Algebra 1

Week #1

1-1 Additional Practice

Operations on Real Numbers

1. Set G is the set of positive integers divisible by 4 and Set F is the set of perfect squares. List the first 5 elements of set H, which contains numbers in G that are also elements of F.

2. Which elements of the set of natural numbers are also irrational numbers?

3. When you divide an even number by an even number, is the result always an even number? Justify your answer.

4. When you subtract two positive integers, is the result always a positive integer? Justify your answer.

5. For each of these expressions, draw a line or lines to show the subset(s) of the real numbers it belongs to.

   a. $0 - 10$ Irrational Numbers

   b. $-3 + \sqrt{3}$ Rational Numbers

   c. $\frac{5}{12} + 4\frac{1}{3}$ Integers

   d. $7 \times \sqrt{49}$ Whole Numbers

Order from least to greatest.

6. $\sqrt{\frac{4}{9}}, \frac{1}{4}, 0.6$

7. $\sqrt{5}, \sqrt{\frac{25}{16}}, 1.8$

8. $\sqrt{\frac{12}{3}}, 1.01, \sqrt{0.09}$

9. Is the quotient of $\sqrt{10}$ and 5 a rational number? Explain.

10. Is the difference of $\sqrt{18}$ and 3 a rational number? Explain.

11. Can the sum of two irrational numbers ever be a rational number? Can the quotient of two irrational numbers ever be a rational number? Explain with examples.

12. To put a narrow border around a square photo, Alicia has 32 inches of trim. The area of the photo is 60 square inches. Will she have enough trim for all four sides of the square? Explain how you decided.

1-2 Additional Practice

Solving Linear Equations

Solve each equation.

1. $4m - 5 = 11$

2. $-3d + 10 = 43$

3. $\frac{2(r - 3)}{4} - 8 = 50$

4. $5h - 13 = 12$

5. $-8 = 3y - 2$

6. $8(n + 2) = 24$

7. $-\frac{2}{3}y - \frac{3}{4} = 5$

8. $\frac{p}{4} + 6 = 8$

9. $-3 = -3(2t - 1)$

10. $x - 2(x + 10) = 12$

11. $-15 = 5(3q - 10) - 5q$

12. $-5(x - 3) = -25$

For Items 13–16, write and solve a linear equation to match each situation.

13. The sum of three consecutive integers is 78. What are the three integers?

14. Darren wins a coupon for $4 off the lunch special for each of 5 days. He pays $75 for his 5 lunch specials. Write and solve an equation to find the original price *p* for one lunch special.

15. Olivia ate at the same restaurant four times. Each visit she ordered a salad and left a $1.50 tip. She spent a total of $54. Find the cost *c* of each salad.

16. Casey buys sandwiches and bags of chips. Each sandwich costs three times as much as a bag of chips. She bought 5 sandwiches for $6 each and spent $42. How many bags *b* did she buy?

17. Renaldo catches the bus at 4:00 P.M. to ride 3.2 miles from his house to the dentist's office. He arrives at 4:30 P.M., for a one-hour appointment. Then he will ride a bus traveling at the same rate of speed for 4.8 miles to the soccer field. Will he be on time for his 6:30 P.M. soccer practice? Explain.

18. What property was used on $14k + 2(3k + 5) - 5 = 10$ to obtain $14k + 6k + 10 - 5 = 10$?

Name _____

1-3 Additional Practice

Solving Equations with a Variable on Both Sides

Identify if no, one, or infinitely many solutions exist for each equation. If a solution exists, determine the value.

1. $4y - 7 + 2y = -3(y - 1) - 1$

2. $-(5a + 6) = 2(3a + 8)$

3. $-8x - (3x + 6) = 4 - x$

4. $14 + 3n = 8n - 3(n - 4)$

5. $6.8 - 4.2b = 5.6b - 3$

6. $\frac{1}{3} + \frac{2}{3}m = \frac{2}{3}m - \frac{2}{3}$

7. $\frac{1}{3}(t + 6) - 10 = -3t + 2$

8. $\frac{1}{2}r + 6 = 3 - 2r$

9. $0.5t + 0.25(t + 16) = 4 + 0.75t$

10. $2.5(2z + 5) = 5(z + 2.5)$

11. $-6(-p + 8) = -6p + 12$

12. $\frac{3}{8}f + \frac{1}{2} = 6(\frac{1}{16}f - 3)$

Solve each problem.

13. A square and a rectangle have the same perimeters. The length of a side of the square is $4x - 1$. The length of the rectangle is $2x + 2$ and the width is $2x$. Write and solve an equation to find x.

14. A movie club charges a one-time membership fee of $25. This allows members to purchase movies for $7 each. Another club does not charge a membership fee and sells movies for $12 each. How many movies must a member purchase for the total cost of the two clubs to be equal?

