections	Write the Number of Sections Using Exponents
1.	0	1	
2.	1		
3.	2		
4.	3		
5.	4		
6.	5		
7.	6		
8.	The paper folding experiment suggests that $2^0 = \underline{\hspace{2cm}}$		

EXPONENT PATTERNS

Complete each table.

	Expression	Expanded Form	Power of 10 (fractions okay)	Power of 10 (no fractions)	Value
1.	10^3			10^3	1000
2.	$\frac{10^3}{10^1}$	$\frac{10 \cdot 10 \cdot 10}{10}$			
3.	$\frac{10^3}{10^2}$		10^1	10^1	
4.		$\frac{10 \cdot 10 \cdot 10}{10 \cdot 10 \cdot 10}$			
5.	$\frac{10^3}{10^4}$		$\frac{1}{10^1}$		$\frac{1}{10}$
6.	$\frac{10^3}{10^5}$			10^{-2}	

	Expression	Expanded Form	Power of 3 (fractions okay)	Power of 3 (no fractions)	Value
7.	3^1				
8.			3^0	3^0	
9.	$\frac{3^1}{3^2}$				$\frac{1}{3}$
10.	$\frac{3^1}{3^3}$		$\frac{1}{3^2}$		
11.		$\frac{3}{3 \cdot 3 \cdot 3 \cdot 3}$			$\frac{1}{27}$
12.	$\frac{3^1}{3^5}$			3^{-4}	

Make conjectures: If $x > 0$ and $a > 0$, then

13. $x^0 = \underline{\hspace{2cm}}$ $x^{-1} = \underline{\hspace{2cm}}$ $x^{-a} = \underline{\hspace{2cm}}$

EXPONENT DIVISION 3

Write each result using a **zero** or **negative** exponent.

Expression	Conclusion
<p>1.</p> <div style="text-align: center;"> </div> <p style="text-align: center;">Exponent relationship: $2 - 5 =$ </p>	$\frac{5^2}{5^5} = \underline{\hspace{2cm}}$
<p>2.</p> $\frac{10^3}{10^7} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ <p style="text-align: center;">Exponent relationship: =</p>	$\frac{10^3}{10^7} = \underline{\hspace{2cm}}$
<p>3.</p> $\frac{3}{3^5} = \frac{3^{\square}}{3^5} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ <p style="text-align: center;">Exponent relationship: =</p>	$\frac{3}{3^5} = \underline{\hspace{2cm}}$
<p>4.</p> $\frac{13^4}{13^4} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ <p style="text-align: center;">Exponent relationship: =</p>	$\frac{13^4}{13^4} = \underline{\hspace{2cm}}$
<p>5. Make a conjecture: If $x > 0$ and $a < b$, then</p> $\frac{x^a}{x^b} = x^{\square} \quad \text{and} \quad \frac{x^a}{x^b} = \underline{\hspace{2cm}}$	

PROBABILITY: FAIR GAMES

Ready (Summary)	Set (Goals)
<p>We will play a number cube game and use the game to practice finding empirical and theoretical probabilities. We will use probabilities to determine whether games are fair or unfair. We will learn the difference between independent and dependent events.</p>	<ul style="list-style-type: none"> • Identify terminating and repeating decimals. • Find and compare the experimental and theoretical probabilities of events. • Organize possible outcomes using lists, tree diagrams, and outcome grids. • Understand independence and dependence of events. • Use probability to determine fairness of games.

Go (Warmup)

A terminating decimal is a decimal whose digits are 0 from some point on. The final 0s in the expression for a terminating decimal are usually omitted.

A repeating decimal is a decimal that ends with repetitions of the same pattern of digits.

Write each fraction as a decimal. Is it a terminating decimal or repeating decimal?

1. $\frac{3}{5}$

2. $\frac{5}{6}$

3. $\frac{4}{11}$

4. $\frac{17}{40}$

THE TERMINATOR: EXPERIMENTAL

Ruben and Teresa are playing a game called “The Terminator.” In this game, two six-sided number cubes labeled 1-6 are rolled and a fraction less than or equal to 1 is formed from the values on the two number cubes. If the fraction gives a “repeating decimal,” Ruben gets a point. If the fraction gives a “terminating (non-repeating) decimal,” Teresa gets a point.

Play the game 20 times with a partner and record your results in the table.

Trial #	Numbers Rolled	Fraction Formed	Winner
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Trial #	Numbers Rolled	Fraction Formed	Winner
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

	My Game Data			Our Class Data		
	Number of Wins	Proportion of Wins	Percentage of Wins	Number of Wins	Proportion of Wins	Percentage of Wins
Ruben (repeating)						
Teresa (terminating)						

Ruben thinks this is a fair game. Do you agree with Ruben? Explain. _____

THE TERMINATOR: THEORETICAL

1. Use a list, tree diagram, or an outcome grid to determine the theoretical probabilities of Teresa winning, and of Ruben winning.

2. Based on the theoretical probabilities, do you think that this game is fair? Explain.

3. How do the empirical probabilities in “Our Class Data” compare to the theoretical probabilities?

FROGS IN A POND

Two green frogs and one brown frog live in a pond. The frogs jump in and out of the pond. Put two green cubes and one brown cube in a bag to represent the frogs in the pond.

<p>1. Probability Experiment #1 (Drawing without replacement):</p> <p>One frog is removed from the bag at random and set aside. Then a second frog is removed at random, and the color of the two frogs is noted.</p> <p>Find the sample space:</p> <p>Find the probabilities:</p> <p>P(two green frogs) = _____ (Think: green and green)</p> <p>P(two brown frogs) = _____ (Think: brown and brown)</p> <p>P(two frogs of same color) = _____ (Think: green and green, or brown and brown)</p> <p>P(at least one green frog) = _____ (Think: not two brown frogs)</p>	<p>2. Probability Experiment #2 (Drawing with replacement):</p> <p>One frog is removed from the bag at random, the color is noted, and it is replaced. After shaking the bag, another frog is removed from the bag and the color is noted.</p> <p>Find the sample space:</p> <p>Find the probabilities:</p> <p>P(two green frogs) = _____ (Think: green and green)</p> <p>P(two brown frogs) = _____ (Think: brown and brown)</p> <p>P(two frogs of same color) = _____ (Think: green and green, or brown and brown)</p> <p>P(at least one green frog) = _____ (Think: not two brown frogs)</p>
---	--

SKILL BUILDER 1A

Scientific Notation is a system of writing numbers using exponents and powers of 10. In scientific notation, a positive number is written as a decimal greater than or equal to 1 and less than 10, multiplied by a power of 10.

	Standard notation	Product of a number between 1 and 10, and a multiple of 10	Scientific notation
	0.007	7×0.001 or $7 \times \frac{1}{1000}$ or $7 \times \frac{1}{10^3}$	7×10^{-3}
1.	0.023	2.3×0.01 or $2.3 \times \boxed{}$ or $2.3 \times \boxed{}$	$2.3 \times 10^{\boxed{}}$
2.	0.000459	$4.59 \times \boxed{}$ or $4.59 \times \boxed{}$ or $4.59 \times \boxed{}$	$4.59 \times 10^{\boxed{}}$
3.	0.0061	$\boxed{} \times \boxed{}$	$\boxed{} \times 10^{\boxed{}}$
4.		7.58×0.0001	
5.		$6.2 \times \frac{1}{1000}$	
6.			9.1×10^{-4}
7.			8.03×10^{-5}

SKILL BUILDER 1B

Simplify. Use exponent rules when possible.

8. $\frac{6^8}{6^{12}}$	9. $\frac{x^7}{x^9}$	10. $\frac{(7^4)^3}{(7^7)^6}$
11. x^{6-6}	12. $\frac{6^4 \cdot 6^3}{(6^4)^3}$	13. $\frac{(x^{-2} \cdot x^3)}{x^5}$
14. Write 5^{-4} in as many ways as you can that include exponents.		

KNOWLEDGE CHECK 23

Show your work on a separate sheet of paper and write your answers on this page.

23.1 Conjectures About Exponents 2

Simplify each expression.

1. $\frac{(10^2)^3}{10^8}$

2. $\frac{x^3y}{x^3y}$

23.2 Probability: Fair Games

Marvin and Nathan are playing a game where two number cubes (labeled 1-6) are rolled and the product is calculated. If the product is a multiple of 3, Marvin gets a point. Otherwise, Nathan gets a point.

3. Make an outcome grid to show all the possible outcomes.
4. Is the game fair? Explain how you know.

23.3 Rules for Exponents 2

Complete the chart.

	Standard form	Product of a number between 1 and 10, and a multiple of 10	Scientific notation
Ex.	0.004	4×0.001 or $4 \times \frac{1}{1,000}$	$4 \times \frac{1}{10^3}$ or 4×10^{-3}
5.	0.067		
6.	0.0059		

Highlighted Review: Ratio and Proportion

Solve for each proportion.

7. $\frac{3}{8} = \frac{18}{n}$

8. $\frac{5}{n} = \frac{7}{20}$

HIGHLIGHTED REVIEW PRACTICE 23

Ratio and Proportion

1. $\frac{3}{10} = \frac{x}{15}$	2. $\frac{7}{4} = \frac{84}{x}$
----------------------------------	---------------------------------

3. To make 20 biscuits, Juanita uses 5 a ratio of $\frac{5 \text{ cups flour}}{1 \text{ cup milk}}$.
- a. If Juanita uses 3 cups of milk, how many cups of flour will she use?
- b. How many biscuits can Juanita make with 3 cups of milk?
4. When 2,000 pounds of paper are recycled or reused, 16 trees are saved. How many trees are saved if 5,000 pounds of paper are recycled?

Choose the best answer.

5. If Farmer Bob spends \$90 to feed 3 cows for one week, how much will he spend to feed 8 cows for one week?

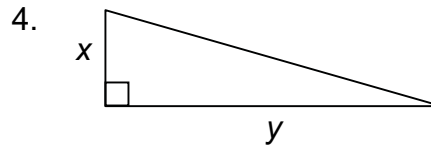
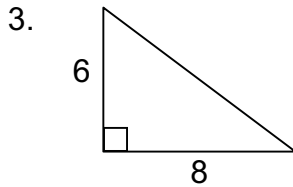
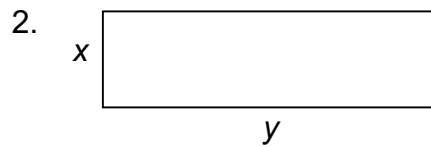
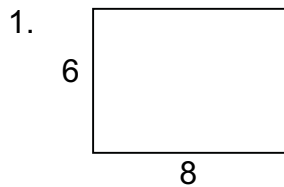
- A. \$240 B. \$270 C. \$420 D. \$720

THE PYTHAGOREAN THEOREM

Ready (Summary)	Set (Goals)
<p>We will explore the relationship between side lengths of right triangles and then look at a proof of the Pythagorean theorem. Then we will use this theorem to solve problems.</p>	<ul style="list-style-type: none"> • Explore the Pythagorean theorem numerically, algebraically, and geometrically. • Understand a proof of the Pythagorean theorem. • Use the Pythagorean theorem and its converse to solve problems.

Go (Warmup)

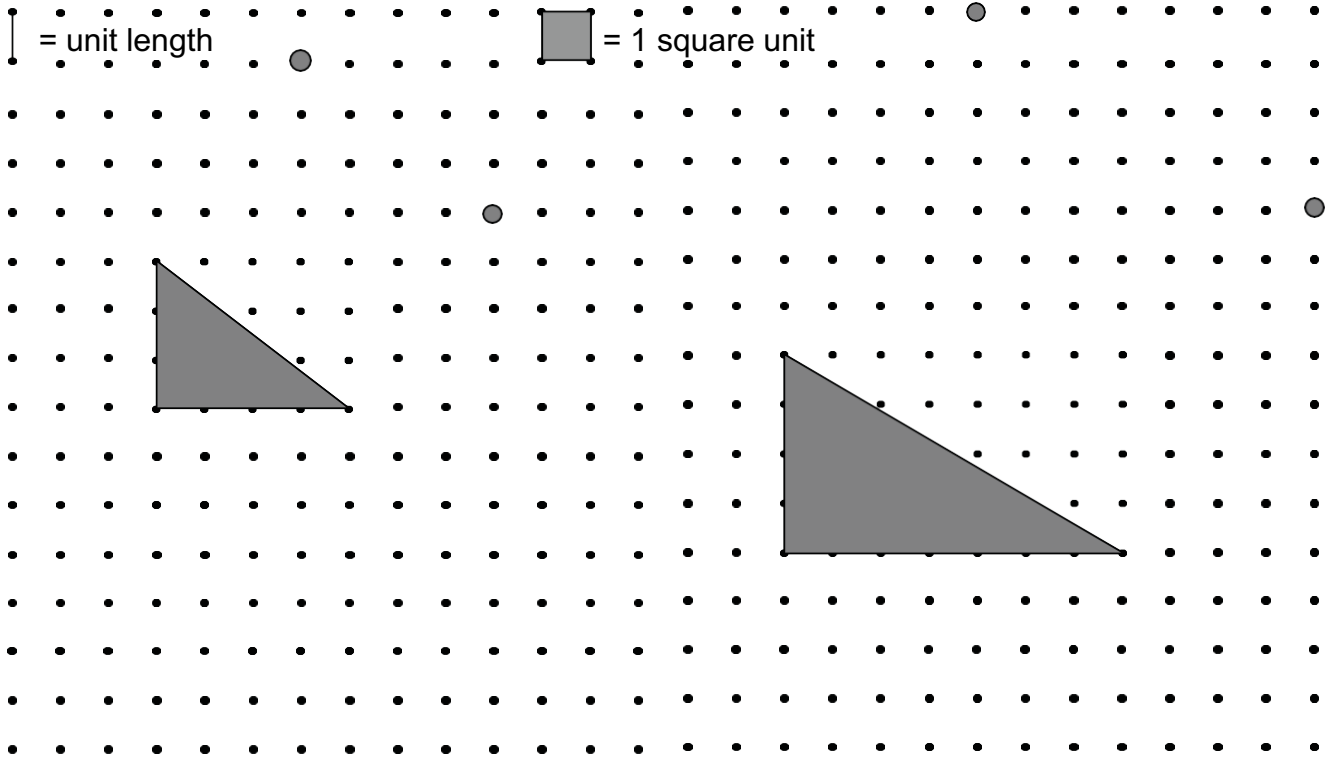
Find the area of each figure in square units.



Simplify each expression.

<p>5. $a + a$</p>	<p>6. $ab + ab$</p>
<p>7. $\frac{1}{2}a + \frac{1}{2}a$</p>	<p>8. $\frac{1}{2}ab + \frac{1}{2}ab$</p>

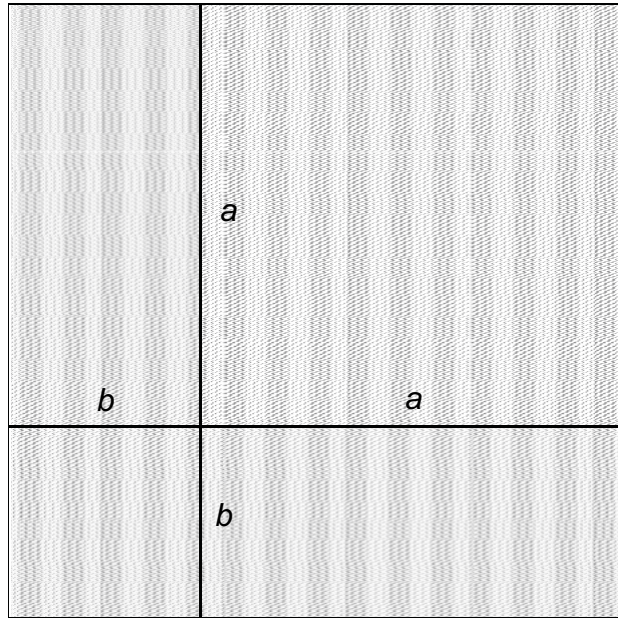
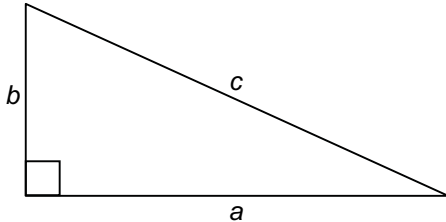
TWO RIGHT TRIANGLES



		Smaller triangle	Larger triangle
1.	Length of the shorter leg		
2.	Length of the longer leg		
3.	Area of the square on the shorter leg		
4.	Area of the square on the longer leg		
5.	Area of the square on the hypotenuse		
6.	Length of the hypotenuse		
7. Write a conjecture about the relationship between the area of square on the hypotenuse and the area of the squares of the legs.			

THE PYTHAGOREAN THEOREM: PART 1

Here is a right triangle with lengths a , b , and c :

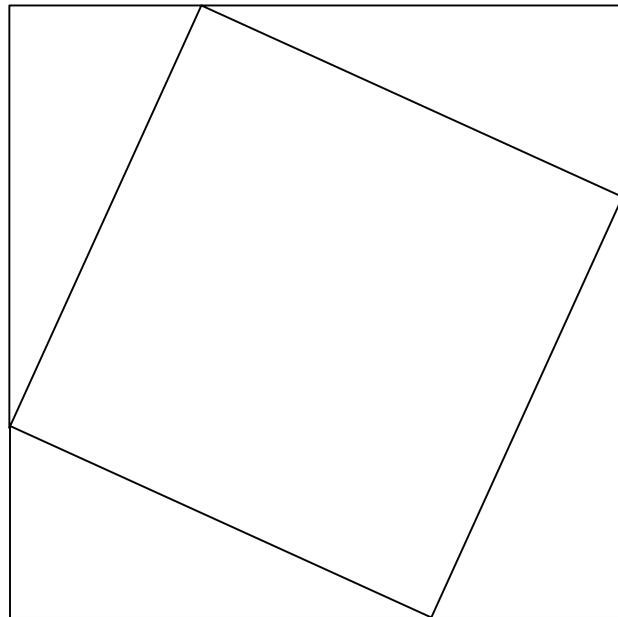


The two congruent squares on the right have been made using lengths a , b , and c .

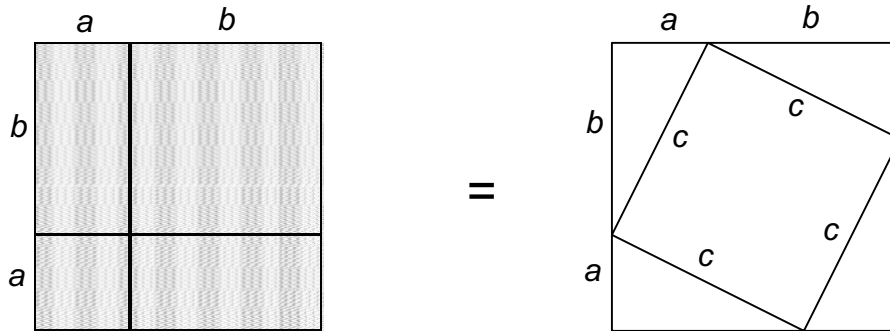
1. Label some right angles and some lengths.

2. Write the area of each polygonal piece inside of it.

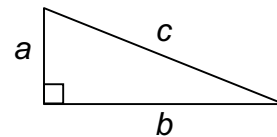
3. Cut out both squares. Then cut them up into the polygons.



THE PYTHAGOREAN THEOREM: PART 2

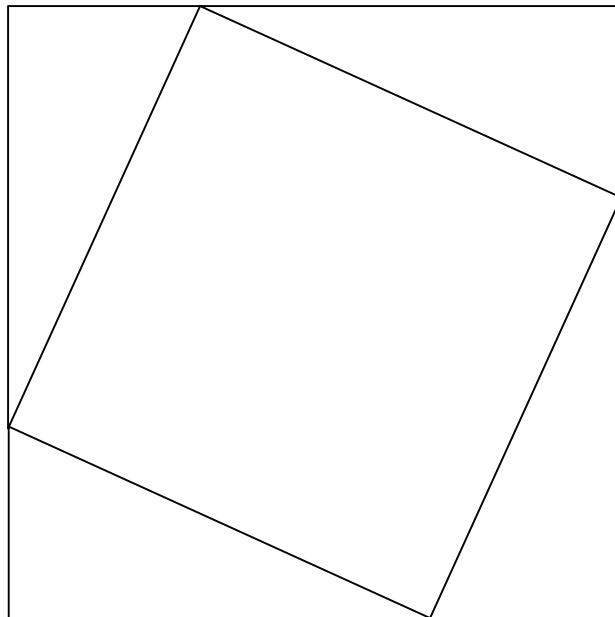
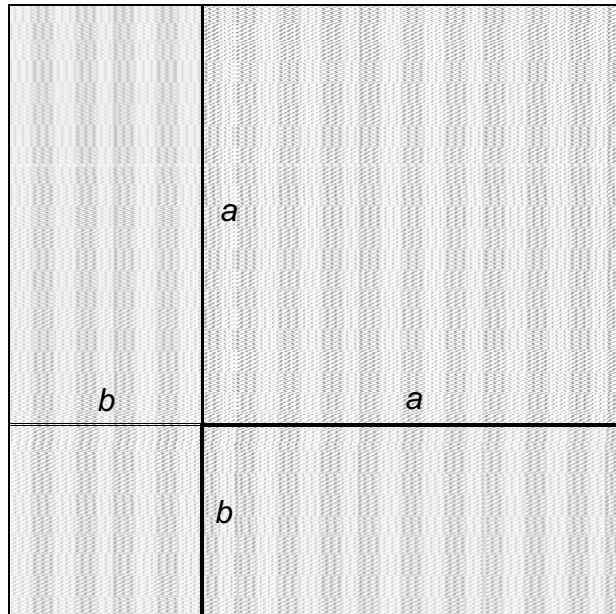


1. Write the areas inside the polygonal pieces in the two square figures above.
2. Write an equation that equates the sum of the areas of the shaded polygons with the sum of the areas of the unshaded polygons.
3. Simplify your equation.
4. Use words to state the meaning of this equation as it refers to the legs and the hypotenuse of the original triangle.



