Stockton Unified School District
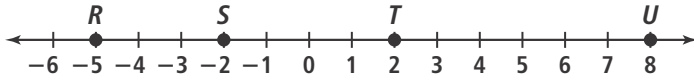Since 1852

# Geometry

Week # 1

# 1-1 Additional Practice

## Measuring Segments and Angles

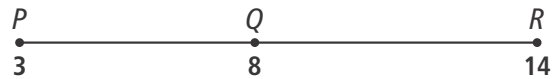**In Exercises 1–4, use the figure shown. Find the length of each segment.**
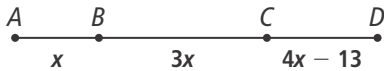


1. $\overline{RS} =$ ☐

2. $\overline{RT} =$ ☐

3. $\overline{ST} =$ ☐
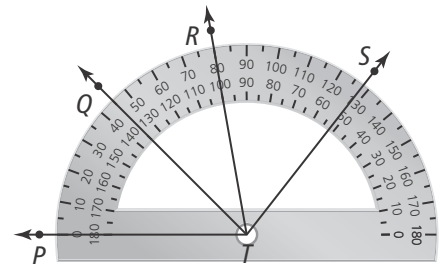
4. $\overline{RU} =$ ☐

**For Exercises 5–7, use the figure shown.**



5. What is *PQ*?

6. What is *QR*?

7. What is *PR*?

**Points *A*, *B*, *C*, and *D* on the figure below are collinear. Use the figure for Exercises 8 and 9.**



8. If $AC = 24$, what is *AB*?

9. If $BC = 15$, what is *BD*?

**Use the figure shown for Exercises 10–13.**

10. What is $m\angle PTR$?

11. What is $m\angle PTQ$?

12. What is $m\angle QTS$?

13. **Understand** Luis said that $m\angle\ QTR = 80°$. Explain Luis's error.



14. **Apply** A typical television newscast has three cameras. The center camera directly faces the news anchor's desk. The other two cameras are both angled 45° away from the center camera. Suppose each camera has a field of 60°. What is the total angle covered by the three cameras? Explain your reasoning.
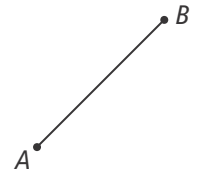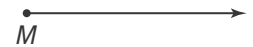
## 1-2 Additional Practice

Basic Constructions

**For Exercises 1–3, use the ray with endpoint M.**

1. Explain how you can use a compass to mark point N on the ray with endpoint M so that $\overline{MN}$ is a copy of $\overline{AB}$.
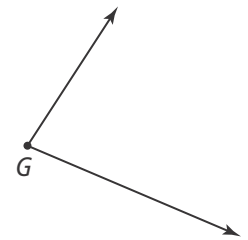
2. Mark point N.

3. Construct the perpendicular bisector of MN.

**For Exercises 4–6, use $\overline{PQ}$.**

4. Explain how you can use point Q to find point R such that $\angle RPQ$ is a copy of $\angle G$.

5. Draw $\angle RPQ$.

6. Construct the angle bisector of $\angle RPQ$.

7. **Understand** In the figure at the right, $\angle M$ is bisected twice to form $\angle K$. How much smaller than $\angle M$ is $\angle K$?

8. **Apply** A 50-ft × 300-ft parking lot is divided into sections for a craft fair by bisecting the width and the length. Each half is again bisected in length and width, forming 16 sections in all. What are the dimensions and area of each section? Show your work.

Name _____
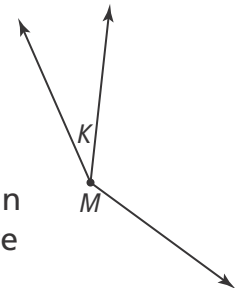
# 1-3 Additional Practice

Midpoint and Distance

**1.** What is the midpoint formula?

**For Exercises 2–5, find the midpoint of each segment with the given endpoints.**

**2.** $A(-4, 6)$ and $B(10, -10)$

**3.** $C(-3, -8)$ and $D(-6.5, -4.5)$

**4.** $E(3, 7)$ and $F(-8, -10)$

**5.** $G(-6, -13)$ and $H(-6.4, -3.8)$

**For Exercises 6–9, find the coordinates of each point described in relation to line segment *CD*.**

**6.** $\frac{1}{3}$ of the way from *C* to *D*

**7.** $\frac{2}{3}$ of the way from *D* to *C*

**8.** $\frac{2}{3}$ of the way from *C* to *D*

**9.** $\frac{1}{3}$ of the way from *D* to *C*
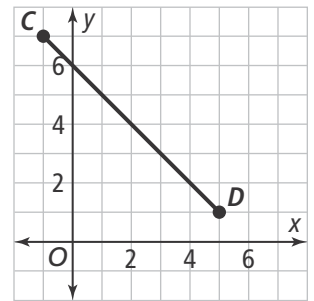
**10.** What is the distance formula?