15. How many pounds of cashews that cost $14 per pound must be mixed with 5 pounds of peanuts that cost $6.50 per pound to make mixed nuts that cost $10.25 per pound?

1-4 Additional Practice

Literal Equations and Formulas

Rewrite each equation to solve for *m*.

1. $m + 3n = 7$

2. $3m - 9n = 24$; $n = -1, 1, 3$

3. $-5n = 4m + 8$

4. $2m = -6n - 5$; $n = 1, 2, 3$

5. $8n = -3m + 1$

6. $4n - 6m = -2$; $n = -2, 0, 2$

7. $-5n = 13 - 3m$

8. $10m + 6n = 12$; $n = -2, -1, 0$

Rewrite each equation to solve for *x*.

9. $fx - gx = h$

10. $qx + x = r$

11. $m = \dfrac{x + n}{p}$

12. $d = f + fx$

13. $-3(x + n) = x$

14. $\dfrac{x - 4}{y + 2} = 5$

Solve each problem. Round decimals to the nearest tenth.

15. What is the width of a rectangle with length 14 cm and area 161 cm^2?

16. The weather report gives the temperature as 35 degrees Celsius. Find the equivalent temperature in degrees Fahrenheit. $C° = (F° - 32) \times \dfrac{5}{9}$

17. A rectangle has perimeter 182 in. and length 52 in. What is the width?

18. A triangle has base 7 m and area 17.5 m^2. What is the height?

1-5 Additional Practice

Solving Inequalities in One Variable

Solve each inequality. Then graph the solution.

1. $-6t - 3 < -2t - 19$

2. $-3(m - 4) < 6$

3. $4(1 - x) < 16$

4. $2y \leq -3$

5. $3(v - 4) \geq 5v - 24$

6. $-x - 1 > 3x + 1$

Solve each inequality.

7. $2(k + 4) - 3k \leq 14$

8. $3(4c - 5) - 2c > 0$

9. $15(j - 3) + 3j < 45$

10. $22 \geq 5(2y + 3) - 3y$

11. $-53 > -3(3z + 3) + 3z$

12. $20(d - 4) + 4d \leq 8$

13. $-2(6 + s) < -16 + 2s$

14. $9 - 2x < 7 + 2(x - 3)$

Solve each inequality.
If all real-number values of *x* are solutions of the inequality, write TRUE.
If no real-number values of *x* are solutions of the inequality, write FALSE.

15. $2(n - 3) \leq -13 + 2n$

16. $-3(w + 3) < 9 - 3w$

17. The unit cost for a piece of fabric is $4.99 per yard including tax. You have $30 to spend on material. How many whole feet of material could you buy?

1-6 Additional Practice

Compound Inequalities

Write a compound inequality that represents each phrase. Graph the solution.

1. all real numbers that are less than −3 or greater than or equal to 5

2. The time a cake must bake is between 25 minutes and 30 minutes, inclusive.

Solve each compound inequality. Graph your solution.
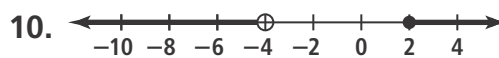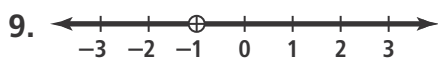
3. $5 < k - 2 < 11$

4. $-4 > y + 2 > -10$

5. $6b - 1 \leq 41$ or $2b + 1 \geq 11$

6. $5 - m < 4$ or $7m > 35$

7. $3 < 2p - 3 \leq 12$

8. $3 > \frac{11 + k}{4} \geq -3$

Write a compound inequality that each graph could represent.

9.

10.

11.

12.
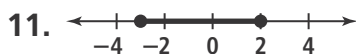
15. A family is comparing different car seats. One car seat is designed for a child up to and including 30 lb. Another car seat is designed for a child between 15 lb and 40 lb. A third car seat is designed for a child between 30 lb and 85 lb, inclusive. Model those ranges with compound inequalities. Which car seats are appropriate for a 32-lb child?

1-7 Additional Practice

Absolute Value Equations and Inequalities

Solve each equation. Graph and check your solutions.

1. $|b| = \frac{2}{3}$

2. $10 = |y|$

3. $|n| + 2 = 5$

4. $4 = |s| - 3$

5. $|x| - 5 = -1$

6. $7|d| = 49$

Solve each equation. If there is no solution, write *no solution*.

7. $|r - 9| = -3$

8. $|c + 3| = 15$

9. $1 = |g + 3|$

10. $2 = \left|m + \frac{2}{3}\right|$

11. $-2|3d| = 4$

12. $-3|2w| = -6$

13. $4|v - 5| = 16$

14. $3|d - 4| = 12$

15. $|3f + 0.5| - 1 = 7$

Solve and graph each inequality.