5. This relationship is called the _____

PYTHAGOREAN THEOREM CUT UPS



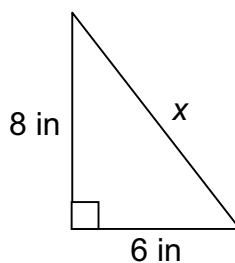
APPLICATIONS OF THE PYTHAGOREAN THEOREM

Ready (Summary)	Set (Goals)
We will use the Pythagorean theorem to solve problems.	<ul style="list-style-type: none">• Use the Pythagorean theorem and its converse to solve problems.• Find perimeters and areas of triangles and rectangles.

Go (Warmup)

1. A triangle has side lengths of 3, 5, and 6 units. Use the Pythagorean theorem to show why this cannot be a right triangle.

2. Find the length of the hypotenuse in the right triangle.



FIND THE MISSING PART

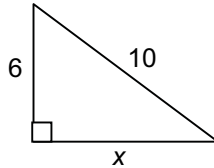
Find the missing length in each right triangle. If needed, use fractions to write square root approximations.

Example: $x^2 + 6^2 = 10^2$

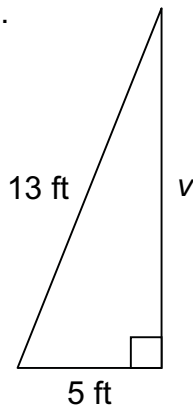
$$x^2 + 36 = 100$$

$$x^2 = 64$$

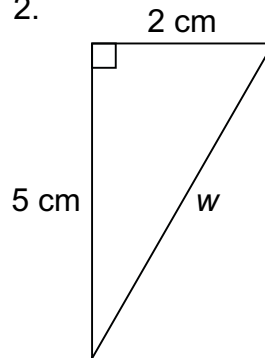
$$x = 8$$



1.



2.



Solve.

3. To get from home to work every day, Samos drives 7 miles east on Avenue A, and then drives north on Avenue B. He knows that the straight-line distance from his home to his place of work is about 25 miles. How many miles is his drive north on Avenue B?

Picture:

Symbols/Numbers:

Words:

MORE GEOMETRIC FIGURES

For each problem, use fractions to write square root approximations.

1. Find the diagonal of a rectangle whose sides are 15 mm and 20 mm long.

Picture:

Symbols/Numbers:

Words:

2. Find the diagonal of a square whose side is 10 cm long.

Picture:

Symbols/Numbers:

Words:

MORE GEOMETRIC FIGURES (continued)

For each problem, use fractions to write square root approximations.

3. Find the height of an isosceles triangle with two congruent sides of 12 inches each and a base that is 18 inches long.

Picture:

Symbols/Numbers:

Words:

4. Find the height of an equilateral triangle whose sides are 4 feet in length.

Picture:

Symbols/Numbers:

Words:

SKILL BUILDER 1

Complete each sentence with the correct word.

mean	median	mode
------	--------	------

1. The _____ is/are the number(s) that appear(s) most often in a group of numbers.
2. The _____ is the sum of a group of numbers divided by the number of addends.
3. The _____ is the middle number in a group of numbers arranged in numerical order.
4. Ken rolled five number cubes labeled 1-6 and found that the sum was 15. What was the mean (average) of these rolls? _____
5. Suppose none of Ken's rolls were sixes. What could the five number cubes rolls be?

_____, _____, _____, _____, _____

6. What is the mode(s) of your numbers from problem #5? _____
7. Six students recorded the number of hours they watched TV over the weekend. The minimum number of hours watched was 4 and maximum was 9. Their mean time was 7 hours. How much TV might each student have watched?

_____, _____, _____, _____, _____, _____

8. Jackie played in 5 basketball games. She always scored more than 5 points. She scored in double-digits once. Her median score was 8. What might her 5 scores be so that her mean is also 8?

_____, _____, _____, _____, _____

9. What is the range for Jackie's scores from your answer to problem #8? _____

KNOWLEDGE CHECK 24

Show your work on a separate sheet of paper and write your answers on this page.

24.1 The Pythagorean Theorem

1. Determine whether a triangle with side lengths 4 m, 6 m, and 7 m is a right triangle.
2. A right triangle has legs of 5 mm and 12 mm. Find the length of its hypotenuse.

24.2 Applications of the Pythagorean Theorem

3. A square has a perimeter of 20 cm. Find the length of its diagonal rounded to the nearest tenth.
4. Find the height of an equilateral triangle whose side is 8 ft. Round your answer to the nearest tenth.

24.3 Statistics: Measures of Center

5. Compute the mean, median, mode, and range of the following set of numbers:

5, 5, 5, 5, 5, 5, 5, 64, 70, 55, 60, 60, 80, 45, 5

6. There are seven whole numbers in a group. The minimum number is 5 and the maximum number is 15. The mean and the median are 11 and the mode is 15. What might be the possible numbers in the group?

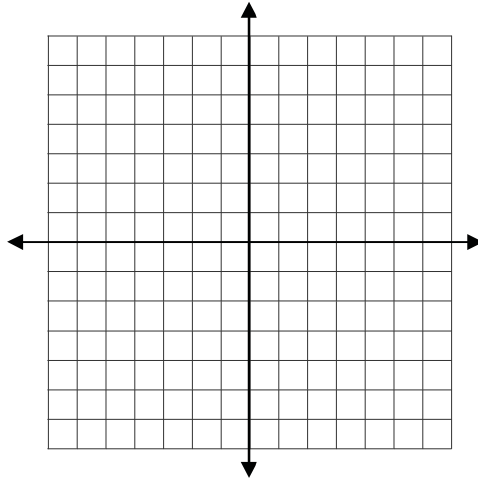
Highlighted Review: Finding Lengths and Areas

7. The points $A(-3, 3)$, $B(-3, -4)$, $C(1, -4)$, and $D(1, 3)$ form rectangle $ABCD$. Find the lengths of side AB and side BC .
8. If the area of the triangle formed by points A , B , and C is 14 square units, then what is the area of the rectangle $ABCD$?

HIGHLIGHTED REVIEW PRACTICE 24

Finding Lengths and Areas

1. Plot the points $J(0, 3)$, $K(-3, -3)$, $L(3, -3)$, and $M(6, 3)$ and connect them to create a parallelogram.



2. Find the length of the parallelogram's base.
3. Find the length of the parallelogram's height.
4. Find the area of the parallelogram.
5. Connect points J and L to create a diagonal. Find the area of triangle JKL .

Choose the best answer.

6. Find the area of a square with a perimeter of 36 mm.

A. 8 mm^2 B. 9 mm^2 C. 64 mm^2 D. 81 mm^2

USING ALGEBRA TO PROVE CONJECTURES 1

Ready (Summary)	Set (Goals)
<p>We will perform mathematical number tricks and use algebraic expressions to show how they work.</p>	<ul style="list-style-type: none"> • Use algebraic expressions to generalize patterns. • Apply number properties to simplify algebraic expressions. • Evaluate expressions using rational numbers. • Write verbal expressions as algebraic expressions.

Go (Warmup)




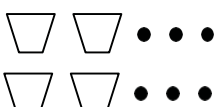
Perform the number trick below.

Steps	Directions	Result
1	Choose a natural number between 1 and 10.	
2	Multiply your number by 2.	
3	Add 8 to your answer.	
4	Divide your answer by 2.	
5	Subtract your original number from your answer.	

What number did you end with? Compare your answers with other classmates' answers. Will this trick work for all numbers? Explain.

NUMBER TRICK 1

Perform the number trick below.

Steps	Words	Numbers	Pictures	Algebraic Process
1	Choose a single digit natural number.			n
2	Add the number to itself.			$n + n = 2n$
3	Add 3.			$2n + 3$
4	Double the result.			$2(2n + 3) = 4n + 6$
5	Subtract your original number.			
6	Divide by 3.			
7	Subtract 2.			
8	What number do you have now?			

What is the number trick? _____

Does this trick always work? Explain. _____

NUMBER TRICK 2

Perform the number trick below.

Steps	Words	Numbers	Pictures	Algebraic Process
1	Choose a natural number.			
2	Multiply by 4.			
3	Add 6.			
4	Multiply by $\frac{1}{2}$.			
5	Add 5.			
6	Divide by 2.			
7	Subtract 4.			
8	Add your original number.			
9	What number do you have now?			

What is the number trick? _____

Does this trick always work? Explain. _____

NUMBER TRICK TEMPLATE

Use this page to create your own number trick.

Step	Words	Numbers	Pictures	Algebraic Process

What is the number trick? _____

Does this trick always work? Explain. _____

USING ALGEBRA TO PROVE CONJECTURES 2

Ready (Summary)	Set (Goals)
<p>We will investigate patterns on the hundreds chart. We will write and use algebraic expressions to prove conjectures based on the patterns.</p>	<ul style="list-style-type: none"> • Gather empirical data to form conjectures about number patterns. • Write and simplify algebraic expressions. • Use algebraic expressions to prove (or disprove) conjectures. • View algebra as a useful mathematical tool.

Go (Warmup)

Using the hundreds chart on the next page, experiment with four numbers that form a 2×2 square. For example, one such group of numbers is

5	6
15	16

Add each diagonal. In other words, find the sums of 5 and 16, and then 6 and 15. Do this for several more 2×2 squares. List any observations or conjectures you might have about these diagonal sums.

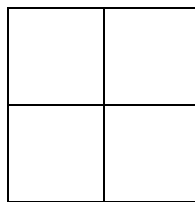
HUNDREDS CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

PROVING CONJECTURES 1

1. Conjecture that the class is going to prove: _____

2. Prove your conjecture by using algebra to label a generalized square and then by taking the sum of each diagonal:



Sum of Diagonal 1	Sum of Diagonal 2
$(\underline{\quad}) + (\underline{\quad} + \underline{\quad})$ $\underline{\quad} + \underline{\quad} + \underline{\quad}$ $\underline{\hspace{2cm}}$	$(\underline{\quad} + \underline{\quad}) + (\underline{\quad} + \underline{\quad})$ $\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$ $\underline{\hspace{2cm}}$

3. Why does this prove the conjecture? _____

PROVING CONJECTURES 2

Now try the same experiment with a 3×3 square. For example:

5	6	7
15	16	17
25	26	27

1. Add each diagonal and compare the sums. Do this for several more 3×3 squares. Do you think the conjecture that we proved for 2×2 squares similarly holds for 3×3 squares?

2. Prove your conjecture algebraically.

Sum of Diagonal 1	Sum of Diagonal 2

3. Does the conjecture hold for all 3×3 squares? Explain. _____

SKILL BUILDER 1

Evaluate.

1. $5 - 3(4)$	2. $(5 - 3)4$
3. $27 \div (9 \cdot 3)$	4. $27 \div 9 \cdot 3$
5. $(10 \cdot 2)^2$	6. $10 \cdot 2^2$
7. -10^2	8. $(-10)^2$
9. $(9 \cdot 3) + (30 \div 6)$	10. $(36 - 28)^2 \div 4^2$
11. $(4^2 + 2) + 75 \div 3$	12. $2 \cdot (12^2 - 3^2) \div 3$

KNOWLEDGE CHECK 25

Show your work on a separate sheet of paper and write your answers on this page.

25.1 Using Algebra to Prove Conjectures 1

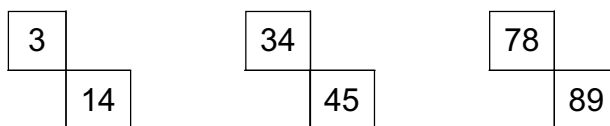
1. Perform the number trick below.

Steps	Words	Numbers	Pictures	Algebraic Process
1	Choose a single digit number.			
2	Square the number.			
3	Multiply by 6.			
4	Add 6.			
5	Divide by 2.			
6	Divide by 3.			
7	Subtract 1.			
8	What number do you have now?			

2. What is the number trick?

25.2 Using Algebra to Prove Conjectures 2

Each of these sets of two numbers forms a diagonal on the hundreds chart:



3. What do you notice when you subtract the number on the upper corner from the number on the lower corner?

4. Prove your conjecture by using algebra to label a generalized diagonal and then by finding the difference.

KNOWLEDGE CHECK 25 (continued)

25.3 Order of Operations

Evaluate each expression.

5. $(12 - 2)^2 \div (28 \div 14)$

6. $(2 + 2)^2 \div 4^2$

Highlighted Review: Exponents and Roots

7. The square root of 115 is located between which two consecutive integers?

8. Which is greater, $\frac{5^2}{5^4}$ or $\frac{5^3}{5^4}$? Explain.

HIGHLIGHTED REVIEW PRACTICE 25

Exponents and Roots

Simplify.

1. $(-9x^5)^2$	2. $(-3mn^2)(-3m^5n)(3n^3)$
3. $r^{-8} \cdot r^4$	4. $\frac{y^9 \cdot y^{-2}}{(3y)^3}$

Estimate each square root between two integers.

5. $\sqrt{62}$	6. $\sqrt{200}$
----------------	-----------------


Choose the best answer.

7. Simplify $\frac{(7x)^2}{7x^2}$.			
A. $49x$	B. 7	C. 49	D. $7x$

WEEKLY QUIZ 26


Solve each equation. Show all steps and check your solution using substitution. Draw pictures if needed.

1.

Picture	Equation/Steps
	$-5x = -7x - 10$

Check your solution using substitution:	

2.

Picture	Equation/Steps
	$-2(2x + 3) = 6$

Check your solution using substitution:	

WEEKLY QUIZ 26 (continued)

3. The perimeter of a square is 68 units. Find the length of each side.

Draw a picture.

Guess		Check
Length of side	Perimeter	$P = 68?$

Generalize	
Length of side	Perimeter
Write and solve the equation	Answer the question
	Check the answer

4. Simplify the expression $-9x + 8x + 2(-2x - 5)$.
5. Write an algebraic expression to represent "12 less than 7 times n ."

HIGHLIGHTED REVIEW QUIZ 26A

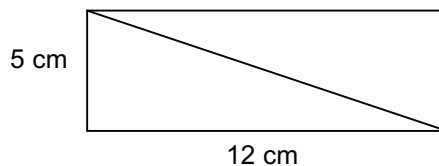
The Pythagorean Theorem

State whether or not the three given numbers could represent the lengths of the sides of a right triangle.

1. 3, 9, 11	2. 14, 48, 50
-------------	---------------

3. The length of one side of a right triangle is 8 inches. The length of the hypotenuse is 17 inches. Find the length of the unknown side.

4. Find the length of the diagonal in the rectangle.



Choose the best answer.

5. The shorter sides of a right triangle are 16 cm and 30 cm long. Find the length of the hypotenuse.
A. 14 cm B. 46 cm C. 34 cm D. 480 cm

HIGHLIGHTED REVIEW QUIZ 26B

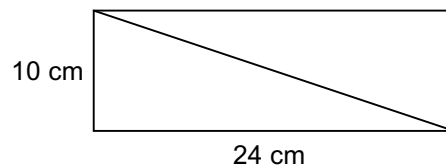
The Pythagorean Theorem

State whether or not the three given numbers could represent the lengths of the sides of a right triangle.

1. 15, 20, 25	2. 4, 8, 12
---------------	-------------

3. The length of one side of a right triangle is 8 inches. The length of the hypotenuse is 10 inches. Find the length of the unknown side.

4. Find the length of the diagonal in the rectangle.



Choose the best answer.

5. The shorter sides of a right triangle are 20 ft and 21 ft long. Find the length of the hypotenuse.
A. 1 ft. B. 29 ft. C. 41 ft. D. 420 ft.

SOLVING EQUATIONS 2

Ready (Summary)	Set (Goals)
<p>We will use a model to solve linear equations. We will record and use mathematical properties to justify each step.</p>	<ul style="list-style-type: none"> • Solve two-step and multi-step linear equations. • Justify the steps in equation solving. • Check solutions of equations. • Use properties of arithmetic and equality.

Go (Warmup)

Solve the following equations using mental math.

1. $4x = -12$

2. $-4x = -12$

3. $-4x = 12$

Fill in the missing numbers and name the property of arithmetic or equality being shown.

4. $(3)(4) = (\underline{\quad})(3) = 12$

Property:

5. $2(5 + 10) = 2(5) + \underline{\quad}(10) = 30$

6. $\begin{array}{c} \square 3 \square \\ \square 3 \square \\ \square \quad \square \end{array} (6) = \underline{\quad} (6) = 6$

SOLVING EQUATIONS TEMPLATE

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div>	
Check your solution using substitution:		

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div>	
Check your solution using substitution:		

ALGEBRA APPLICATIONS: PERIMETER PROBLEMS

Ready (Summary)	Set (Goals)
<p>We will solve problems involving the perimeter of polygons using organized guess-and-check tables and algebra.</p>	<ul style="list-style-type: none"> • Solve and check problems in a geometric context. • Use multiple approaches for solving word problems, including pictures, numbers, and symbols. • Use algebraic notation and conventions to solve problems.

Go (Warmup)

Sketch and label each figure described below. Then find each perimeter.

<p>1. A square with a side that equals 6 cm.</p>	<p>2. A rectangle that is 14 in. by 12 in.</p>
<p>3. An equilateral triangle with a side that equals 11 cm.</p>	<p>4. An isosceles triangle with congruent sides that are 5 in. each and the third side that is 9 in.</p>

PERIMETER PROBLEM 1

The perimeter of a square is 216 units. How long is each side?

Make a sketch and label it:

Guess	Perimeter ($4s = P$)	Check $P = 216?$
Length of one side (s)		
20	80	too high <u>too low</u> just right

Generalize

Length of one side s	Perimeter $\underline{\quad} \cdot s = 216$
Write and solve the equation	How long is each side?
	Check the answer

PERIMETER PROBLEM 2

The perimeter of a rectangle is 144 units. The width is 10 units more than the length. How long are the length and width?

Make a sketch and label it:

Guess			Check
Length	Width	Perimeter ($2L + 2W = P$)	P = ____?
20	$20 + 10 = 30$	$2(20) + 2(30) = 40 + 60 = 100$	too low

Generalize

Length L	Width ____ + ____	Perimeter $2(\underline{\quad}) + 2(\underline{\quad} + \underline{\quad}) = 144$
Write and solve the equation		How long are the length and the width?
		Check the answer

PERIMETER PROBLEM 3

The length of the second side of a triangle is twice the length of the first side. The length of the third side is 4 units more than the first side. The perimeter of the triangle is 72 units. How long is each side?

Make a sketch and label it:

Guess				Check
Length of the first side (L)	Length of the second side	Length of the third side	Perimeter	$P = \underline{\hspace{1cm}}?$

Generalize			
Length of first side	Length of second side	Length of third side	Perimeter
Write and solve the equation		Answer the question	
		Check the answer	

PERIMETER PROBLEM 4

A regular octagon has a perimeter of 208 units. How long is each side?

Make a sketch and label it:

Guess		Check
Length of one side (s)	Perimeter (P)	$P = \underline{\hspace{1cm}}?$

Generalize	
Length of one side s	Perimeter
Write and solve the equation	Answer the question
	Check the answer

SKILL BUILDER 1A

Translate each verbal expression into an algebraic expression, expression, or inequality.

1. 23 less than x	2. 23 is less than x	3. x less than 23
4. 15 more than twice x	5. 15 is more than twice x	6. Twice 15 is more than x
7. x increased by the product of 5 and 8	8. x is the product of 5 and 8	9. The product of x and 5, increased by 8

Write an algebraic expression for each verbal expression.

Verbal Expression	Algebraic Expression
10. 47 less than x	
11. The product of n and 15	
12. The product of 8 and x , all divided by 5	
13. 7 more than 2 times x	

SKILL BUILDER 1B

Simplify.

14. $6x + 2x - 5$	15. $3x + 2(x - 5)$	16. $a^2 + 2a + 3a - 6$
17. $10(s - 5) + 5$	18. $x^2 + 5 + 3x - 5$	19. $-x + x + (3x - x)$

Evaluate for $x = 2$ and $y = -3$.

20. $3x + 9y - 26$	21. $54 + 13x - 3y$	22. $-x^2 + y^2 - 23$
23. $-(x + y)^2$	24. $2x + 3(x - 5) + (-y)$	25. $16 \div x \cdot y$

KNOWLEDGE CHECK 26

Show your work on a separate sheet of paper and write your answers on this page.