**For Exercises 11–14, find the distance between each pair of points.**

**11.** $A(6, 8)$, $B(-1, 8)$

**12.** $C(5, -6)$, $D(5, 6)$

**13.** $E(-2, 0)$, $F(11, 0)$

**14.** $Q(1, -5)$, $T(9, 1)$

**15. Understand** If *M* is the midpoint of $\overline{ST}$, write an equation that describes the relationship between *ST* and *MT*.

**16. Apply** The axes in the coordinate grid at the right represent the walls of a bedroom. One corner of the room is at the origin. What is the distance from that corner of the room to the corner of the bed that is farthest away? If necessary, round to the nearest tenth of a foot.
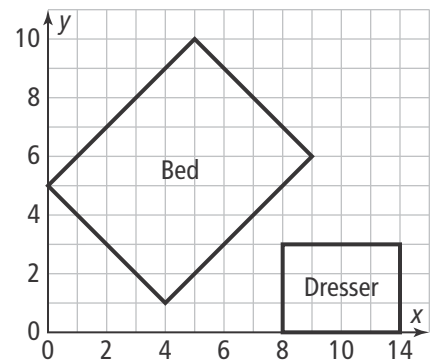
## 1-4 Additional Practice

Inductive Reasoning

**For Exercises 1 and 2, find a pattern for each sequence. Use the pattern to find the next two terms.**

1. 5, 11, 18, 26, _____, _____, …

   Pattern: _____

2. B, D, F, H, J, _____, _____, …

   Pattern: _____

**Make a conjecture for each scenario. Show your work.**

3. the square of an even number

4. the product of two odd numbers and a multiple of 2

**Find one counterexample to show that each conjecture is false.**

5. For two real numbers $a$ and $b$, $a$ is either equal to $b$ or greater than $b$.

6. All quadrilaterals are parallelograms.

**For each conjecture, verify it with several more examples or find a counterexample to disprove it.**

7. For whole number $n$, $n^3$ will be odd if $n$ is odd and even if $n$ is even.

8. **Understand** Consider this statement: All families go to the movies together. What is required to prove that the statement is false?

9. **Apply** A farmer keeps track of the water his livestock uses each month. How can he use his data to predict the amount of water used in August?

**Livestock Water Use by Month**
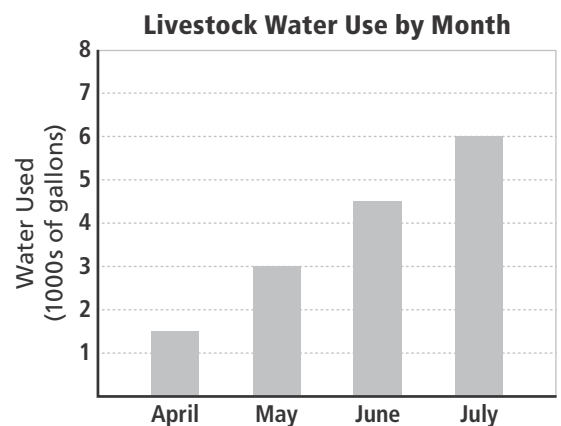
# 1-5 Additional Practice

## Conditional Statements

**Write each sentence as a conditional.**

1. A regular hexagon has exactly six congruent sides.

2. Two supplementary angles form a line.

**Determine the truth value of each conditional. Explain your reasoning or give a counterexample.**

3. If a figure has four congruent angles, then the figure is a square.

4. If the sidewalks are wet, then it has been raining.

**Write the negation of each part of the conditional. Then write the converse, the inverse, and the contrapositive. Determine the truth value of each new statement.**

5. If a figure is a square, then it is a rectangle.

6. If the game is field hockey, then the game is a team sport.

7. Write a biconditional for the following conditional. Determine the truth value of the new statement. *If two lines have the same slope, then they are parallel.*

8. **Understand** Write the Distributive Property of Multiplication Over Addition as a conditional statement.