16. $|x + 3| < 10$

17. $|y + 4| > 12$

18. $|y - 1| \le 8$

19. $\left|2t + \frac{2}{3}\right| \le 4$

20. In a sports poll, 53% of those surveyed believe their high school football team will win the state championship. The poll shows a margin of error of 0.5 percentage points. Write and solve an absolute value inequality to find the least and the greatest percent of people that think their team will win the state championship.

2-1 Additional Practice

Slope-Intercept Form

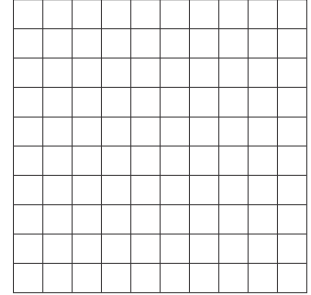**Graph the line that represents each linear equation.**

1. $y = x + 3$
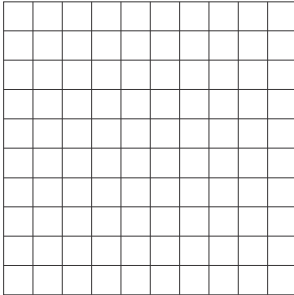
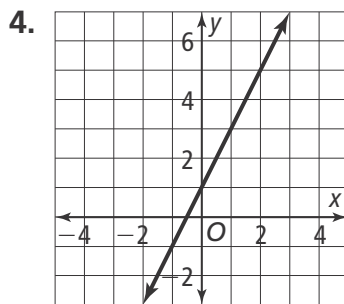**2.** $y = -5x + 1$
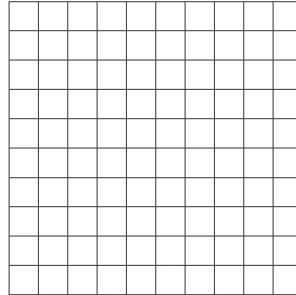
3. $y = \frac{2}{3}x - 5$

What slope-intercept form equation represents the line?

4.

5.

6.
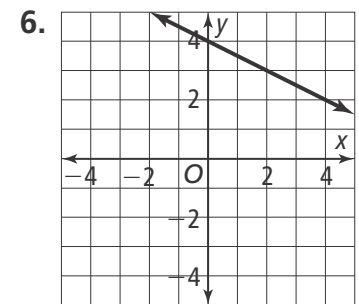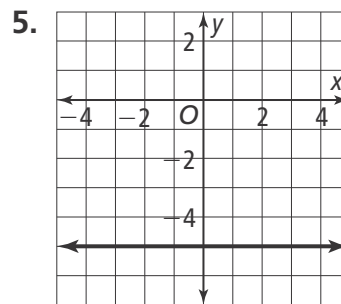
Write the equation in slope-intercept form of the line that passes through the given points.

7. $(-1, 3)$ and $(-3, 1)$

8. $(-4, 8)$ and $(4, 6)$

9. $(9, 2)$ and $(-3, -2)$

10. Zachary purchased a computer for \$1,800 on a payment plan. Three months after he purchased the computer, his balance was \$1,350. Five months after he purchased the computer, his balance was \$1,050. What is an equation that models the balance B after m months?

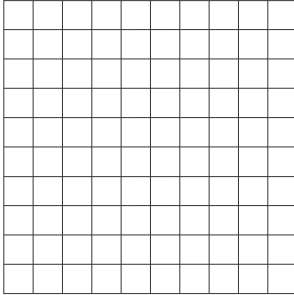**11.** What does the slope signify in this equation and why?
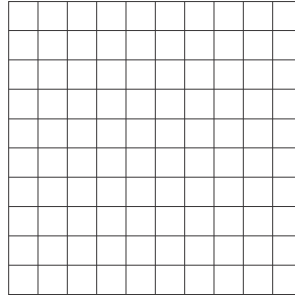
2-2 Additional Practice

Point-Slope Form

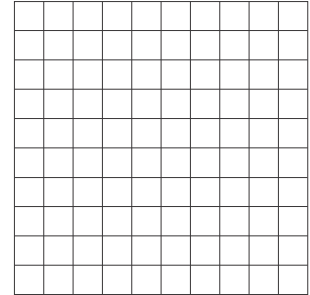**Graph the line that represents each linear equation.**

1. $y - 2 = 2(x + 3)$

2. $y + 3 = -2(x + 1)$

3. $y + 1 = -\frac{3}{5}(x + 5)$

Write the equation in point-slope form of the line that passes through the given point with the given slope.

4. $(2, 1); m = 3$

5. $(-3, -5); m = -2$

6. $(4, -11); m = \frac{3}{4}$

Write an equation in point-slope form of the line that passes through the given points.