26.1 Solving Equations 2

Solve each equation. Show all steps and check your solution using substitution. Draw pictures if needed.

1. $4x = -4x - 8$

2. $-6(x+1) = -12$

26.2 Algebra Applications: Perimeter Problems

3. The perimeter of a rectangle is 98 units. The length is 9 units more than the width. Find the dimensions of the rectangle.
4. A regular hexagon has a perimeter of 102 units. How long is each side?

26.3 Simplifying Expressions

5. Simplify the expression $-3x + 2x + 5(x - 2)$.
6. Write an algebraic expression to represent "8 less than 3 times x."

Highlighted Review: The Pythagorean Theorem

7. Explain whether it is possible for a right triangle have side lengths of 10 units, 15 units, and 20 units.
8. What is the length of the hypotenuse of a right triangle with legs that measure 6 units and 8 units?

HIGHLIGHTED REVIEW PRACTICE 26

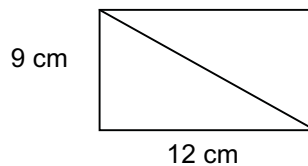
The Pythagorean Theorem

State whether or not the three given numbers could represent the lengths of the sides of a right triangle.

1. 14, 48, 50	2. 8, 9, 10
---------------	-------------

3. The length of one side of a right triangle is 16 inches. The length of the hypotenuse is 20 inches. Find the length of the unknown side.

4. Find the length of the diagonal in the rectangle.



Choose the best answer.

5. The shorter sides of a right triangle are 10 units and 24 units long. Find the length of the hypotenuse.
A. 14 units B. 26 units C. 34 units D. 240 units

SOLVING EQUATIONS TEMPLATE

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; height: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; height: 100%; display: flex; flex-direction: column; justify-content: space-around; align-items: center;"> <div style="border-bottom: 1px dashed black; width: 80%;"></div> <div style="border-bottom: 1px dashed black; width: 80%;"></div> <div style="border-bottom: 1px dashed black; width: 80%;"></div> </div>	
Check your solution using substitution: <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>		


Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; height: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; height: 100%; display: flex; flex-direction: column; justify-content: space-around; align-items: center;"> <div style="border-bottom: 1px dashed black; width: 80%;"></div> <div style="border-bottom: 1px dashed black; width: 80%;"></div> <div style="border-bottom: 1px dashed black; width: 80%;"></div> </div>	
Check your solution using substitution: <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>		

SOLVING EQUATIONS 3

Ready (Summary)	Set (Goals)
<p>We will solve algebraic equations. We will rely less on models and pictures, and focus more on using symbolic notation.</p>	<ul style="list-style-type: none"> • Solve two-step and multistep linear equations. • Justify the steps in equation solving. • Check solutions of equations.

Go (Warmup)

Solve the equation. Fill in the table completely.

Picture	Equation/Steps	What did you do?
	$-3(x - 1) = 9$	
<p>Check solution by substitution:</p>		

PROPERTIES OF ARITHMETIC AND EQUALITY

Properties of Arithmetic

Property	Description with symbols	Example with numbers	Abbreviation
Associative property of addition	$a + (b + c) = (a + b) + c$ for any numbers a , b , and c		
Commutative property of addition	$a + b = b + a$ for any numbers a and b		
Identity property of addition	$a + 0 = a$ for any number a		
Inverse property of addition	$a + (-a) = 0$ for any number a		
Associative property of multiplication	$a \cdot (b \cdot c) = (a \cdot b) \cdot c$ for any numbers a , b , and c		
Commutative property of multiplication	$a \cdot b = b \cdot a$ for any numbers a and b		
Identity property of multiplication	$a \cdot 1 = 1 \cdot a = a$ for any number a		
Inverse property of multiplication	$a \cdot \frac{1}{a} = 1$ for any number $a \neq 0$		
Distributive property of multiplication over addition	$a(b + c) = ab + ac$ for any numbers a , b , and c		

Properties of Equality

Property	Description	Example with numbers	Abbreviation
Addition property of equality	If $a = b$ and $c = d$, then $a + c = b + d$ for all numbers		
Multiplication property of equality	If $a = b$ and $c = d$, then $ac = bd$ for all numbers		

RIGHT OR WRONG

Check each solution. If it is correct, write in what was done for each step. If it is incorrect, find the mistake and correct it. Use pictures if needed.

	Equation/Steps	What was done?
1.	$16x - 9 = 20x + 19$ $\begin{array}{r} -16x \quad -16x \end{array}$	addition property of equality
	$-9 = 4x + 19$ $\begin{array}{r} -19 \quad -19 \end{array}$	
	$\frac{-28}{4} = \frac{4x}{4}$	
	$-7 = x$	
	Check solution by substitution:	

	Equation/Steps	What was done?
2.	$-x + 7 = -3(x - 5)$	
	$-x + 7 = -3x + 15$ $\begin{array}{r} +3x \quad +3x \end{array}$	
	$2x + 7 = 15$ $\begin{array}{r} -7 \quad -7 \end{array}$	
	$\frac{2x}{2} = \frac{8}{2}$ $x = 4$	
	Check solution by substitution:	

RIGHT OR WRONG (continued)

	Equation/Steps	What was done?
3.	$-2x - 1 = -(x - 1)$	
	$-2x - 1 = -x$ $+x \quad +x$	
	$-x - 1 = -1$ $+1 \quad +1$	
	$-x = 0$ $x = 0$	
	Check solution by substitution:	

	Equation/Steps	What was done?
4.	$-2(x + 3) = 12$	
	$-2x - 6 = 12$ $+6 \quad +6$	
	$\frac{-2x}{2} = \frac{18}{2}$	
	$x = 9$	
	Check solution by substitution:	

SOLVING EQUATIONS TEMPLATE

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div>	
Check your solution using substitution:		

Picture	Equation/Steps	What did you do?
<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div>	<div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%;"></div> <div style="border-left: 1px dashed black; border-right: 1px dashed black; width: 100%; text-align: center;">=</div>	
Check your solution using substitution:		

ALGEBRA APPLICATIONS: NUMBER PROBLEMS

Ready (Summary)	Set (Goals)
<p>We will solve problems about numbers and coins using organized guess-and-check tables and algebra.</p>	<ul style="list-style-type: none">• Solve and check single-variable word problems involving unknown numbers.• Use multiple representations for solving word problems, including words, pictures, numbers, and symbols.• Use algebraic notation and conventions to solve problems.

Go (Warmup)

Translate these verbal expressions into algebraic expressions.

1. The sum of a number x and 4
2. A number x , decreased by 4
3. 4 decreased by x
4. The product of a number m and 6
5. Twice a number w , subtracted from 12

NUMBER PROBLEM 1

The sum of two numbers is 160. One number is 48 more than the other. What are the two numbers?

Guess		Check	
The first number	The second number	Sum	_____ = 160?
25	$25 + 48 = 73$	$25 + 73 = 98$	too high <u>too low</u> just right

Generalize

n	$n + \underline{\hspace{2cm}}$	$n + (\underline{\hspace{1cm}} + \underline{\hspace{1cm}}) = 160$
Write and solve an equation		Answer the question
		Check your answer

NUMBER PROBLEM 2

Five times a number added to 6 times the same number is equal to 209. What is the number?

Guess			Check	
The number	5 times the number	6 times the number	Sum	_____ = 209?
Generalize				
n	_____ • n	_____ • n	_____ • n + _____ • n = 209	
Write and solve an equation			Answer the question	
			Check your answer	

NUMBER PROBLEM 3

420 is subtracted from the product of a number and 12. This difference is equal to 960. What is the number?

Guess				Check
The number				____ = ____ ?

Generalize

n			
Write and solve an equation		Answer the question	
		Check your answer	

NUMBER PROBLEM 4

The sum of a number and 44 is equal to twice the number decreased by 30. What is the number?

Guess				Check
The number				_____ = _____ ?

Generalize

n			
Write and solve an equation		Answer the question	
		Check your answer	

SKILL BUILDER 1A

Solve each equation. Justify each step.

Equation	Why can you do this?
1. $\frac{1}{2}x + 3 = 5$	<hr/> <hr/> <hr/> <hr/>
2. $2x + \frac{1}{2} = \frac{5}{6}$	<hr/> <hr/> <hr/> <hr/>
3. $-2.6 = 3x + 2.5$	<hr/> <hr/> <hr/> <hr/>

SKILL BUILDER 1B

Solve each equation. Justify each step.

Equation	Why can you do this?
4. $1.6x + 9.8 = 3.8x + 5.4$	<div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px;"></div>
5. $\frac{1}{2}x + 2 = \frac{1}{4}x - 6$	<div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px;"></div>
6. $3x - \frac{4}{5} = 2\frac{\square}{\square}x + \frac{1\square}{5\square}$	<div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px; margin-bottom: 10px;"></div> <div style="border-top: 1px dashed black; height: 10px;"></div>

KNOWLEDGE CHECK 27

Show your work on a separate sheet of paper and write your answers on this page.

27.1 Solving Equations 3

Write all steps in solving each equation. Provide justifications/explanations for each step. Use pictures as needed.

1. $-5x + 10 = 7x - 6$

2. $2(x - 2) - 3(x + 1) = 0$

27.2 Algebra Applications: Number Problems

3. Three times a number added to 5 times the same number is equal to 176. What is the number?
4. The sum of a number and 28 more than the number is 74. What is the number?

27.3 Solving Equations 4

Solve each equation. Justify each step.

5. $\frac{1}{2}x + 5 = 9$

6. $2.5x + 7.5 = 0.5x + 16.5$

Highlighted Review: Probability and Statistics

7. Two 6-sided number cubes, each labeled 1-6, are rolled and their sum is recorded. Make an outcome grid to show all the equally likely outcomes.
8. What is the probability of rolling a sum less than 7?

HIGHLIGHTED REVIEW PRACTICE 27

Probability and Statistics

A box contains 3 red and 3 white chips. Two chips are drawn without replacement.

1. Make an outcome grid to find all possible outcomes.

Use the outcome grid to find the probability of each event:

2. P(2 red chips)	3. P(2 chips of the same color)
4. P(1 red and 1 white chip)	5. P(at least one white chip)

6. Neko took four math tests and got the following scores: 82, 74, 78, 91. What must he earn on the next math test to have an average of 85?

Choose the best answer.

7. Which of these numbers could not be a probability?			
A. 3:10	B. 0.5	C. 100%	D. $\frac{5}{2}$

INEQUALITIES

Ready (Summary)	Set (Goals)
<p>We will write, solve, and graph the solutions of equations and inequalities.</p>	<ul style="list-style-type: none"> • Add, subtract, multiply, and divide integers. • Write expressions, equations, and inequalities. • Solve linear equations and inequalities. • Graph inequalities. • Make and test conjectures about equations and inequalities.

Go (Warmup)

Here are six mathematical symbols:

= < > ≤ ≥ ≠

Select two different symbols to make each statement true.

1. $4 \square 6$

or

$4 \square 6$

2. $\frac{3}{4} \square 0.75$

or

$\frac{3}{4} \square 0.75$

3. $-4 \square -6$

or

$-4 \square -6$

4. $0.52 \square 0.206$

or

$0.52 \square 0.206$

5. $-4(-6) \square -3(-8)$

or

$-4(-6) \square -3(-8)$

6. $5 - 7 \square -2 + (-3)$

or

$5 - 7 \square -2 + (-3)$

7. $\frac{5-3}{8} \square \frac{-4(3+(-1))}{-2}$

or

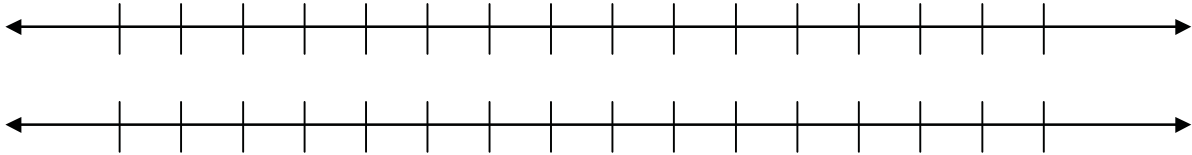
$\frac{5-3}{8} \square \frac{-4(3+(-1))}{-2}$

EXPLORING INEQUALITIES

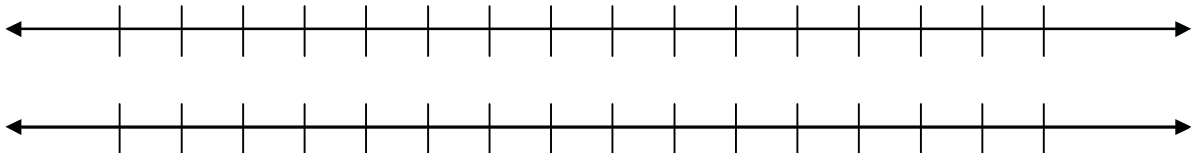
1. Complete this table.

Begin each operation with	then do to both sides:	Steps		Result
		Left	Right	
$4 < 10$	Add 5	$4 + 5$	$10 + 5$	$9 < 15$
	Add -5			
	Subtract 3			
	Subtract -3	$4 - (-3)$	$10 - (-3)$	
	Multiply by 8			
	Multiply by -8			
	Divide by 2			
	Divide by -2	$4 \div \underline{\quad}$	$10 \div \underline{\quad}$	

On the first number line below, graph the numbers 4 and 10. Below it, graph the result of subtracting -3 from 4 and -3 from 10.



On the first number line below, graph the numbers 4 and 10. Below it, graph the result of dividing 4 by -2 and 10 by -2.



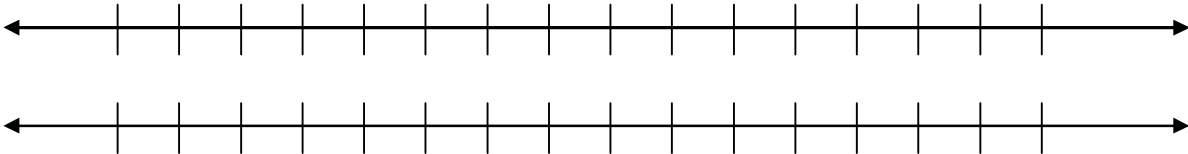
- Circle every result where the inequality must change direction.
- When must the direction of the inequality symbol change?

EXPLORING INEQUALITIES (continued)

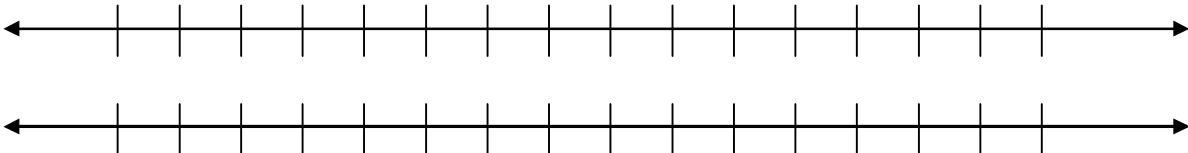
2. Complete this table.

Begin each operation with	then do to both sides:	Steps		Result
		Left	Right	
$-6 > -9$	Add 5	$-6 + 5$	$-9 + 5$	
	Add -5			
	Subtract 7			
	Subtract -7			
	Multiply by 2			
	Multiply by -2			
	Divide by 3			
	Divide by -3			

On the first number line below, graph the numbers _____ and _____. Below it, graph the results of dividing _____ by _____ and _____ by _____.



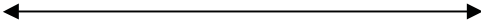
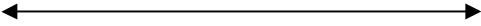
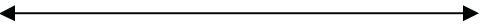

On the first number line below, graph the numbers _____ and _____. Below it, graph the results of dividing _____ by _____ and _____ by _____.



- Circle every result where the inequality must change direction.
- When must the direction of the inequality symbol change?

SOLVING INEQUALITIES 1

Solve each inequality. Then graph the solution and check by testing a number.

<p>1. Inequality: $-2x + 1 \leq 5$</p> <p>Graph:</p>  <p>Check:</p>	<p>2. Inequality: $-x + 6 \geq 3$</p> <p>Graph:</p>  <p>Check:</p>
<p>3. Inequality: $5 - x > 2$</p> <p>Graph:</p>  <p>Check:</p>	<p>4. Inequality: $-(x - 1) < -4$</p> <p>Graph:</p>  <p>Check:</p>

TESTING CONJECTURES IN MATHEMATICS

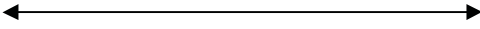
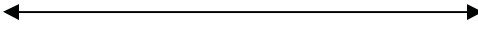
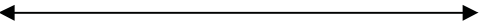
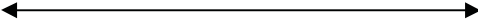
Test each statement by checking examples. Then make a conjecture. Is the statement true or false? If false, what is the correct statement?

<p>1. True or false:</p> <p style="text-align: center;">$\text{If } a = b, \text{ then } b = a.$</p> <p>Test with examples:</p> <p>Conjecture:</p>	<p>2. True or false:</p> <p style="text-align: center;">$\text{If } a > b, \text{ then } b > a.$</p> <p>Test with examples:</p> <p>Conjecture:</p>
--	--

<p>3. True or false:</p> <p style="text-align: center;">$\text{If } a = b \text{ and } b = c, \text{ then } a = c$</p> <p>Test with examples:</p> <p>Conjecture:</p>	<p>4. True or false:</p> <p style="text-align: center;">$\text{If } a > b \text{ and } b > c, \text{ then } a > c$</p> <p>Test with examples:</p> <p>Conjecture:</p>
--	---

SOLVING INEQUALITIES TEMPLATE

Solve each inequality. Then graph the solution and check by testing a number.

<p>1. Inequality:</p> <p>Graph:</p> <p style="text-align: center;"></p> <p>Check:</p>	<p>2. Inequality:</p> <p>Graph:</p> <p style="text-align: center;"></p> <p>Check:</p>
<p>3. Inequality:</p> <p>Graph:</p> <p style="text-align: center;"></p> <p>Check:</p>	<p>4. Inequality:</p> <p>Graph:</p> <p style="text-align: center;"></p> <p>Check:</p>

ALGEBRA APPLICATIONS: TRAIN PROBLEMS

Ready (Summary)	Set (Goals)
<p>We will use organized guess-and-check tables and algebra to solve rate problems about trains.</p>	<ul style="list-style-type: none"> • Solve and check single-variable word problems involving rate, time, and distance. • Use multiple representations for solving word problems, including words, pictures, numbers, and symbols. • Use algebraic notation and conventions to solve problems.

Go (Warmup)

Draw a sketch for each situation. Use arrows (\longrightarrow) and label with the appropriate letters and numbers.

1. Two trains start at the same place and travel away from one another. Train A travels 100 miles east and Train B travels 150 miles west.

2. Two trains start in the same place and travel in the same direction. Train C travels 50 miles south and Train D travels 100 miles south.

3. Two trains start 300 miles apart and travel toward one another. Train E travels 100 miles west to east and Train F travels 200 miles east to west to a point at which they meet.

Use the formula Distance = Rate \times Time ($D = RT$) to solve these problems:

<p>4. If a train travels 40 miles per hour for 2 hours, how far does it travel?</p>	<p>5. How long does it take a train to travel 150 miles at 50 miles per hour?</p>	<p>6. If a train travels for 5 hours and goes 75 miles, what is its rate?</p>
---	---	---

TRAIN PROBLEM 1

Two trains that are 360 miles apart are approaching one another. Train A is traveling at a rate of 50 miles per hour and Train B is traveling at a rate of 40 miles per hour. How long will it take for them to meet? How far does each train travel?

Make a sketch and label it:				
Guess Number of hours	Distance Train A travels	Distance Train B travels	Total distance traveled	Check Total distance = 360 miles?
10	$50(10) = 500$	$40(10) = 400$	$500 + 400 = 900$	too high

Generalize

Number of hours h	Distance Train A travels ___ ih	Distance Train B travels ___ ih	Write the equation. ___ $ih +$ ___ $ih =$ _____
Write and solve the equation			How long will it take for the trains to meet?
			How far does each train travel?
Write and solve the equation			Check your answer

TRAIN PROBLEM 2

Two trains start traveling in the same direction, from the same place and at the same time. Train C travels at a rate of 65 miles per hour and Train D travels at a rate of 90 miles per hour. After some time has passed, one train is ahead by 150 miles. Which train is it, and how many hours have passed?

Make a sketch and label it:				
Guess number of hours	Distance Train C travels	Distance Train D travels	Distance between them	Check ___ = ___?
Generalize h				

Solve using algebra

Write and solve the equation	Which train is ahead?
	By how much?
	Check your answer

TRAIN PROBLEM 3

Two trains start traveling from the same place and at the same time. Train E travels West at a rate of 75 miles per hour and Train F travels East at a rate of 80 miles per hour. How long will it take for the trains to be 1,085 miles apart?

Make a sketch and label it:				
Guess				Check ____ = ____?

Solve using algebra.

Write and solve the equation	Answer the question
	Check your answer

TRAIN PROBLEM 4

Two trains start traveling in the same direction from the same place and at the same time. Train G travels at a rate of 110 miles per hour, and train H travels at a rate of 85 miles per hour. After some time has passed, one train is ahead by 125 miles. Which train is it, and how much time has passed?

Make a sketch and label it:				
Guess				Check ____ = ____?

Solve using algebra.