9. **Apply** The number of people in the United States who are at least 100 years old grew about 66% from 1980 to 2010. Write that information as a conditional statement.

## 1-6 Additional Practice

Deductive Reasoning

1. You are given that a conditional and its hypothesis are false. Determine whether the conclusion is true or false.

**For Exercises 2–4, assume that each set of given information is true. Use the Law of Detachment to form a conclusion about each situation.**

2. If a triangle is an equilateral triangle, then the triangle has exactly three 60° angles. △ABC is an equilateral triangle.

3. If a parallelogram has four congruent sides and angles, then the parallelogram is a square. The parallelogram has four congruent sides and angles.

4. If the light is red, then you must stop at the intersection. The light is red.

**For Exercises 5 and 6, assume that each set of given information is true. Use the Law of Syllogism to write a conditional.**

5. If you want to get a black belt in karate, then you must first get a brown belt. If you want to get a brown belt in karate, you must first get a white belt.

6. If a baby has a fever, then the baby is sick. If a baby is sick, then the baby must be brought to the hospital.

7. **Understand** Suppose conditional $p \rightarrow q$ is true and conditional $q \rightarrow r$ is false. Must the conditional $p \rightarrow r$ also be false? Explain.

8. **Apply** Represent each true statement with symbols. Use symbols to write related contrapositives of the conditionals. Then use the Law of Detachment and the Law of Syllogism to draw a conclusion.
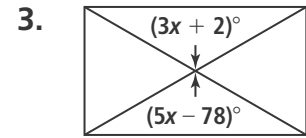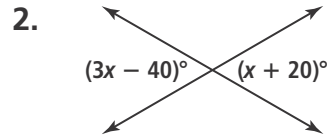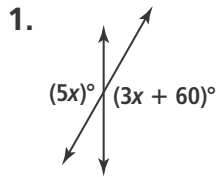
   If Jaylen rolls a number cube and gets a 3, then he moves his game piece to a purple square. If he moves to a purple square, he gets to skip his opponent. Jaylen skips his opponent.

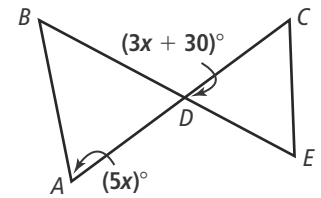# 1-7 Additional Practice

## Writing Proofs

**Find the value of each variable and the measure of each labeled angle.**

**1.**

$(5x)°$  $(3x + 60)°$

**2.**

$(3x - 40)°$  $(x + 20)°$

**3.**

$(3x + 2)°$

$(5x - 78)°$

**4.** Write a paragraph proof based on the given information.

**Given:** $\angle A \cong \angle BDA$
**Prove:** $x = 15$

$B$  $C$  $(3x + 30)°$  $D$  $E$  $A$  $(5x)°$

**5. Understand** Complete the proof by filling in the blanks.

**Given:** $\angle 1 \cong \angle 7$
**Prove:** $m\angle 6 + m\angle 2 = 180°$

1 2
4 3
6 5
8 7
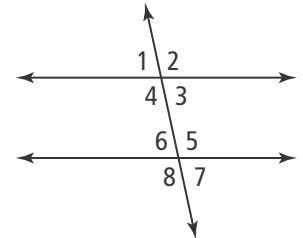
| Statements | Reasons |
|---|---|
| 1. | 1. Given |
| 2. | 2. Vertical Angles are $\cong$. |
| 3. $\angle 1 \cong \angle 6$ | 3. |
| 4. | 4. Definition of congruent angles |
| 5. $m\angle 1 + m\angle 2 = 180°$ | 5. |
| 6. $m\angle 6 + m\angle 2 = 180°$ | 6. |

**6. Apply** Streets A and L run parallel to each other. Boulevard N forms a 75° angle with Street L south of (below) their intersection. What angle does Boulevard N make with Street L north of (above) their intersection? Justify your answer.

N
L
A
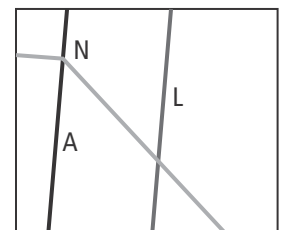
# 1-8 Additional Practice

Indirect Proof

**Use indirect reasoning to draw a conclusion in each situation.**

1. A factor of a whole number is a whole number that divides evenly into the given number. The number $x$ does not does not divide evenly into 6.