7. $(4, 0)$ and $(-2, 1)$

8. $(-3, -2)$ and $(5, 3)$

9. $(-5, 1)$ and $(3, 4)$

10. Explain why it does not matter which point you choose when writing the equation of the line in point-slope form, given two points.

11. Members of the student council are conducting a fundraiser by selling school calendars. After selling 80 calendars, they had a loss of $360. After selling 200 calendars, they had a profit of $600. Write an equation that describes the relation between y, the profit or loss, and x, the number of calendars sold. How much profit did they make from selling each calendar? How much would they have lost if they had sold no calendars?
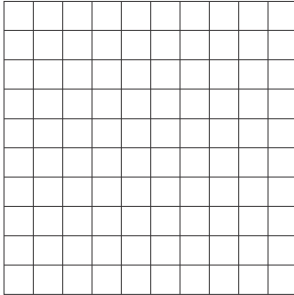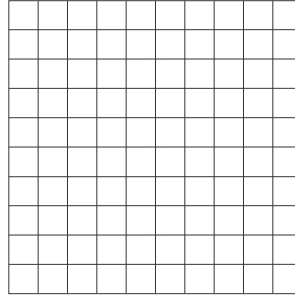
2-3 Additional Practice

Standard Form

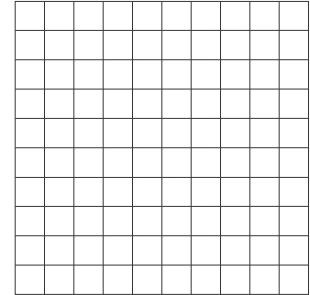**Graph the line that represents each linear equation.**

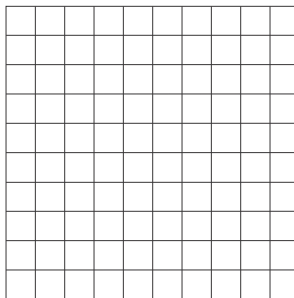**1.** $-5x + y = -10$

2. $-3x - 6y = 12$
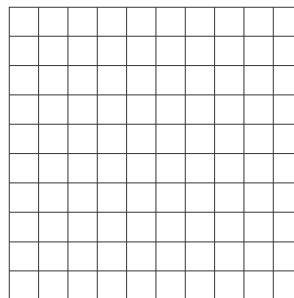
3. $4x - 12y = -24$

Graph the line that represents each linear equation.

4. $5x = 15$

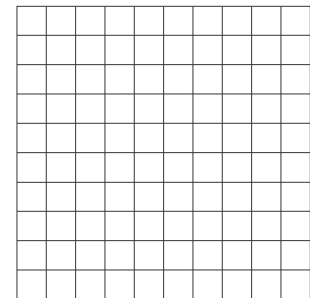**5.** $-4y = -20$

6. $6x = -24$

What points represent the *x*- and *y*-intercepts of each equation?

7. $4x - 5y = 80$

8. $7x + 8y = 112$

9. $-8x + 12y = -144$

10. Find expressions for the slope and *x*- and *y*-intercepts for
    $Ax + By = C$, where *A*, *B*, and *C* are nonzero integers.

11. A high school football team scores a total of 42 points by scoring touchdowns
    and field goals. Suppose each field goal is worth 3 points and each touchdown
    is worth 7 points.

    a. Let *x* represent the number of field goals and *y* represent the number of
        touchdowns. Write an equation that models the total points scored in the game.

    b. Identify and interpret the *x*- and *y*-intercepts.

2-4 Additional Practice

Parallel and Perpendicular Lines

Write an equation for the line that passes through the given point and is parallel to the graph of the given equation.

1. $y = 3x - 2$; (3, 2) **2.** $y = \frac{2}{3}x + 19$; (−9, 4) **3.** $3x + 4y = 12$; (−4, 7)

Write an equation for the line that passes through the given point and is perpendicular to the graph of the given equation.

4. $y = -2x - 1$; (2, −1) **5.** $y + 4 = -\frac{2}{3}(x - 2)$; (4, −2) **6.** $x - 6y = -2$; (−5, 6)

Determine whether the graphs of the given equations are *parallel, perpendicular,* **or** *neither*.

7. $y = 4x + 5$
$2x + 8y = 16$

8. $y = 3x + 5$
$-3x - y = 9$

9. $y - 7x = 3$
$14x - 2y = 28$

10. If you are given the graph of a line and are asked to write the equation of a perpendicular line, does it matter what the *y*-intercept will be for the equation you write? Why or why not?

11. A right triangle is formed by the *y*-axis, the line $y = 2x + 4$, and another line. If the legs of the right triangle intersect at (2, 8), what is the equation of the other line of the triangle?