Write and solve the equation	Answer the questions
	Check your answer

SKILL BUILDER 1A

1. The sum of two numbers is 608. One number is 7 times the other. What are the two numbers?

Guess a number			Check ___ = ___?
Generalize n		Write the equation	
Write and solve the equation.		Answer the question	
		Check the answer	

2. Four is subtracted from twice a number. The result is -10. What is the number?

Guess a number			Check ___ = ___?
Generalize n		Write the equation	
Write and solve the equation		Answer the question	
		Check the answer	

SKILL BUILDER 1B

3. A regular hexagon has a perimeter of 270 units. How long is each side?

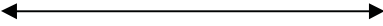
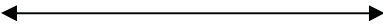
Guess a side			Check ___ = ___?
Generalize s		Write the equation	
Write and solve the equation		Answer the question	
		Check the answer	

KNOWLEDGE CHECK 28

Show your work on a separate sheet of paper and write your answers on this page.

28.1 Inequalities

Solve each inequality, then graph the solution and check by testing a number.

	Inequality	Graph the solution	Test a number
1.	$-3(x-1) > -15$		
2.	$-2x - 8 \leq 12$		

28.2 Algebra Applications: Train Problems

Two trains that are 520 miles apart are approaching one another. Train A is traveling at a rate of 60 miles per hour and Train B is traveling at a rate of 70 miles per hour.

- How long will it take for the trains to meet?
- How much of that distance does each train cover?

28.3 Algebra Applications

- Twice a number added to 6 times the same number is equal to 104. What is the number?
- A regular pentagon has a perimeter of 325 units. How long is each side?

Highlighted Review: Writing Algebraic Expressions

Translate each verbal phrase into an algebraic expression, equation, or inequality.

- Five less than a number n is greater than 12.
- The sum of a number n and 6 is 15.

HIGHLIGHTED REVIEW PRACTICE 28

Writing Algebraic Expressions

Translate each verbal phrase or sentence into an algebraic expression or equation.

1. Eight times the sum of a number and 6	2. A number divided by 4
3. Three less than half of a number	4. Twice the sum of a number and 10 is 20.
5. A number multiplied by 4 is 8	6. Six decreased by 3 times a number

Choose the best answer.

7. Which of these equations represents “twice the sum of a number and 7 is 28”?	
A. $2 + 7x = 28$	B. $2(n + 7) = 28$
C. $2n + 7 = 28$	D. $2 + n + 7 = 28$

INTRODUCTION TO SLOPE

Ready (Summary)	Set (Goals)
<p>We will count distances and use slope definitions to find slopes of line segments on a grid and on a set of coordinate axes. We will explore the meaning of positive, negative, zero, and undefined slopes.</p>	<ul style="list-style-type: none"> • Find distances on a number line. • Understand the concept of slope of a line. • Compute with rational numbers. • Graph ordered pairs in four quadrants of the coordinate plane.

Go (Warmup)

1. Write four equivalent fractions for $\frac{3}{4}$. Include some negative numbers in the numerator and denominator.

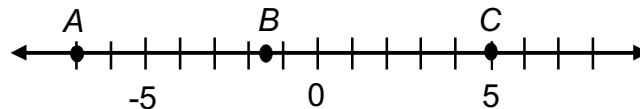
2. Write four equivalent fractions for $-\frac{5}{3}$. Include some negative numbers in the numerator or denominator.

3. Find each distance on the number line.

a. From A to C : _____

b. From B to C : _____

c. From C to A: _____

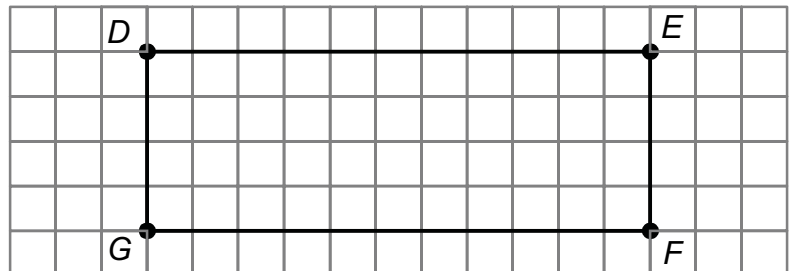


4. Find each distance on the grid (each small square is equal to one square unit):

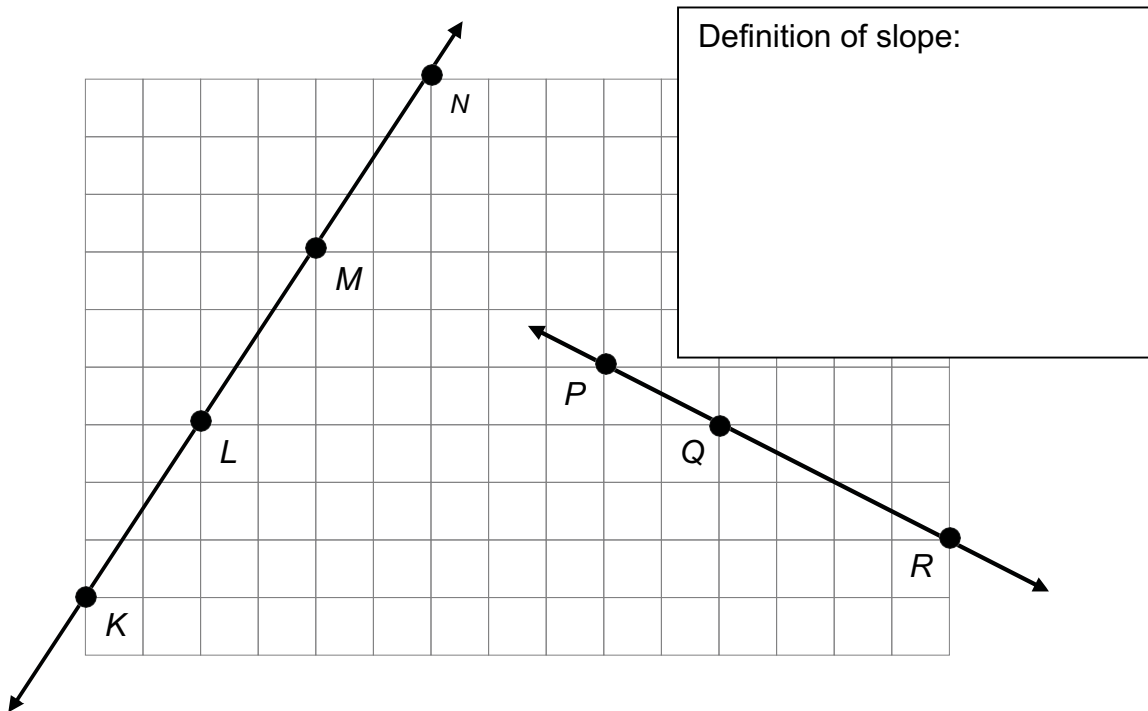
a. From G to D: _____

b. From G to F: _____

c. From E to F: _____



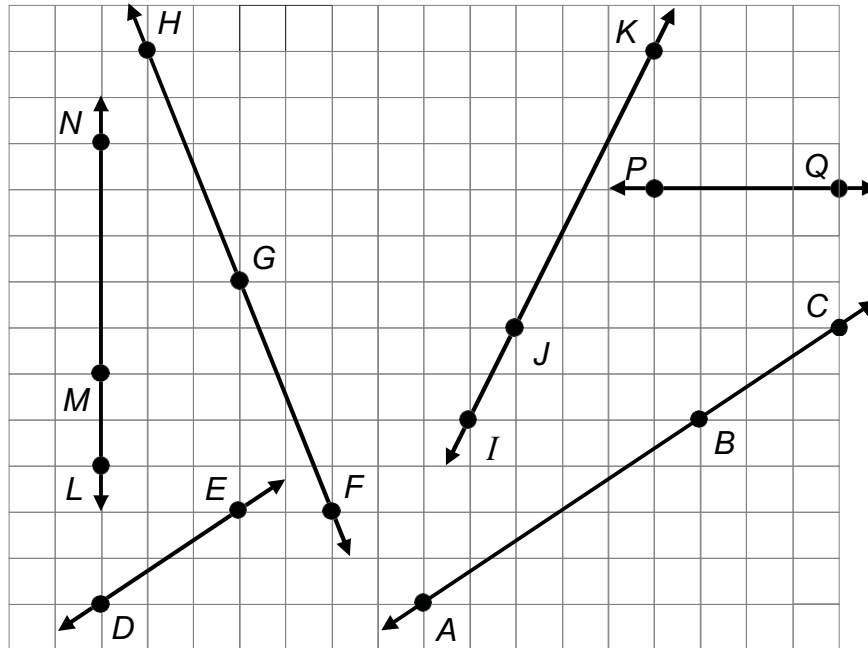
SLOPE NOTES 1



Without counting, determine whether each slope is positive or negative. Then, find the slope of each line segment by counting the vertical and horizontal change as demonstrated by your teacher.

<p>1. Slope of KL: _____</p>	<p>5. Slope of PQ: _____</p>
<p>2. Slope of LN: _____</p>	<p>6. Slope of QR: _____</p>
<p>3. Slope of KN: _____</p>	<p>7. Slope of RP: _____</p>
<p>4. Simplify each fraction. What do you notice?</p> <p>_____</p>	<p>8. Simplify each fraction. What do you notice?</p> <p>_____</p>
<p>9. Make a conjecture about slopes of line segments that lie on the same line.</p>	

SLOPE PRACTICE 1



Without counting, determine whether each slope is positive or negative. Then, find the slope of each line segment by forming a ratio of the vertical change to the horizontal change.

1. Slope of AB : _____	5. Slope of FG : _____
2. Slope of AC : _____	6. Slope of FH : _____
3. Slope of CB : _____	7. Slope of IJ : _____
4. Slope of DE : _____	8. Slope of KI : _____
9. What do you notice about the slopes of line segments lying on the same line?	
10. Which lines appear parallel? What do you notice about the slopes of parallel lines?	

COMPUTATION PRACTICE

Evaluate each expression.

	Column I	Column II
1.	$(6) - (4)$	$-[(4) - (6)]$
2.	$(-2) - (5)$	$-[(5) - (-2)]$
3.	$(-4) - (-1)$	$-[(-1) - (-4)]$

4. Generalize this relationship with symbols:

$$a - b = \underline{\hspace{4cm}}$$

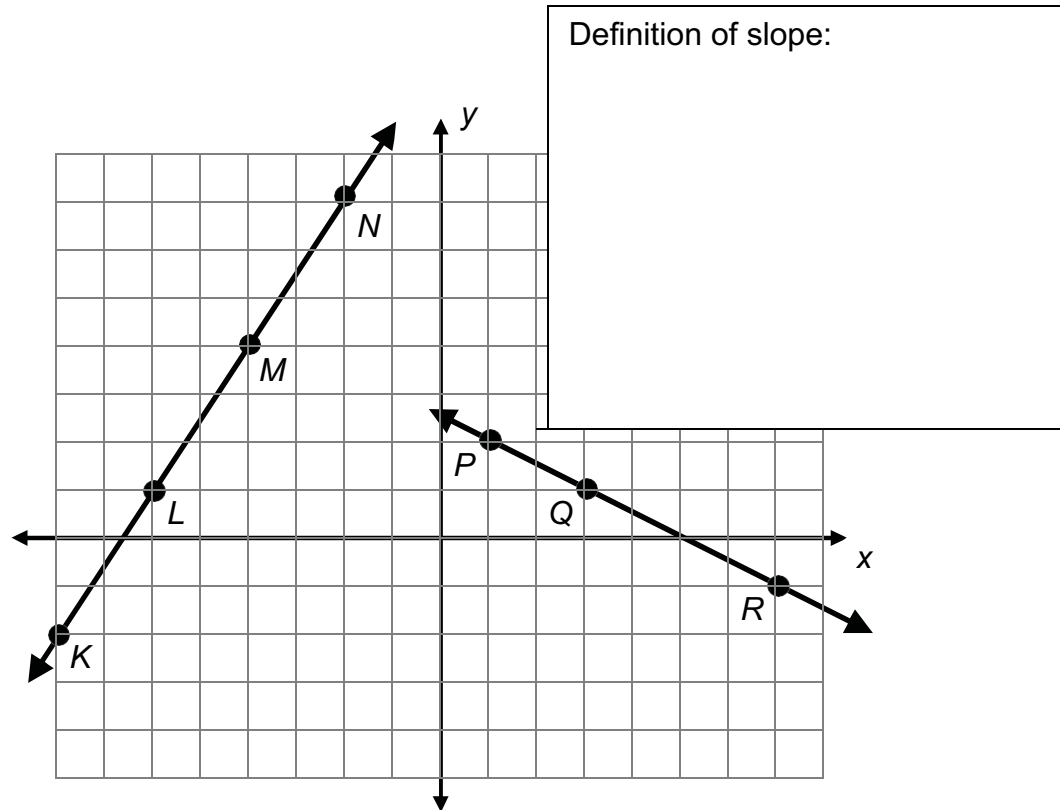
Evaluate each expression.

	Column III	Column IV
5.	$\frac{(2) - (5)}{(6) - (4)}$	$\frac{(5) - (2)}{(4) - (6)}$
6.	$\frac{(-1) - (-2)}{(-4) - (-3)}$	$\frac{(-2) - (-1)}{(-3) - (-4)}$
7.	$\frac{(3) - (-8)}{(12) - (11)}$	$\frac{(-8) - (3)}{(11) - (12)}$

8. Generalize this pattern with symbols:

$$\frac{a - b}{c - d} = \underline{\hspace{4cm}}$$

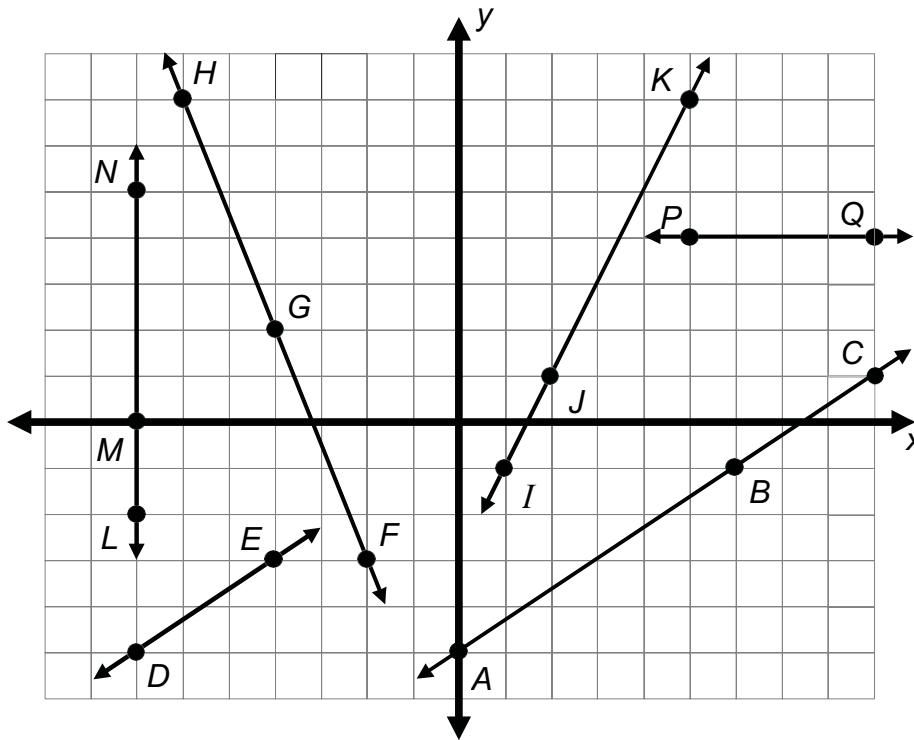
SLOPE NOTES 2



Without counting or computing, determine whether each slope is positive or negative. Then, identify each point as an ordered pair and find the slope of each line segment as demonstrated by your teacher.

<p>1. Line PQ has a _____ slope.</p> <p>2. P: (____, ____)</p> <p>3. Q: (____, ____)</p> <p>4. Slope of line PQ: _____</p>	<p>5. Line KN has a _____ slope.</p> <p>6. K: (____, ____)</p> <p>7. N: (____, ____)</p> <p>8. Slope of line KN: _____</p>
--	--

SLOPE PRACTICE 2

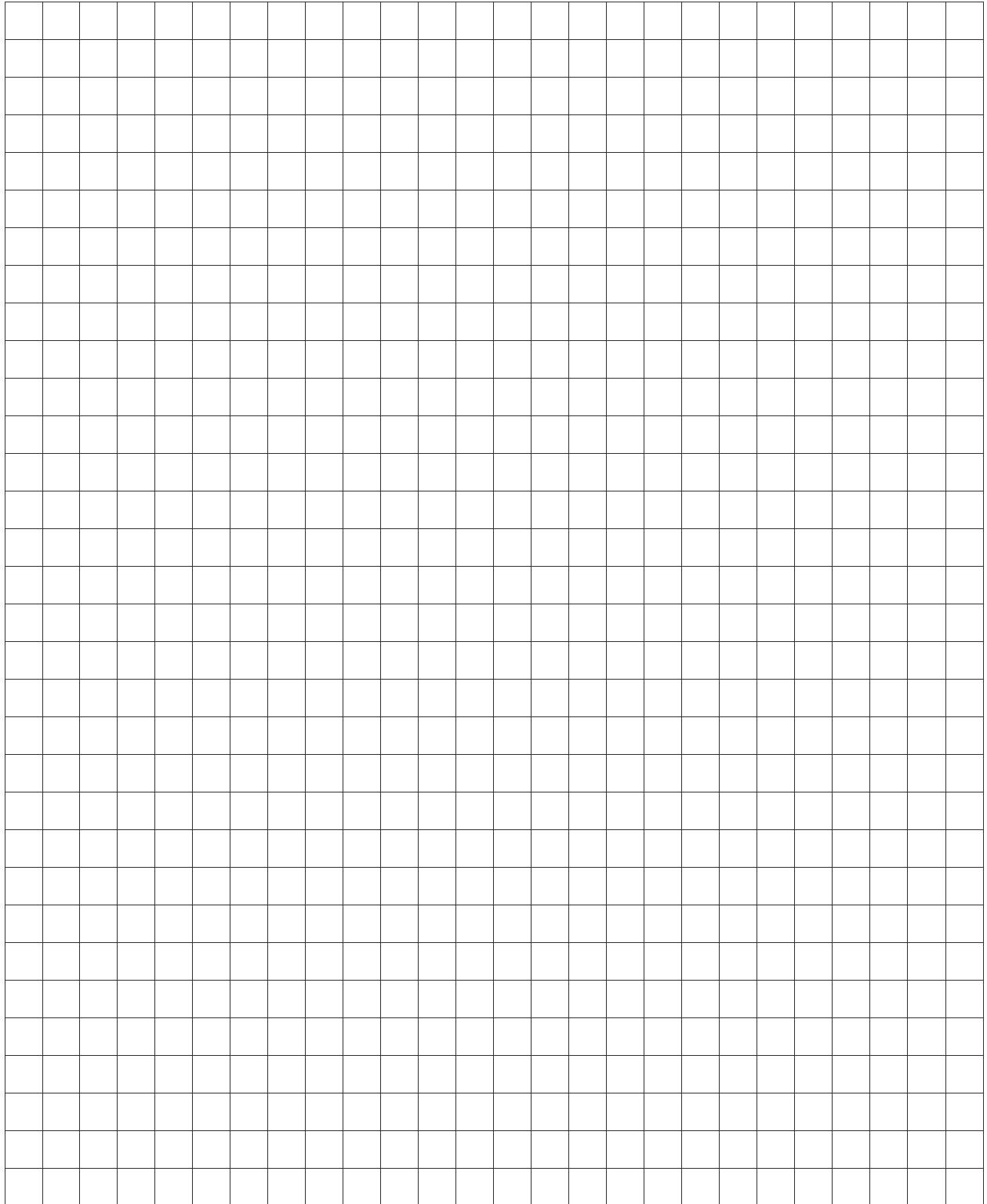


Without counting or computing, determine whether each slope is positive or negative. Then use the slope formula to calculate the slope of each line segment.

<p>1. Slope of FG:</p>	<p>5. Slope of PQ:</p>
<p>2. Slope of FH:</p>	<p>6. Slope of QP:</p>
<p>3. Slope of IJ:</p>	<p>7. Slope of NL:</p>
<p>4. Slope of KI:</p>	<p>8. Slope of LM:</p>

29.1 Introduction to Slope
31.2 Using Two Variables to Solve Problems

GRAPH PAPER

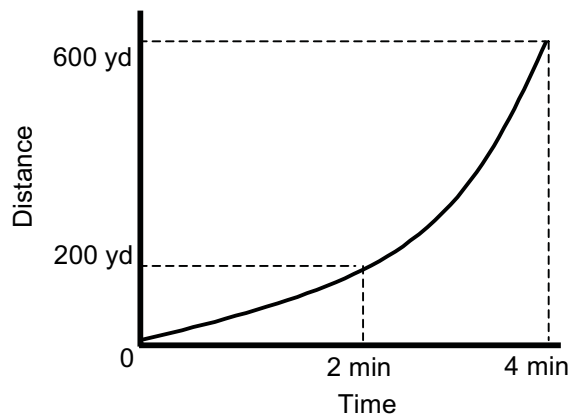


RATE GRAPHS

Ready (Summary)	Set (Goals)
<p>We will use words, pictures, tables of numbers, and graphs to represent rates. We will relate the various representations to each another.</p>	<ul style="list-style-type: none"> • Solve problems involving rates, average speed, distance, and time. • Represent situations graphically and interpret the meaning of specific parts of a graph.