2. A rectangle is a quadrilateral with four congruent angles. An isosceles trapezoid has only two congruent angles.

**Write the first step of an indirect proof of each statement.**

3. **Prove:** If $x > 6$, then $|x| > 6$.

4. **Prove:** A circle is a figure with no sides.

5. Prove the conditional by proving the contrapositive:
   For two positive integers $n$ and $m$, if $nm = 4$, then either $n$ or $m$ is 1 or both are 2.

6. **Understand** Consider the conditional, "If $a^3$ is positive, then $a$ is positive." Jae wrote an indirect proof to prove the conditional. What is Jae's error?

   Assume $a^3$ is negative and $a$ is positive.

   $-a \times -a \times -a = (-a \times -a) \times -a = a^2 \times -a = -a^3$.

7. **Apply** A new camera phone has two settings. The field of view for the camera phone's panorama mode is 240°. The field of view for the same camera in regular mode is 60°. Write an indirect proof to prove the conditional, "If a photographer wants to take a photo in panorama mode, he will have to turn his camera."

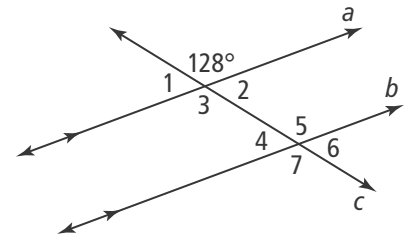## 2-1 Additional Practice

Parallel Lines

**Use the figure for Exercises 1–4. Identify all pairs of each type of angle.**

1. corresponding angles

2. same-side interior angles

3. alternate interior angles

4. alternate exterior angles
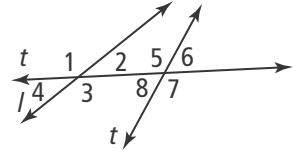
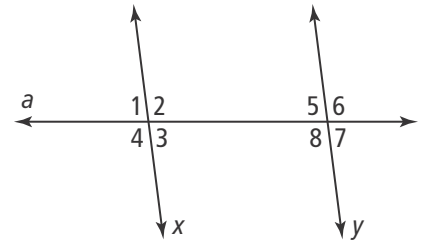**Use the figure for Exercises 5 and 6.**

5. Which angles are supplementary to the given angle?

6. Which angles are congruent to the given angle?

7. Complete the two-column proof.

   **Given:** $x \parallel y$

   **Prove:** $\angle 3 \cong \angle 5$

| Statements | Reasons |
|---|---|
| 1) $x \parallel y$ | 1) |
| 2) $m\angle 3 + m\angle 8 = 180°$ | 2) |
| 3) $m\angle 5 + m\angle 8 = 180°$ | 3) |
| 4) | 4) Transitive Property of Equality |
| 5) | 5) Subtraction Property of Equality |
| 6) | 6) Definition of congruence |

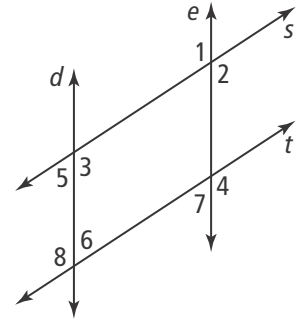8. In the figure, $EH \parallel AI$ and $AI \parallel CJ$.

   a. What is $m\angle 1$? Explain.

   b. What is $m\angle 3$? Explain.

Name _____

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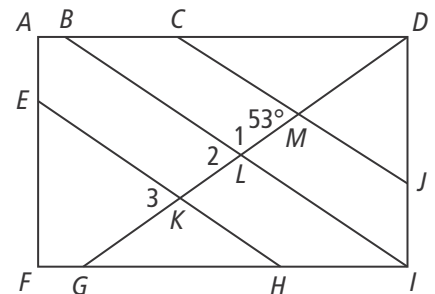
## 2-2 Additional Practice

### Proving Lines Parallel

**Use the figure for Exercises 1–4. Using the given information, which lines can you conclude are parallel? State the theorem or postulate that justifies each answer.**

**1.** $\angle 1 \cong \angle 4$

**2.** $\angle 2 \cong \angle 3$

**3.** $\angle 6 \cong \angle 7$

**4.** $m\angle 5 + m\angle 8 = 180°$

**5.** Complete the flow proof shown. Fill in the blanks.

**Given:** $\angle 1$ and $\angle 4$ are supplementary; $c \parallel d$.

**Prove:** $a \parallel b$

| $c \parallel d$ | ⟶ | _____ | ⟶ | $m\angle 3 + m\angle 4 = m\angle 1 + m\angle 4$ |
| Given | | Same-side interior ∠s are suppl. | | Substitution |

| $\angle 1$ and $\angle 4$ are suppl. | ⟶ | $m\angle 1 + m\angle 4 = 180°$ |
| _____ | | Definition of suppl. ∠s |