Go (Warmup)

Chris went jogging at the park. Use the graph to complete the table.

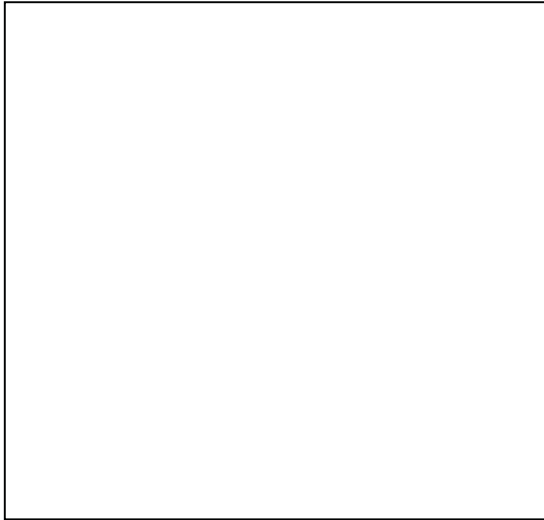


	Time period	Distance traveled	Average rate of speed
1.	From 0 minutes to 2 minutes		
2.	From 2 minutes to 4 minutes		
3.	From 0 minutes to 4 minutes		
<p>4. What part of the jog did Chris run faster, the initial two minutes or the last two minutes? Explain by referencing numbers and the shape of the graph.</p>			

POURING WATER 1

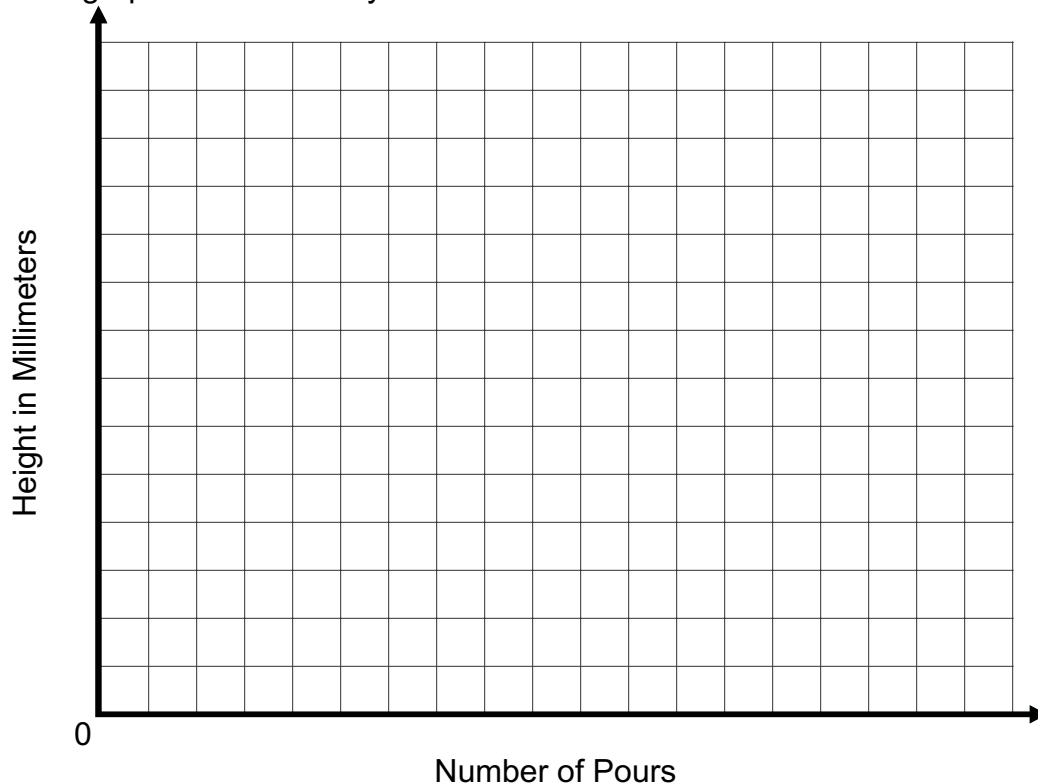
Your teacher will give you a small cup and a clear container. Fill up the small cup with water and pour it into the clear container. After each pour, you will measure and record the height of the water in millimeters.

1. Make a sketch of the clear container used.
2. Record your data in the table.




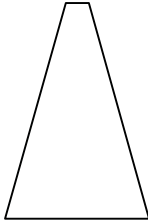
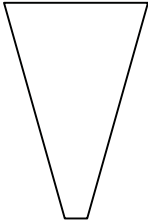
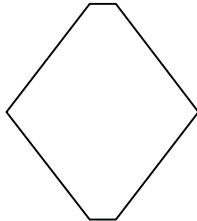
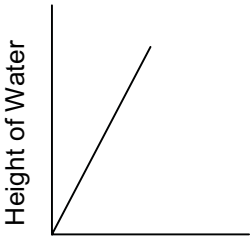
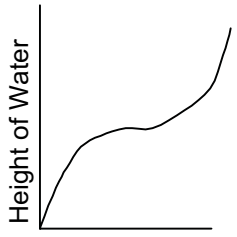
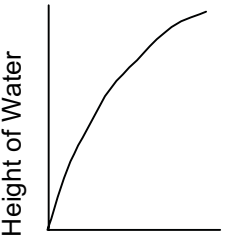
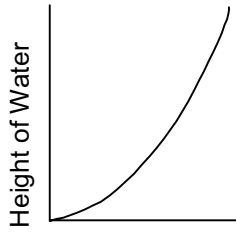
Number of Pours	Height in Millimeters
1	
2	
3	
4	
5	
6	
7	

3. Make a graph of the data in your table.



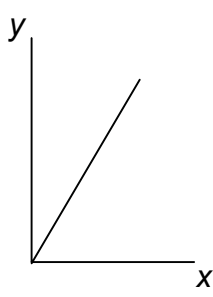
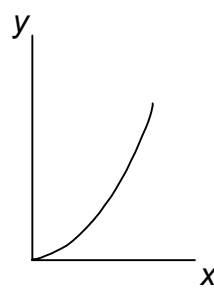
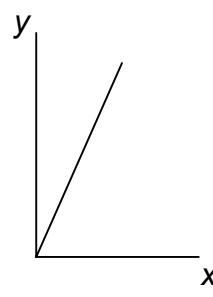
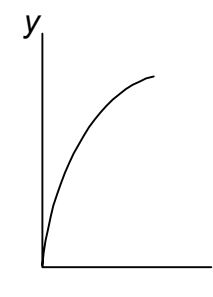
POURING WATER 2

Suppose you poured water into these containers at a constant rate.
 Match each container with an appropriate graph below.
 Write one or two sentences to justify each choice.

<p>1. Container 1</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>Graph: _____</p> <p>Explain:</p>	<p>2. Container 2</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>Graph: _____</p> <p>Explain:</p>		
<p>3. Container 3</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>Graph: _____</p> <p>Explain:</p>	<p>4. Container 4</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>Graph: _____</p> <p>Explain:</p>		
<p>A.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Number of Pours</p>	<p>B.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Number of Pours</p>	<p>C.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Number of Pours</p>	<p>D.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Number of Pours</p>

MATCH THE TABLE TO THE GRAPH

Without plotting the coordinates, match each input-output table with a graph below. Write one or two sentences to justify each choice. Look for constant, increasing, or decreasing rates of change.

<p>1.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Input (x)</th> <th style="padding: 5px;">Output (y)</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;">1</td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;">3</td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;">5</td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;">7</td></tr> <tr><td style="padding: 5px;">4</td><td style="padding: 5px;">9</td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;">11</td></tr> <tr><td style="padding: 5px;">6</td><td style="padding: 5px;">13</td></tr> </tbody> </table> <p>Graph: _____</p> <p>Explain:</p>	Input (x)	Output (y)	0	1	1	3	2	5	3	7	4	9	5	11	6	13	<p>2.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Input (x)</th> <th style="padding: 5px;">Output (y)</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;">1</td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;">4</td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;">7</td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;">10</td></tr> <tr><td style="padding: 5px;">4</td><td style="padding: 5px;">13</td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;">16</td></tr> <tr><td style="padding: 5px;">6</td><td style="padding: 5px;">19</td></tr> </tbody> </table> <p>Graph: _____</p> <p>Explain:</p>	Input (x)	Output (y)	0	1	1	4	2	7	3	10	4	13	5	16	6	19
Input (x)	Output (y)																																
0	1																																
1	3																																
2	5																																
3	7																																
4	9																																
5	11																																
6	13																																
Input (x)	Output (y)																																
0	1																																
1	4																																
2	7																																
3	10																																
4	13																																
5	16																																
6	19																																
<p>3.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Input (x)</th> <th style="padding: 5px;">Output (y)</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;">1</td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;">2</td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;">4</td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;">7</td></tr> <tr><td style="padding: 5px;">4</td><td style="padding: 5px;">11</td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;">16</td></tr> <tr><td style="padding: 5px;">6</td><td style="padding: 5px;">22</td></tr> </tbody> </table> <p>Graph: _____</p> <p>Explain:</p>	Input (x)	Output (y)	0	1	1	2	2	4	3	7	4	11	5	16	6	22	<p>4.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Input (x)</th> <th style="padding: 5px;">Output (y)</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">0</td><td style="padding: 5px;">1</td></tr> <tr><td style="padding: 5px;">1</td><td style="padding: 5px;">7</td></tr> <tr><td style="padding: 5px;">2</td><td style="padding: 5px;">12</td></tr> <tr><td style="padding: 5px;">3</td><td style="padding: 5px;">16</td></tr> <tr><td style="padding: 5px;">4</td><td style="padding: 5px;">19</td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;">21</td></tr> <tr><td style="padding: 5px;">6</td><td style="padding: 5px;">22</td></tr> </tbody> </table> <p>Graph: _____</p> <p>Explain:</p>	Input (x)	Output (y)	0	1	1	7	2	12	3	16	4	19	5	21	6	22
Input (x)	Output (y)																																
0	1																																
1	2																																
2	4																																
3	7																																
4	11																																
5	16																																
6	22																																
Input (x)	Output (y)																																
0	1																																
1	7																																
2	12																																
3	16																																
4	19																																
5	21																																
6	22																																
<p>A.</p> 	<p>B.</p> 	<p>C.</p> 	<p>D.</p> 																														

SKILL BUILDER 1

For problems 1-4, name the property of arithmetic illustrated.

Example		(Main) Property
1.	$a + (b + c) = (a + b) + c$	Associative property of addition
2.	$a(bc) = (ab)c$	
3.	$4(x + 3) = 4(x) + 4(3)$	
4.	$x - 3 + 3 = 12 + 3$	

Name the property used for each step.

Equation		(Main) Property
5.	$-2x - 4 + 4 = 12 + 4$	
6.	$-2x + 0 = 16$	
7.	$-2x = 16$	
8.	$\frac{-1}{2}(-2x) = \frac{-1}{2}(16)$	
9.	$1x = -8$	
10.	$x = -8$	

Equation		(Main) Property
11.	$-3x - 6 = 12$	
12.	$-3x - 6 + 6 = 12 + 6$	
13.	$-3x = 18$	
14.	$\frac{-1}{3}(-3x) = \frac{-1}{3}(18)$	
15.	$x = -6$	

KNOWLEDGE CHECK 29

Show your work on a separate sheet of paper and write your answers on this page.

29.1 Introduction to Slope

1. Find the slope of the line that passes through (2, 3) and (-2, 4).

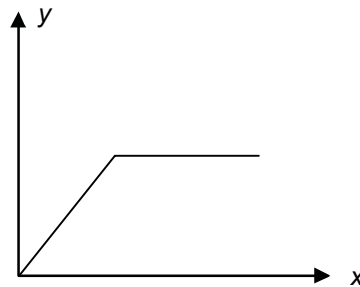
2. Draw a line through the point (4, -2) with a slope of $\frac{-5}{2}$.

29.2 Rate Graphs

Make an appropriate table of numbers for each graph. Use estimates only.

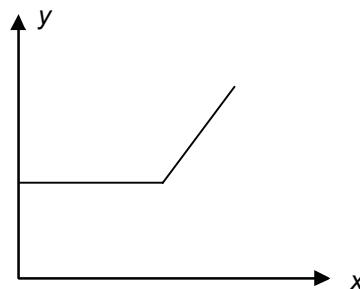
3.

x	y



4.

x	y



KNOWLEDGE CHECK 29 (continued)

29.3 Properties of Arithmetic and Equality

Name the property illustrated in each equation.

5. $25 \cdot 1 = 25$

6. $25 + 0 = 25$

Highlighted Review: Simplifying Expressions, Properties of Arithmetic

Simplify each expression.

7. $\frac{1}{4}(-16x + 20)$

8. $-\frac{1}{5}(-45x + 10y)$

HIGHLIGHTED REVIEW PRACTICE 29

Simplifying Expressions, Properties of Arithmetic

Simplify.

1. $-4(3x + 5)$	2. $3(-4 - x) + 11$
3. $-2(5n + 3) + 5(-2n - 3)$	4. $1.5x - 5.5x + 3$
5. $-\frac{1}{5}(45w - 25)$	6. $(2x^2y^3)^4$

Choose the best answer.

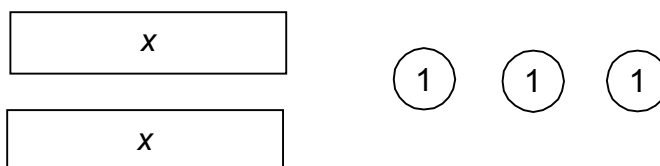
7. Which of the following illustrates the identity property of addition?	
A. $8 + 15 = 15 + 8$	B. $0.5 + 0 = 0.5$
C. $2 + (4 + 6) = (2 + 4) + 6$	D. $9 + 13 = x + 13$

INPUTS AND OUTPUTS 2

Ready (Summary)	Set (Goals)
<p>We will use input-output tables to help us graph and find equations of lines.</p>	<ul style="list-style-type: none"> • Evaluate expressions. • Graph linear functions. • Interpret the slope and y-intercept of a line. • Find equations of lines in slope-intercept form.

Go (Warmup)

Here is a collection of sticks and chips. Find the value of the collection if the chips are worth 1 and the sticks are worth x :



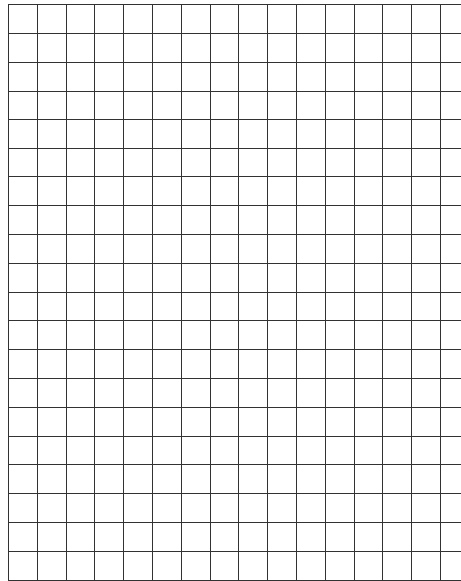
<p>1. If $x = 4$</p>	<p>2. If $x = -0.5$</p>	<p>3. If $x = 8\frac{3}{4}$</p>
---------------------------------	------------------------------------	--

THE INPUT-OUTPUT GAME

Use this page to record, graph, and write a rule for each round of the input-output game.

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



Correct equation: _____

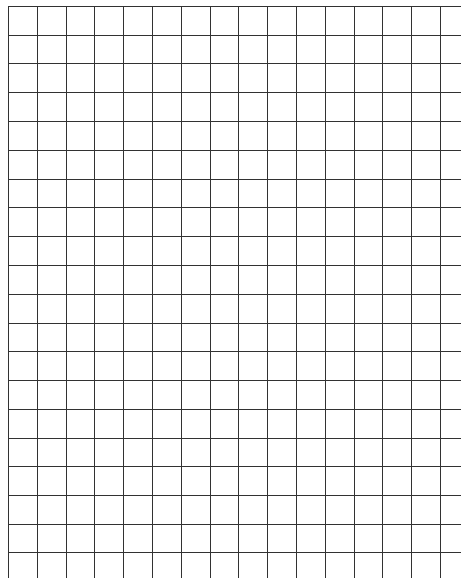
Value of x if $y = 0$: _____

Value of y if $x = 0$: _____

Slope of the line: _____

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



Correct equation: _____

Value of x if $y = 0$: _____

Value of y if $x = 0$: _____

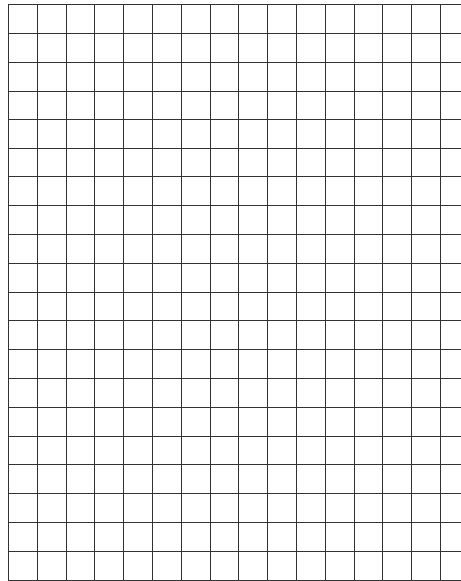
Slope of the line: _____

THE INPUT-OUTPUT GAME (continued)

Use this page to record, graph, and write a rule for each round of the input-output game.

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



Correct equation: _____

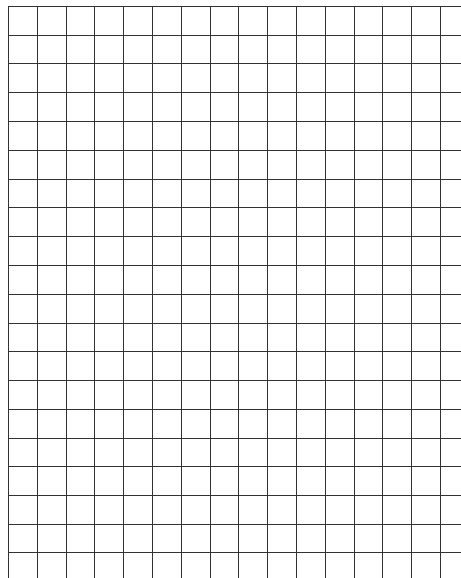
Value of x if $y = 0$: _____

Value of y if $x = 0$: _____

Slope of the line: _____

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



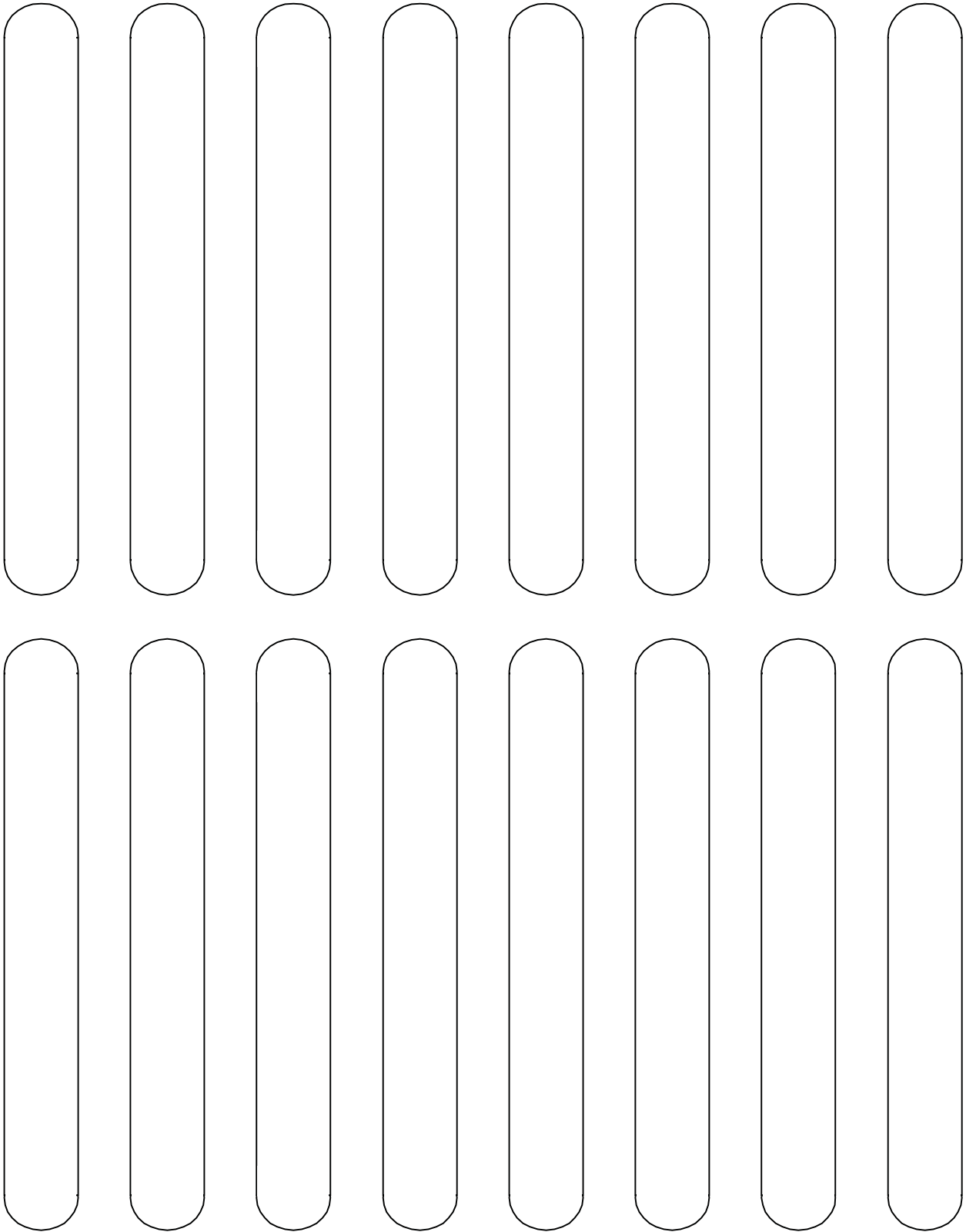
Correct equation: _____

Value of x if $y = 0$: _____

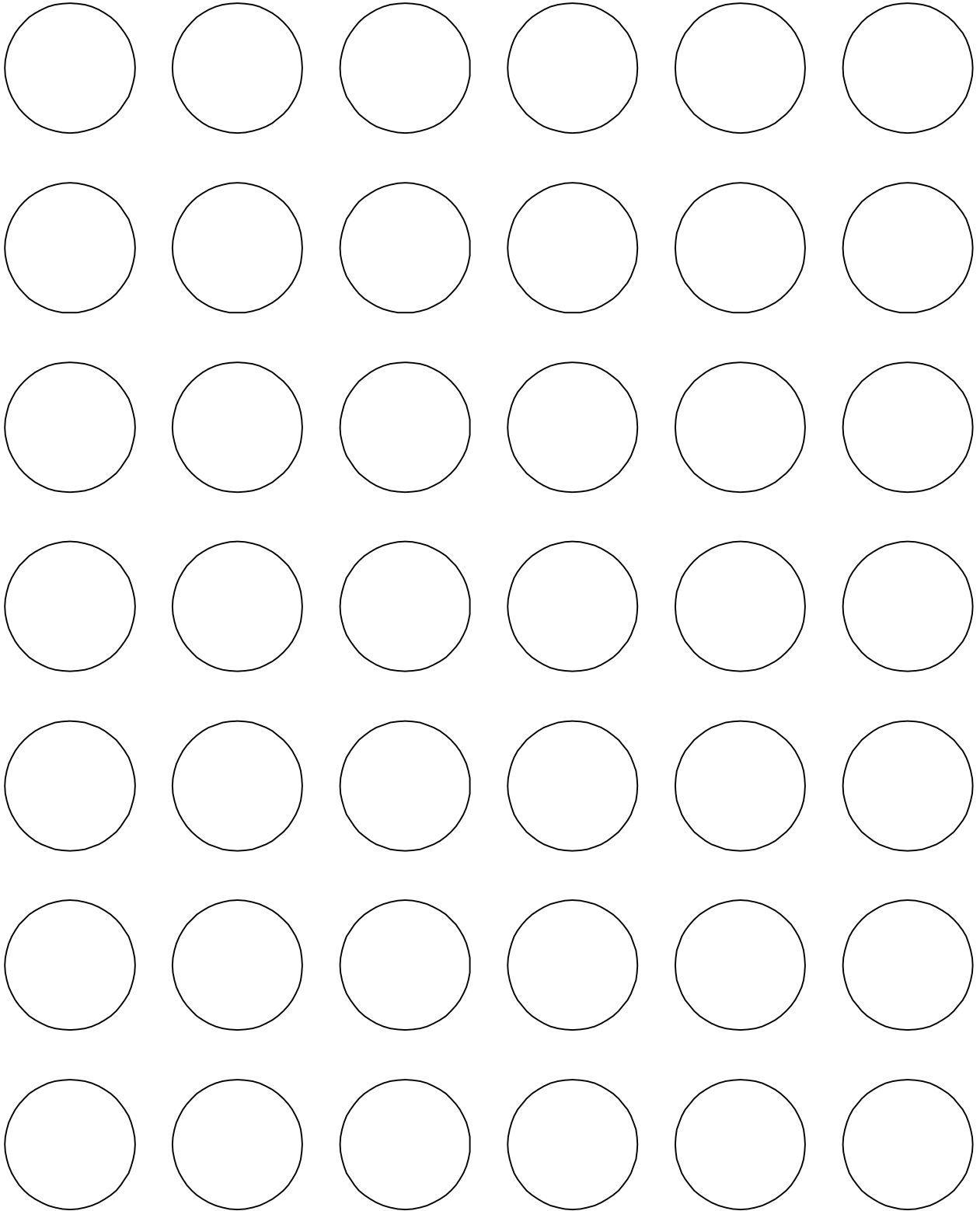
Value of y if $x = 0$: _____

Slope of the line: _____

STICKS



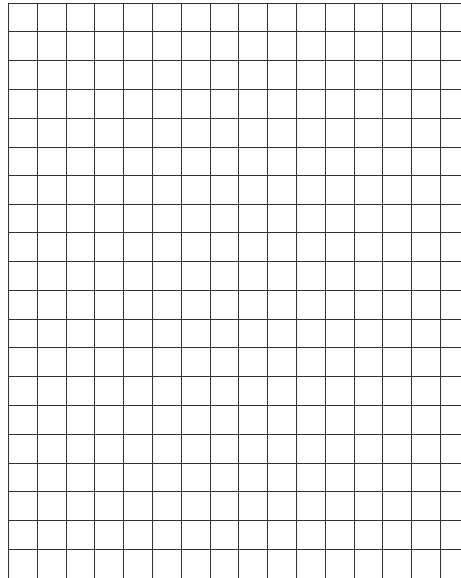
CHIPS



INPUT-OUTPUT GAME TEMPLATE

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



Correct equation: _____

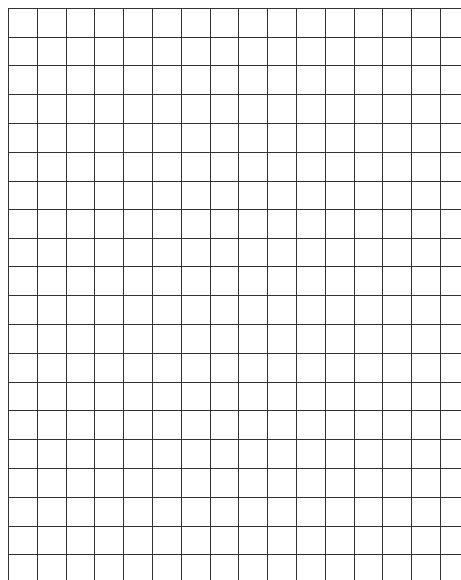
Value of x if $y = 0$: _____

Value of y if $x = 0$: _____

Slope of the line: _____

Round _____

Input (x) (value of stick)	Output (y) (total value)	Possible Equations
x		



Correct equation: _____

Value of x if $y = 0$: _____

Value of y if $x = 0$: _____

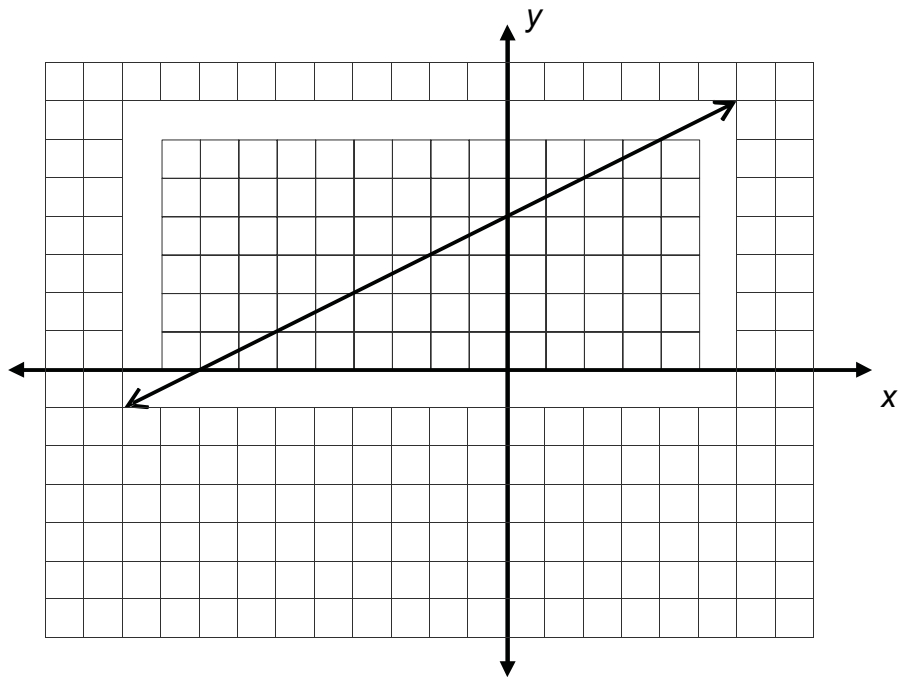
Slope of the line: _____

INTRODUCTION TO LINES

Ready (Summary)	Set (Goals)
We will find equations of lines in “slope-intercept form.”	<ul style="list-style-type: none">• Graph linear functions.• Interpret the slope of the graph.• Find equations of lines.

Go (Warmup)

Find the x -intercept, the y -intercept, and the slope of the given line.

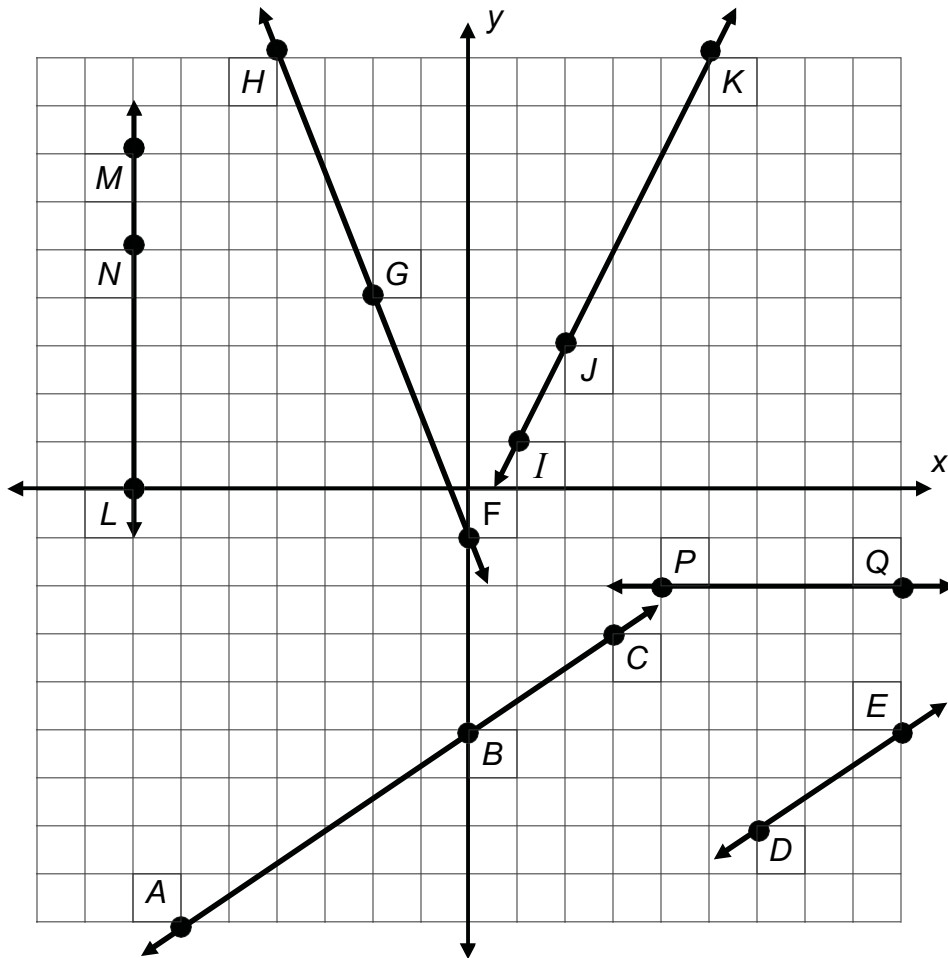


1. x -intercept: _____

2. y -intercept: _____

3. slope: _____

IDENTIFYING COORDINATES



Find the coordinates of each point. Find the slope of each line.

- | | | |
|-------------------|--------------------|--------------------|
| 1. A (____, ____) | 3. F (____, ____) | 5. D (____, ____) |
| 2. B (____, ____) | 4. H (____, ____) | 6. E (____, ____) |
| 7. I (____, ____) | 9. P (____, ____) | 11. L (____, ____) |
| 8. K (____, ____) | 10. Q (____, ____) | 12. M (____, ____) |

FINDING EQUATIONS OF LINES

Slope-intercept form of a line: _____

Use the information on the previous page to find the slope, the y -intercept, and the equation of each line in slope-intercept form.

1. Line AB

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____2. Line FH

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____3. Line DE

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____4. Line IK

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____5. Line PQ

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____6. Line LM

x	y

Slope: _____

 y -intercept: _____Equation: $y =$ _____

SKILL BUILDER 1

Compute.

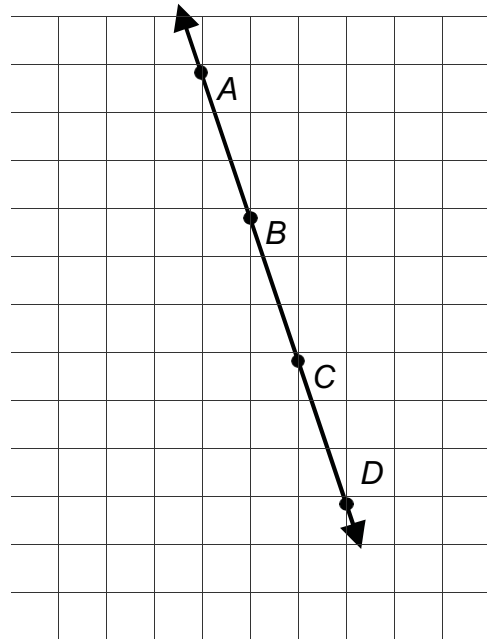
1. Slope of AB : _____

2. Slope of AC : _____

3. Slope of BC : _____

4. Slope of DB : _____

5. What do you notice about the slope of each line segment?



6. Locate a point F so that the slope of line $EF = \frac{-2}{1}$. Then draw line EF .

7. Name these points on your line.

E (____, ____)

F (____, ____)

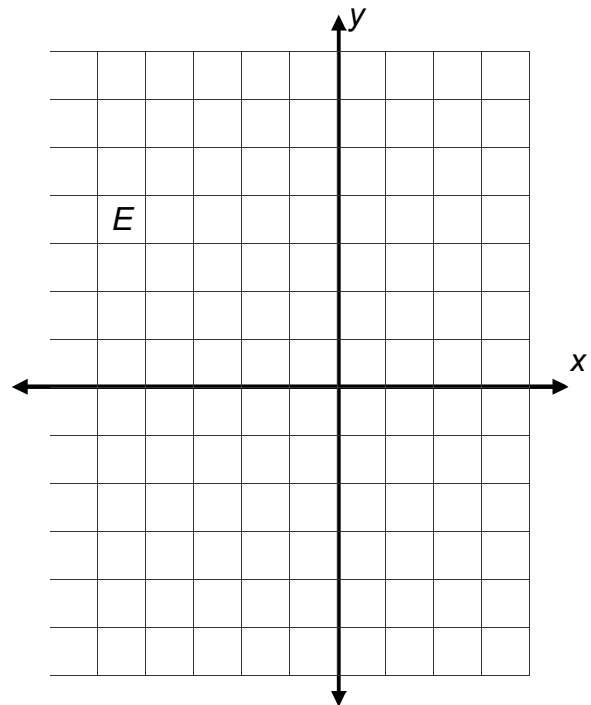
G (0, ____)

H (____, 0)

8. Find the slope of line EH .

9. Find the equation of line EH in slope-intercept form.

$y =$ _____



30.3 Finding Slopes of Lines

KNOWLEDGE CHECK 30

Show your work on a separate sheet of paper and write your answers on this page.

30.1 Inputs and Outputs 2

1. Zarmina and Okwe were playing the input-output game with no more than 10 pieces in the bag. Find the slope and equation of a line that represents the contents in the bag.

Input (x) (value of stick)	Output (y) (total value)
0	8
1	10
2	12

Slope: _____

Equation: $y =$ _____

30.2 Introduction to Lines

Find the equation of each line in slope-intercept form.

2. A line through the point $(-1, -1)$ with a slope of 3
3. A line with an x -intercept of -2 and a y -intercept of -4

30.3 Finding Slopes of Lines

4. Draw a line through point $A (1, -5)$ with a slope of $\frac{1}{2}$.
5. Draw a line through point $B (6, 4)$ with a slope of 0.

KNOWLEDGE CHECK 30 (continued)**Highlighted Review: Equations and Inequalities, Properties of Equality**

6. State the properties of arithmetic and/or inequality used in each step to solve the equation.

Equation	Property
$\frac{1}{2}x = 3$	Given equation
$(2)\frac{1}{2}x = 3(2)$	
$1x = 6$	
$x = 6$	



HIGHLIGHTED REVIEW PRACTICE 30

Equations and Inequalities, Properties of Equality

Solve for x .

1. $-6(x + 2) + 3 = 3$	2. $x + 5(x - 2) = 8$
3. $-\frac{7}{2}x = 14$	4. $\frac{1}{7}x = -3$

Solve each inequality and graph the solution.

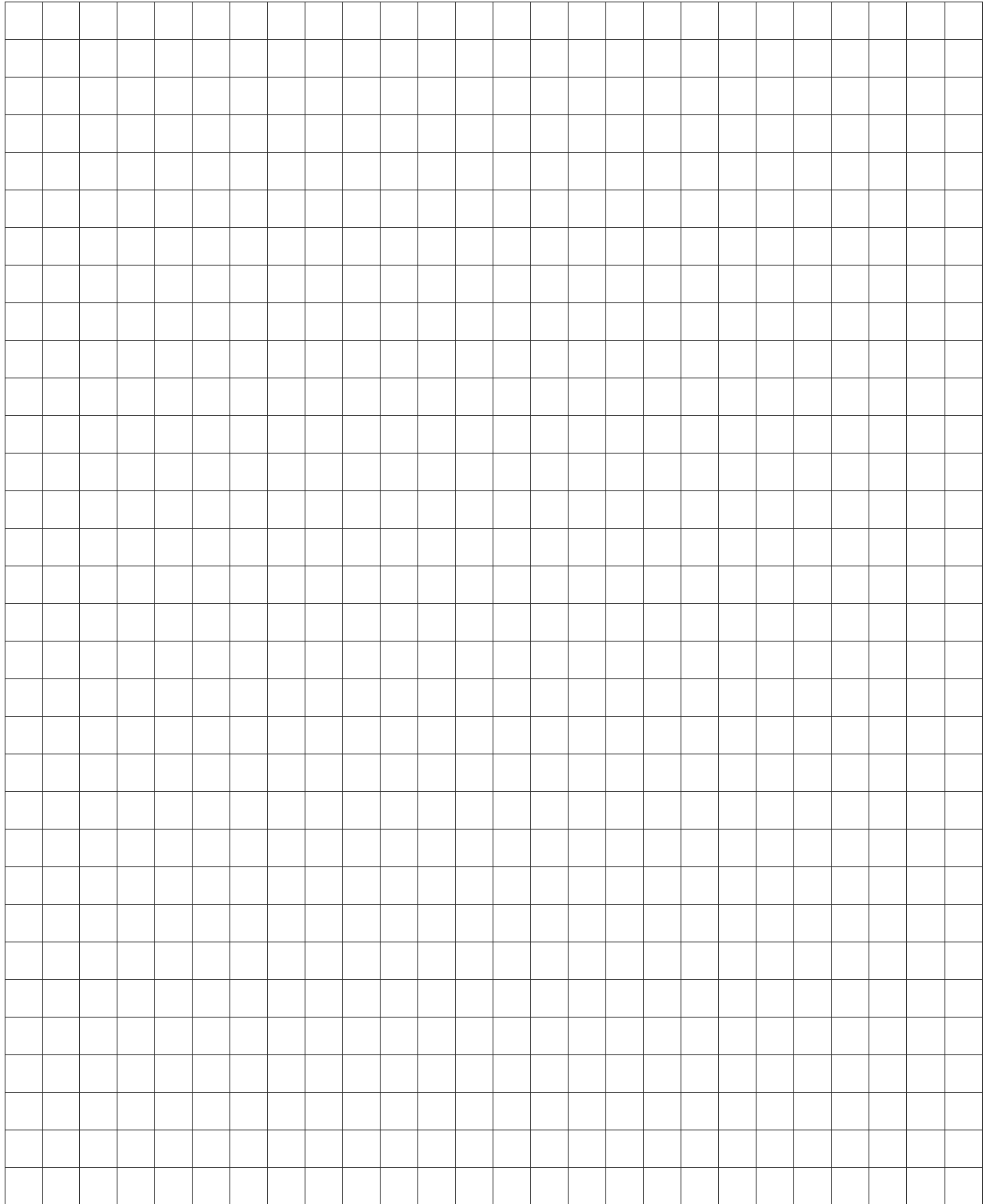
5. $-x - 1 < 11 + 3x$	6. $2(-x - 3) \geq 6$
	

Choose the best answer.