$m\angle 1 = m\angle 3$
Subtraction Property of Equality
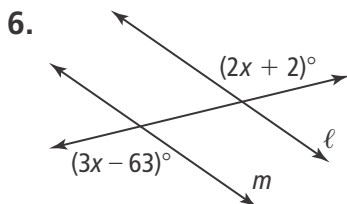
$\angle 1 \cong \angle 3$
Definition of congruent ∠s

$\angle 2 \cong \angle 3$

_____
Transitive Property of ≅
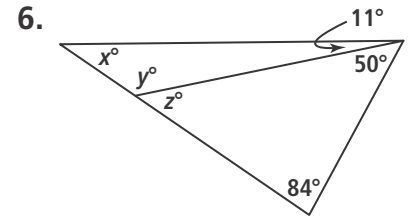
$a \parallel b$
Converse of Corresponding Angles Theorem

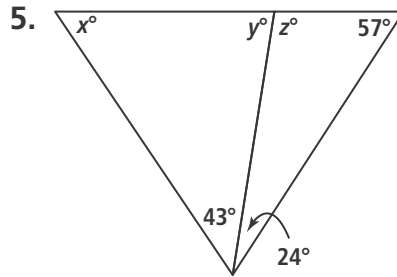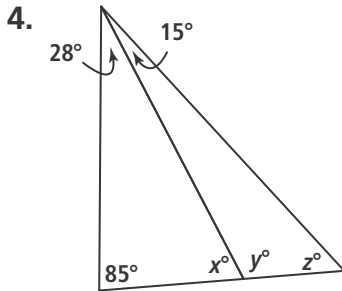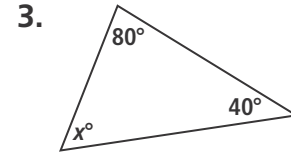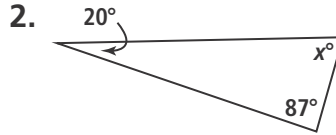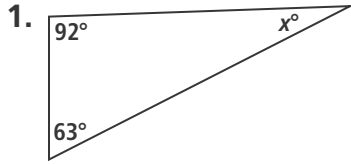**In Exercises 6 and 7, for what value of $x$ is $l \parallel m$? Which theorem or postulate justifies your answer in each case?**

**6.**

$(2x + 2)°$

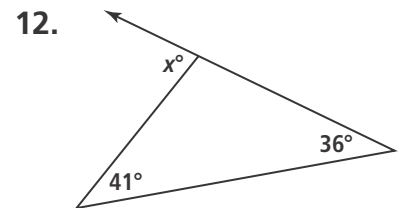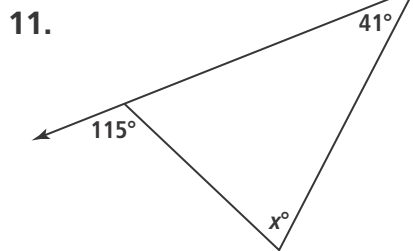$(3x - 63)°$

**7.**

$(2x + 20)°$
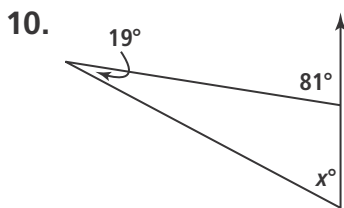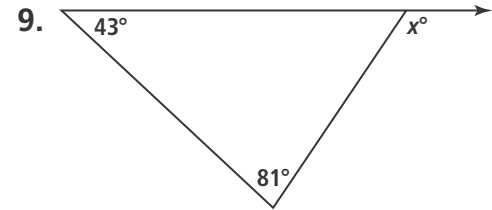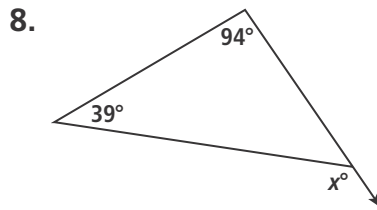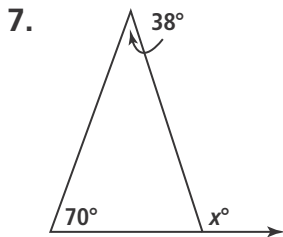
$(6x + 24)°$