7. Choose the property used to solve $\frac{4}{6}n = 4$.	
A. Addition property of equality	B. Inverse property of multiplication
C. Subtraction property of equality	D. Identity property of multiplication

29.1 Introduction to Slope
31.2 Using Two Variables to Solve Problems

GRAPH PAPER



INTRODUCTION TO SYSTEMS OF EQUATIONS

Ready (Summary)	Set (Goals)
<p>We will revisit the Time-Distance Graphs lesson on solving rate, distance, and time problems to help us understand systems of linear equations.</p>	<ul style="list-style-type: none"> • Use variables to write equations and systems of equations. • Solve problems involving rate, distance, and time by graphing and with algebraic techniques. • Interpret the meaning of a specific part of a graph in the context of the problem.

Go (Warmup)

Use the relationship between distance, rate and time to fill in the blanks. For example, in problem 1, find the time needed to travel the given distance at the given rate. Remember to include the appropriate units.

	Distance	Time	Rate
1.	100 miles		50 miles per hour
2.		8 seconds	9 feet per second
3.	120 meters	5 minutes	

Write each problem from the table above as an equation. Check the units of the solutions using dimensional analysis.

4. Problem #1: 100 miles = hours $\frac{50 \text{ miles}}{1 \text{ hour}}$

5. Problem #2:

6. Problem #3:

ANGELICA AND BELEN: TABLES AND EQUATIONS

Two friends, Angelica and Belen, are going to the park. The park is located 90 meters away from their school. They leave at the same time from different locations. Angelica is 30 meters from school on her way to the park, and she is walking at a rate of 1 meter per second. Belen is at school and will jog at a rate of 4 meters per second.

1. Make tables to show the time in seconds, and the distance from school in meters, for Angelica and for Belen.

Angelica

Time in seconds (x)	Distance in meters from school (y)
0	30
10	40

Belen

Time in seconds (x)	Distance in meters from school (y)
0	0
10	

2. Write an equation that describes Angelica's distance in terms of time.
Let x = time in seconds, and y = distance in meters from school. Then find the slope and y -intercept for the equation.

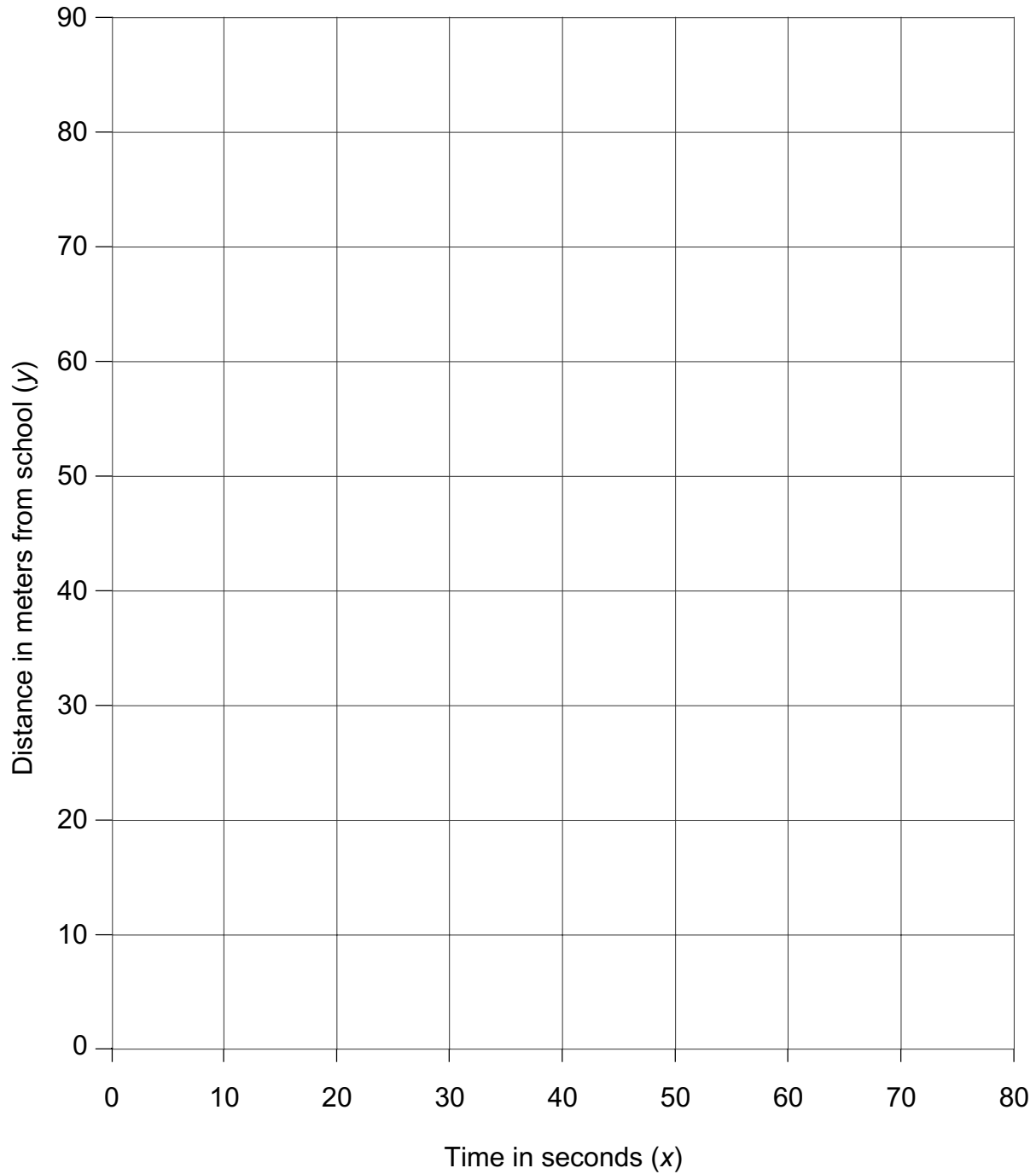
$$y = \underline{\hspace{2cm}} \quad \text{slope} = \underline{\hspace{2cm}} \quad y\text{-intercept} = \underline{\hspace{2cm}}$$

3. Write an equation that describes Belen's distance in terms of time.
Let x = time in seconds, and y = distance in meters from school. Then find the slope and y -intercept for the equation.

$$y = \underline{\hspace{2cm}} \quad \text{slope} = \underline{\hspace{2cm}} \quad y\text{-intercept} = \underline{\hspace{2cm}}$$

ANGELICA AND BELEN: GRAPHS

Graph the distance from school in meters (y) versus the time in seconds (x) for both Angelica and Belen.



ANGELICA AND BELEN: QUESTIONS

1. Use your graph to estimate the number of seconds it takes Angelica to arrive at the park. _____

2. Use your graph to estimate the number of seconds it takes for Belen to arrive at the park. _____

3. At what point do the graphs for Angelica and Belen intersect? _____

What does this point represent? _____

4. Use your graph to estimate the number of seconds between the time that Angelica arrives at the park and the time that Belen arrives at the park. _____

FINDING SOLUTIONS ALGEBRAICALLY 1

1. Recall important information for Angelica and Belen.

- a. Let x represent the time in seconds b. Let y represent _____
- c. Equation to describe Angelica's distance in terms of time: _____
- d. Equation to describe Belen's distance in terms of time: _____
- e. Distance from the school to the park: _____

2. Use algebra to find the number of seconds it takes each girl to arrive at the park.

Angelica	Belen
Equation: $y =$ _____	Equation: $y =$ _____
Substitute:	Substitute:
$x =$	$x =$
Answer:	Answer:

3. Use algebra to find the time in seconds when the two girls meet. Find the position in meters from school where they meet.

System of Equations: $y =$ _____ (Angelica)
 $y =$ _____ (Belen)

$x =$ _____ $y =$ _____

Answer:

4. Do your answers agree with the information on the graph?

USING MULTIPLE STRATEGIES TO SOLVE PROBLEMS

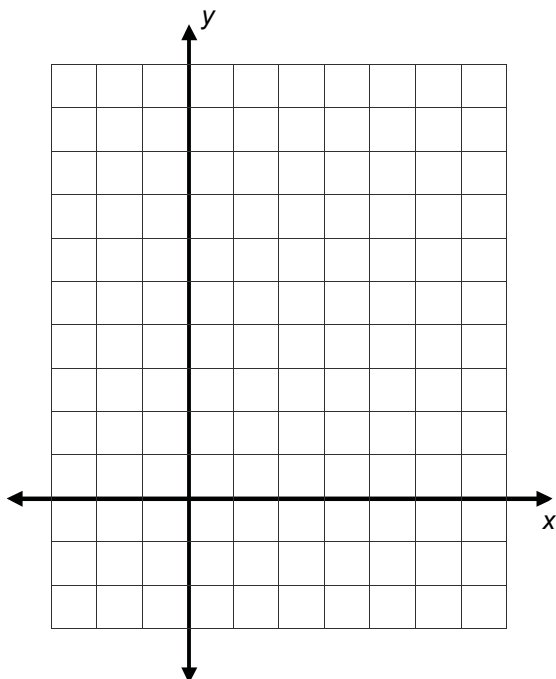
Ready (Summary)	Set (Goals)
<p>We will solve word problems using a variety of strategies, including algebra.</p>	<ul style="list-style-type: none"> ■ Find the point of intersection for a system of linear equations and interpret its meaning in the context of a problem. ■ Solve word problems using numerical, graphical, and algebraic strategies.

Go (Warmup)

Fill in the table, graph the equations, and answer questions 1-4.

x	$y = 2x + 4$
0	
1	
2	
3	
4	
5	

x	$y = -x + 10$
0	
1	
2	
3	
4	
5	



1. For what value of x are the y -values the same?

2. At what coordinates on the graph do these lines intersect?

3. Is there any other ordered pair that is a solution to both of these equations? How do you know?

4. Solve the system of equations by

substitution. $y = 2x + 4$
 $y = -x + 10$

A NUMBER PROBLEM

One number is 4 more than the other. The sum of the two numbers is 10. What are the two numbers?

1. Solve the problem above using guess and check.

2. Solve the problem above by writing an equation using one variable. Then find the solution using algebra.

a. Identify the variables.

Let $x =$ the first number

Let $x + 4 =$ _____

b. Write an equation and solve.

c. Answer the question.

A NUMBER PROBLEM (continued)

One number is 4 more than the other. The sum of the two numbers is 10. What are the two numbers?

3. Write a system of equations using two variables. Then find the solution by graphing.

a. Identify the variables: Let x = the first number

Let y = _____

b. Write an equation that represents the first sentence of the problem above.

$$y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

c. Write an equation that represents the second sentence.

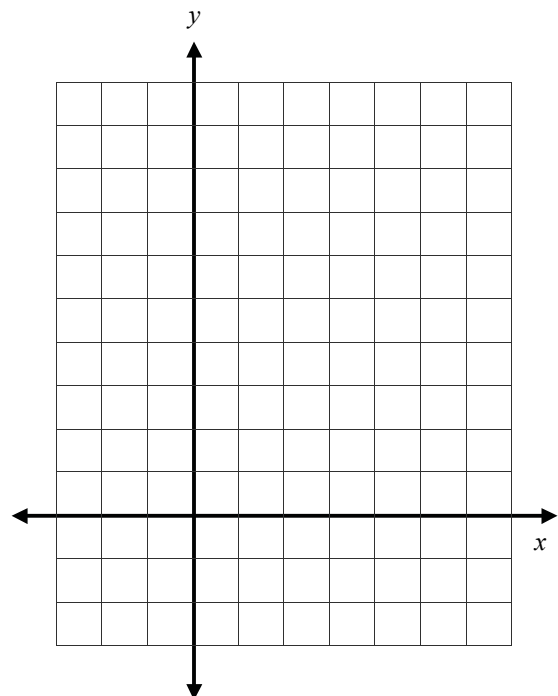
$$x + y = \underline{\hspace{2cm}} \quad \text{can be written as:} \quad y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

d. Graph the equations from parts b and c above.

$y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

$y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

e. What are the coordinates of the intersection point?



f. What does the point of intersection mean in the context of the problem?

A NUMBER PROBLEM (continued)

One number is 4 more than the other. The sum of the two numbers is 10. What are the two numbers?

4. Write a system of equations using two variables. Then find the solution by the substitution method.

a. Identify the variables: Let x = the first number

Let y = _____

b. Write an equation that represents the first sentence of the problem:

$$y = \text{_____} + \text{_____}$$

Write an equation that represents the second sentence of the problem:

$$x + y = \text{_____}$$

c. Substitute and solve for one unknown (in this case, x):

$$x + (\text{_____} + \text{_____}) = \text{_____}$$

d. Substitute the value of x into one of the equations to find y .

e. Solution: The two numbers are _____ and _____.

5. You just solved a word problem using four different solution strategies! Did you get the same solution each time?

Why do you think this happened?

A PERIMETER PROBLEM

The perimeter of a rectangle is 18 feet. The length is twice the width. Find the length and width of the rectangle.

1. Solve the problem above using guess and check.

2. Solve the problem above by writing an equation using one variable. Then find the solution using algebra.

a. Identify the variables. Let _____ = the width

Let _____ = the length

b. Write an equation.

c. Answer the question.

A PERIMETER PROBLEM (continued)

The perimeter of a rectangle is 18 feet. The length is twice the width. Find the length and width of the rectangle.

3. Write a system of equations using two variables. Then find the solution by graphing.

a. Identify the variables: Let $x =$ _____

Let $y =$ _____

b. Write an equation in x and y that represents the first sentence.

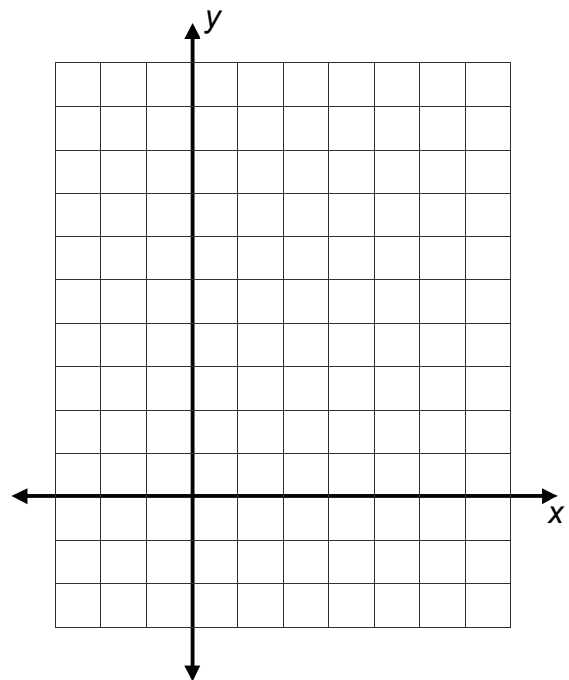
c. Write an equation in x and y that represents the second sentence.

d. Graph the equations from parts b and c above.

$y =$ _____ $+$ _____

$y =$ _____ $+$ _____

e. What are the coordinates of the intersection point?



f. What does the point of intersection mean in the context of the problem?

A PERIMETER PROBLEM (continued)

The perimeter of a rectangle is 18 feet. The length is twice the width. Find the length and width of the rectangle.

4. Write a system of equations using two variables. Then find the solution by the substitution method.

a. Identify the variables:

b. Write an equation that represents the first sentence: _____

Write an equation that represents the second sentence: _____

c. Substitute and solve for one unknown (in this case, x):

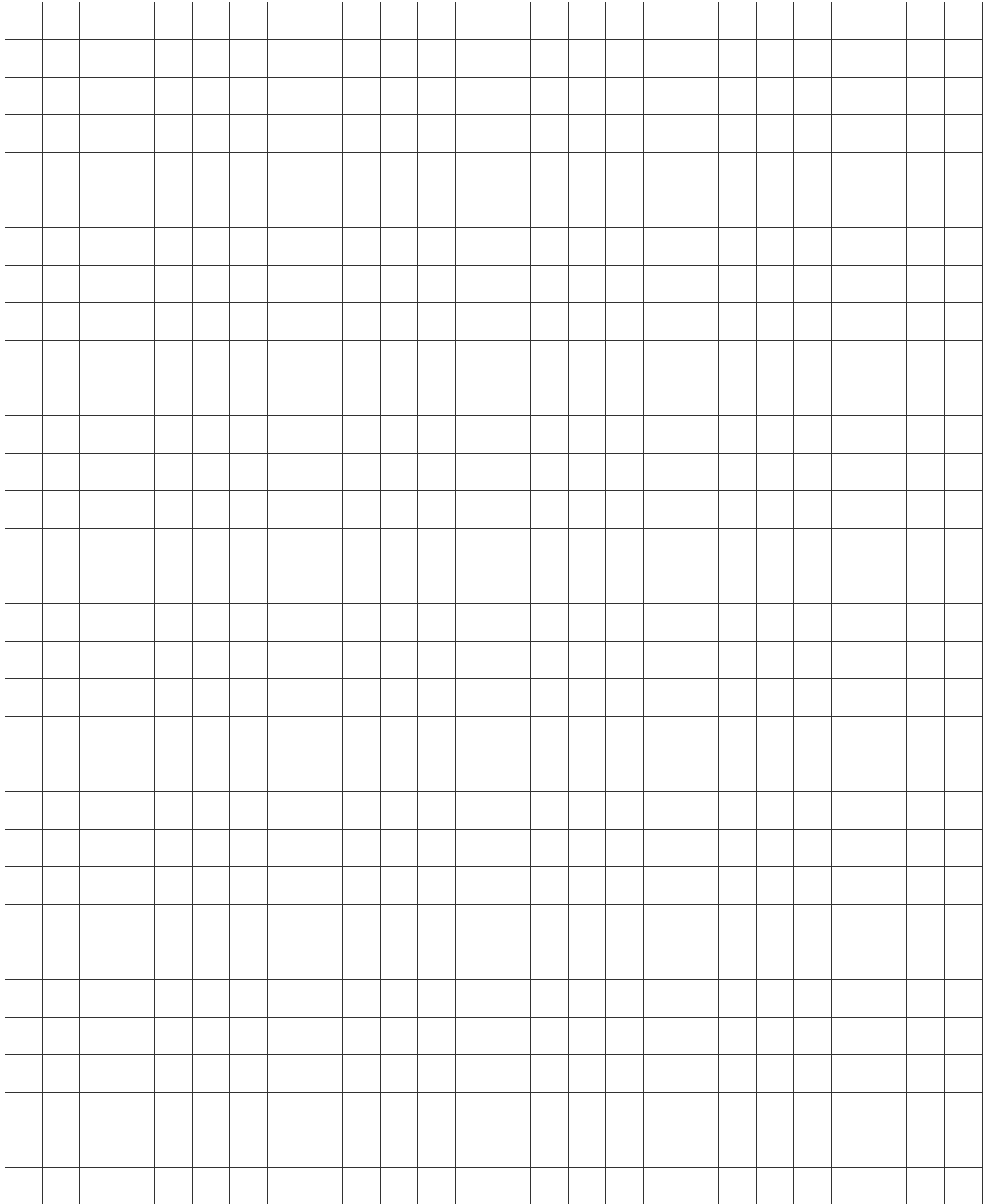
d. Substitute the value of x into one of the equations to y .

e. Solution:

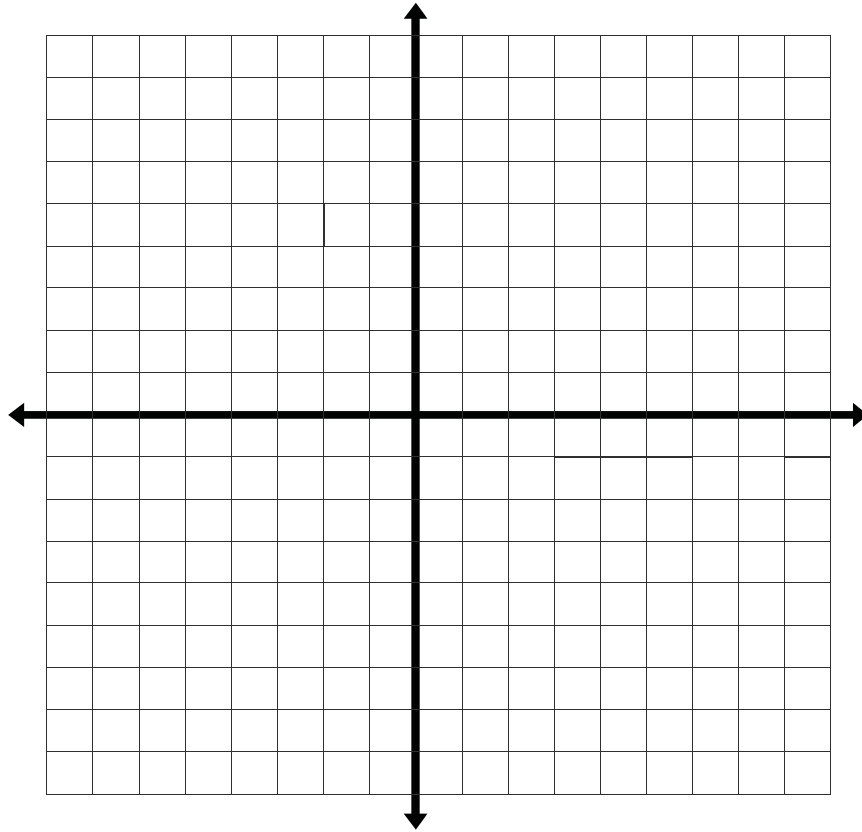
5. Once again, you just solved a perimeter problem using four different solution strategies! Which method do you prefer, and why?

29.1 Introduction to Slope
31.2 Using Two Variables to Solve Problems

GRAPH PAPER



SKILL BUILDER 1



Draw the following lines on the coordinate axis above. Then fill in the table.

Two points on the line	The slope	The y-intercept	Equation of the line $y = mx + b$
1. (-3, 1) (1, 5)			
2. (-3, 9) _____		0	
3. (-2, 4) _____	1		
4. _____ _____	$-\frac{1}{2}$	2	
5. (-3, -1) (6, -4)			

31.3 Writing Equations of Lines

KNOWLEDGE CHECK 31

Show your work on a separate sheet of paper and write your answers on this page.

31.1 Introduction to Systems of Equations

Use substitution to solve each system of equations.

1.
$$\begin{aligned} 3x + 2y &= 1 - 0 \\ y &= 10 - x \end{aligned}$$

2.
$$\begin{aligned} x &= \frac{1}{6}y \\ x + y &= 28 \end{aligned}$$

31.2 Using Multiple Strategies to Solve Problems

Solve using two equations in two variables.

- The sum of two numbers is 140. One number is 32 more than the other. What are the two numbers?
- The sum of two numbers is 136. One number is 18 less than the other number. Find both the numbers.

31.3 Writing Equations of Lines

Draw the following lines on a coordinate axis. Then fill in the table.

Two points on the line	Slope	y-intercept	Equation of the line $y = mx + b$
5. (2, 6) (5, 0)			
6. _____	$\frac{2}{3}$	-2	

Highlighted Review: Algebra Applications

Solve using a guess-and-check table and algebra.

- Two trains start at the same place and at the same time. Train A travels south at a rate of 75 miles per hour and Train B travels north at a rate of 80 miles per hour. How long will it take for them to be 310 miles apart?

HIGHLIGHTED REVIEW PRACTICE 31

Algebra Applications

Solve each problem using algebra.

1. The perimeter of a pentagon is 585 units. Find the length of each side.

2. Two trains start at the same place and at the same time. The red train travels north at a rate of 80 miles per hour and the green train travels south at a rate of 65 miles per hour. How long will it take for them to be 725 miles apart?

Choose the best answer.

3. Seven times a number added to four times a number is 264. What is the number?

A. 11

B. 24

C. 44

D. 77

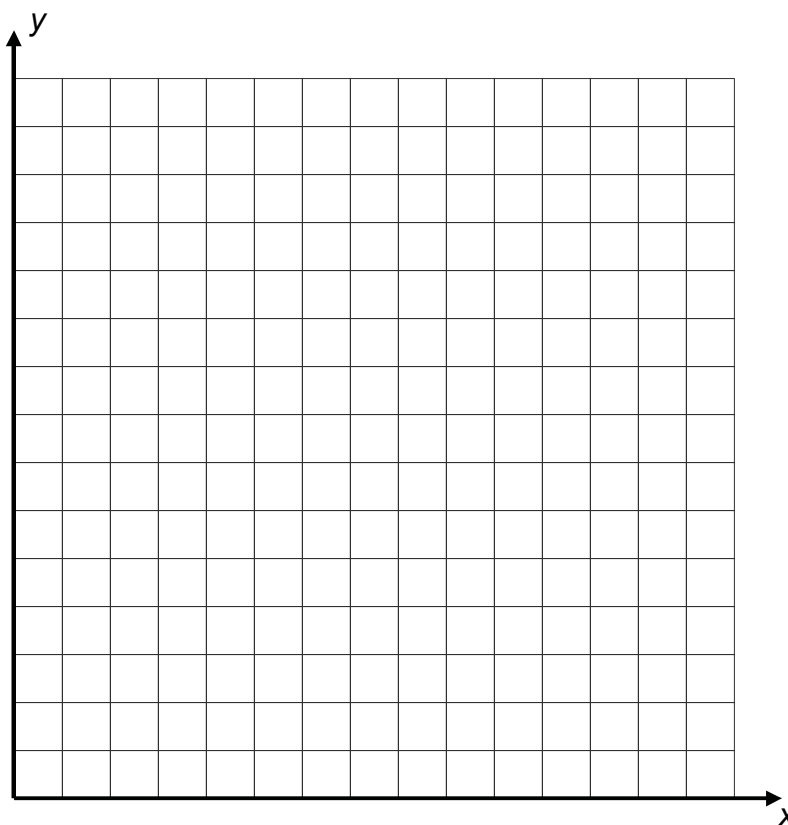
STACKING CUPS

Ready (Summary)	Set (Goals)
<p>We will measure and record heights of stacked cups, and represent the data using numbers, graphs, and algebraic symbols. We will estimate a line of best fit for our data.</p>	<ul style="list-style-type: none"> • Review finding slopes and equations of lines. • Represent data using numbers, graphs, and symbols. • Understand and estimate a line of best fit.

Go (Warmup)

Determine a pattern and write the y -value that corresponds to $x = 4$. Then graph the coordinate pairs, and find the equation of the line that passes through the points.

x	y
0	2
1	5
2	8
3	11
4	







1. Slope: _____

2. y -intercept: _____

3. Equation:

$y =$ _____

STACKING CUPS: TABLE, GRAPH, AND RULE

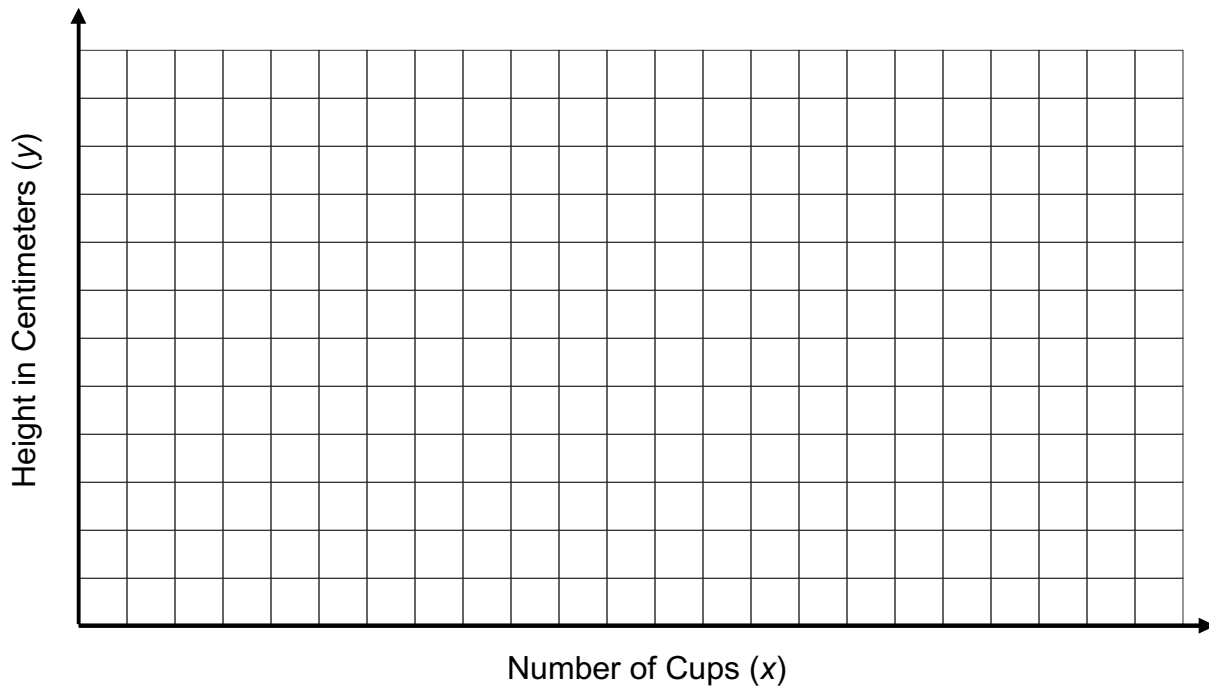
-  Measure and record the height of the first cup in centimeters.
-  Place a second cup inside the first, measure and record the new height.
-  Continue this process a few more times with different numbers of cups.
-  Graph the coordinates and sketch a line of best fit.

Number of cups (x)	Height in cm (y)
1	
2	
3	
4	

Approximate slope of the line:

Approximate equation of the line:

$y =$ _____



LEFTY-RIGHTY EXPERIMENT

Ready (Summary)	Set (Goals)
<p>We will conduct a simple experiment to determine how quickly we are able to cross out circles with our right hands compared to our left hands in a given time. We will graph the results, interpret the graph, and draw conclusions about our hand preference.</p>	<ul style="list-style-type: none"> • Plot points and graph lines. • Interpret the meaning of slope in a problem-solving situation. • Draw conclusions based on data displays.

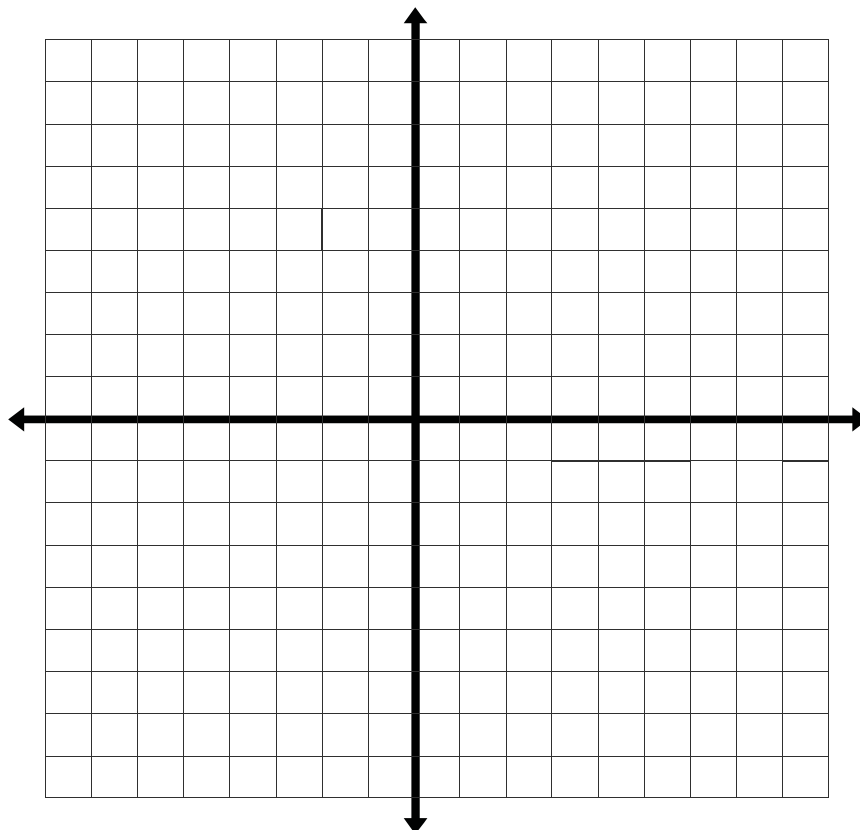
Go (Warmup)

Graph these three linear equations on the same coordinate axes, and fill in the table with a few coordinate pairs for each equation.

1. $y = x$	
x	y

2. $y = 2x$	
x	y

3. $y = \frac{1}{2}x$	
x	y



32.2 Lefty-Righty Experiment

LEFTY-RIGHTY EXPERIMENT TABLE

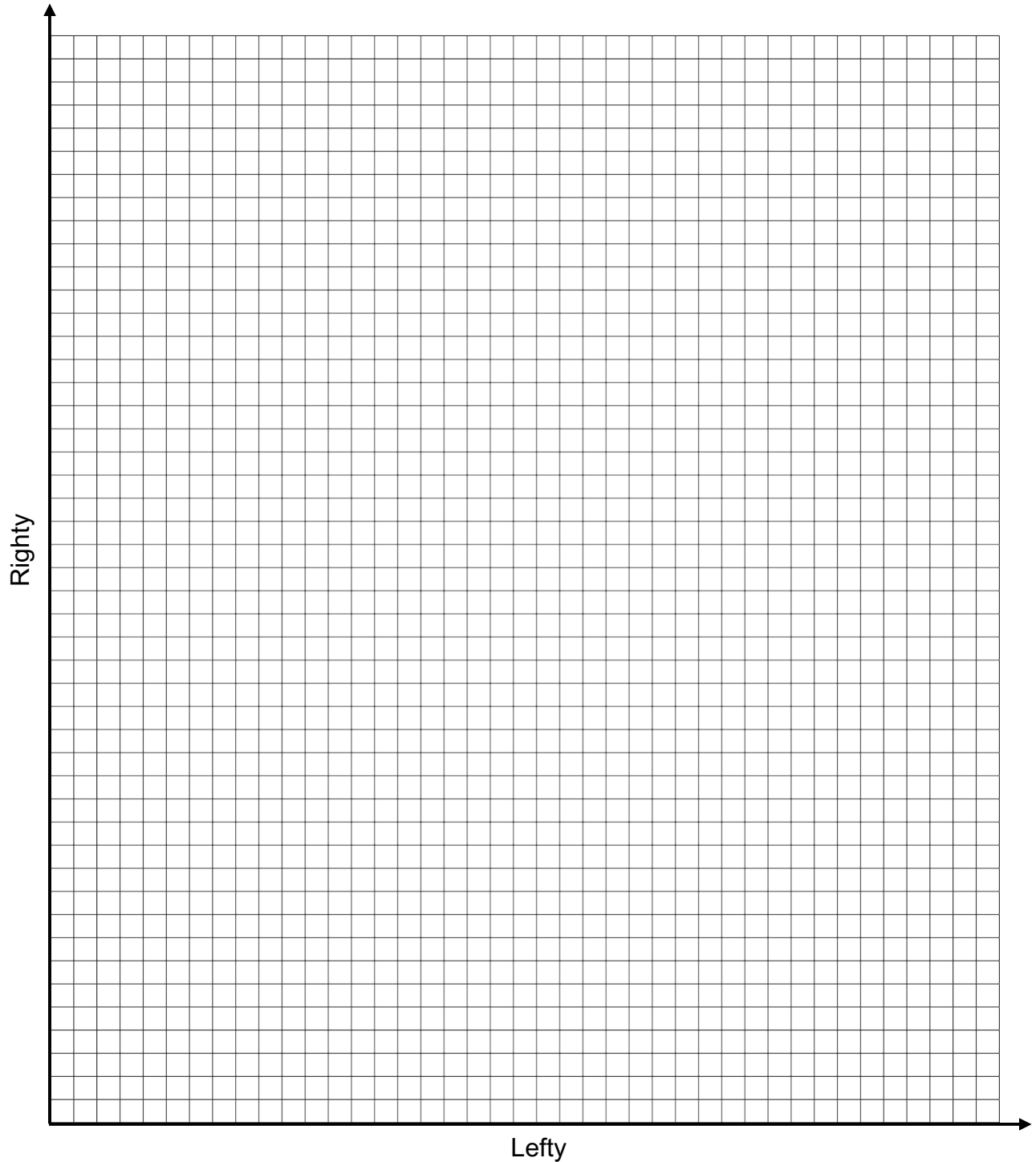
1. Count the number of circles that have an X on your **lefty** page. _____
2. Count the number of circles that have an X on your **righty** page. _____
3. Record the class data in the table below.

	# of circles with X's on the lefty page (x)	# of circles with X's on the righty page (y)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

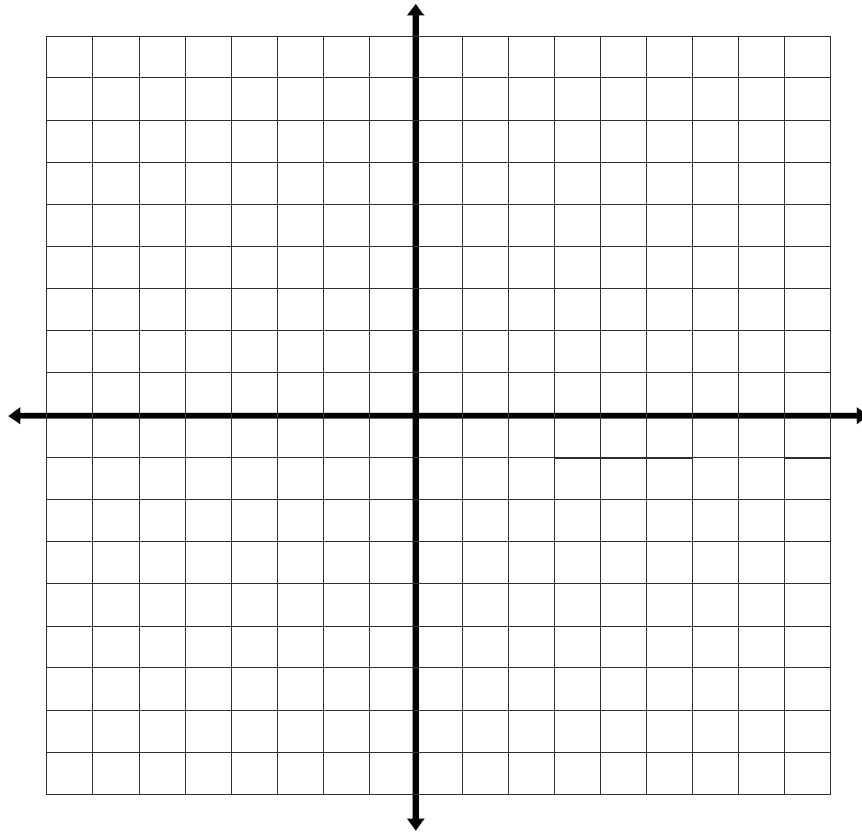
	# of circles with X's on the lefty page (x)	# of circles with X's on the righty page (y)
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		

LEFTY-RIGHTY EXPERIMENT GRAPH

Graph all coordinate pairs from the table on the previous page. Use an appropriate scale. Then, graph the line $y = x$ on the same set of axes.



SKILL BUILDER 1



Use the given information to graph each line. Then fill in the missing information in each row.

Two points on the line	The slope	The y -intercept	Equation of the line $y = mx + b$
1. $(-2, 2)$ and $(2, 4)$			
2.	-2	2	
3.			$y = -4$
4.	$\frac{3}{2}$	4	
5. $(-2, 1)$ and $(2, -1)$			

KNOWLEDGE CHECK 32

Show your work on a separate sheet of paper and write your answers on this page.

32.1 Stacking Cups

Marisol made a table showing the height of a stack of plates for a given number of plates.

Number of Plates (x)	1	2	3	4	5
Height of Plates (y)	2.2 cm	2.4cm	2.6 cm	2.8 cm	3.0 cm

1. Make a graph of Marisol's data.
2. Write an equation that best fits the data.

32.2 Lefty-Righty Experiment

Leonardo conducted an experiment with his family. He gave each person in his family one minute to snap their fingers as many times as they could with each hand. Then, he recorded the number of finger snaps for each person in a table.

	Mom	Dad	Brother	Sister	Grandpa	Grandma	Uncle	Aunt
Right Hand (x)	48	50	30	17	38	27	46	35
Left Hand (y)	44	47	34	12	43	24	46	31

3. Use Leonardo's data to make a graph of the left hand (y) versus the right hand (x).
4. Sketch the line $y = x$. Then, sketch a line that best fits the data.
5. What does the data tell you?

Highlighted Review: Slope

6. Draw a line that goes through $(3, -2)$ with a slope of $\frac{3}{4}$.
7. Find the slope of a line that passes through $(7, 0)$ and $(4, -4)$.

HIGHLIGHTED REVIEW PRACTICE 32

Slope

Compute.

1. (4, 8) and (1, 3)	2. (2, 0) and (3, 5)
3. (1, 2) and (6, 0)	4. (-1, -2) and (-4, -5)
5. Find y if $x = \frac{3}{4}$ and $y = -2x + 5$	6. Find x if $y = 12$ and $y = 5x - 3$

Choose the best answer.

7. Which of the following best describes the slope of the line through the points (-2, 4) and (3, -2)? A. Positive slope B. Negative slope C. Zero slope D. No slope
--