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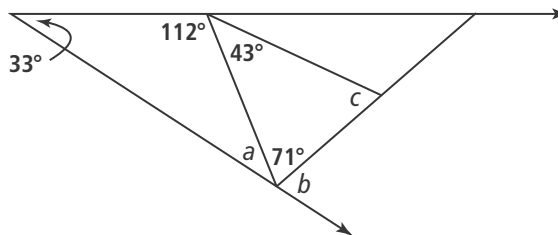Name
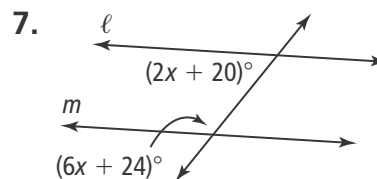
# 2-3 Additional Practice

Parallel Lines and Triangle Angle Sums

**For Exercises 1–6, find the value of each variable.**

**1.**

92°
x°
63°

**2.**

20°
x°
87°

**3.**

80°
40°
x°

**4.**

28°
15°
85°
x° y° z°

**5.**

x°
y° z°
57°
43°
24°

**6.**

11°
x°
y°
z°
50°
84°

**For Exercises 7–12, find the value of x for each figure.**

**7.**

38°
70°
x°

**8.**

94°
39°
x°

**9.**

43°
x°
81°

**10.**

19°
81°
x°

**11.**

41°
115°
x°

**12.**

x°
36°
41°

**Use the figure for Exercises 13–15. Find the measure of the given angle.**

112°
33°
43°
c
a 71°
b

**13.** a

**14.** b

**15.** c

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# 2-4 Additional Practice

Slopes of Parallel and Perpendicular Lines

1. A hand rail is installed along the stairs of a new house as shown in the figure. The table shows the distance, in inches, of the top rail $f(x)$ and bottom rail $g(x)$ from the floor for the middle of each numbered step $x$. Determine the slope of each rail. Are the top and bottom rails parallel?

| x | f(x) | g(x) |
|---|------|------|
| 1 | 9 | 43 |
| 2 | 16 | 50 |
| 3 | 23 | 57 |
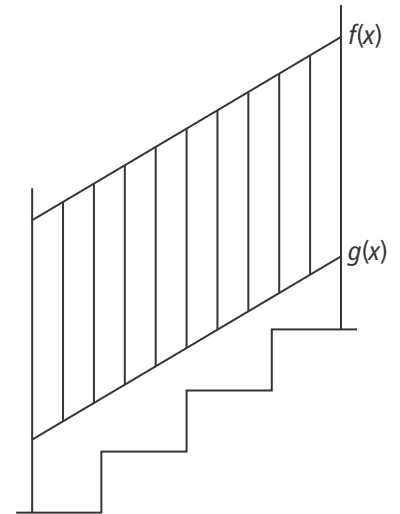


**Use the figure for Exercises 2–9. Determine whether each pair of lines are parallel or perpendicular. Write *yes* or *no*.**



2. $q$ and $v$, parallel

3. $r$ and $s$, parallel

4. $r$ and $t$, parallel

5. $s$ and $u$, parallel

6. $q$ and $s$, perpendicular

7. $q$ and $v$, perpendicular

8. $r$ and $s$, perpendicular

9. $t$ and $v$, perpendicular
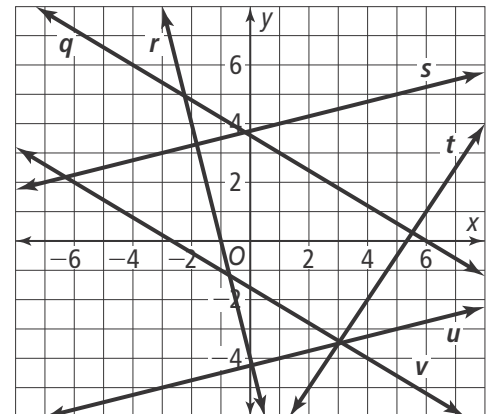
**Write the equations for the line parallel and the line perpendicular to the given line passing through the given point.**

10. $y = 2x + 7$; (0, 1)

11. $y = -\frac{1}{3}x + 2$; (3, 5)

12. $y = -5x - \frac{1}{2}$; (–4, 2)