

# Holt Geometry

## Homework and Practice Workbook



**HOLT, RINEHART AND WINSTON**

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## Blackline Masters

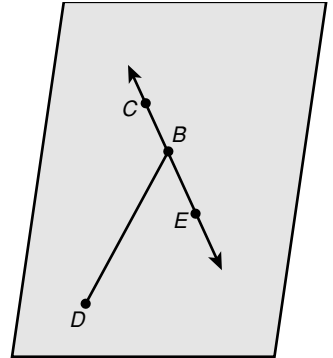
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**LESSON**

**Practice B**

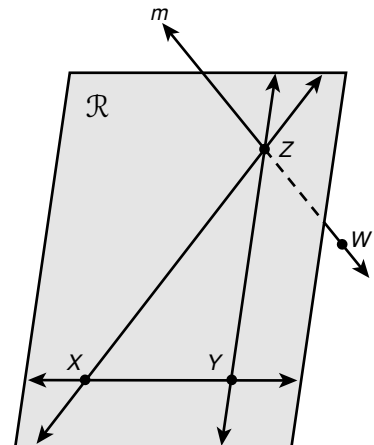
**1-1 Understanding Points, Lines, and Planes**

Use the figure for Exercises 1–7.



1. Name a plane. \_\_\_\_\_
2. Name a segment. \_\_\_\_\_
3. Name a line. \_\_\_\_\_
4. Name three collinear points.  
\_\_\_\_\_
5. Name three noncollinear points.  
\_\_\_\_\_
6. Name the intersection of a line and a segment not on the line. \_\_\_\_\_
7. Name a pair of opposite rays. \_\_\_\_\_

Use the figure for Exercises 8–11.



8. Name the points that determine plane  $\mathcal{R}$ .  
\_\_\_\_\_
9. Name the point at which line  $m$  intersects plane  $\mathcal{R}$ . \_\_\_\_\_
10. Name two lines in plane  $\mathcal{R}$  that intersect line  $m$ .  
\_\_\_\_\_
11. Name a line in plane  $\mathcal{R}$  that does not intersect line  $m$ . \_\_\_\_\_

**Draw your answers in the space provided.**

Michelle Kwan won a bronze medal in figure skating at the 2002 Salt Lake City Winter Olympic Games.

12. Michelle skates straight ahead from point  $L$  and stops at point  $M$ . Draw her path.
13. Michelle skates straight ahead from point  $L$  and continues through point  $M$ . Name a figure that represents her path. Draw her path.
14. Michelle and her friend Alexei start back to back at point  $L$  and skate in opposite directions. Michelle skates through point  $M$ , and Alexei skates through point  $K$ . Draw their paths.

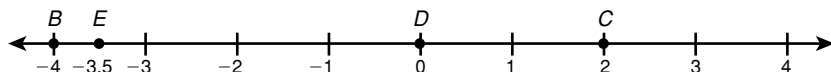
**LESSON** **Practice B**  
**1-2** **Measuring and Constructing Segments**

Draw your answer in the space provided.

1. Use a compass and straightedge to construct  $\overline{XY}$  congruent to  $\overline{UV}$ .



Find the coordinate of each point.



2.  $D$  \_\_\_\_\_                      3.  $C$  \_\_\_\_\_                      4.  $E$  \_\_\_\_\_

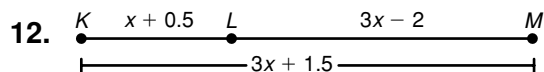
Find each length.

5.  $BE$  \_\_\_\_\_                      6.  $DB$  \_\_\_\_\_                      7.  $EC$  \_\_\_\_\_

For Exercises 8–11,  $H$  is between  $I$  and  $J$ .

8.  $HI = 3.9$  and  $HJ = 6.2$ . Find  $IJ$ . \_\_\_\_\_  
 9.  $JI = 25$  and  $IH = 13$ . Find  $HJ$ . \_\_\_\_\_  
 10.  $H$  is the midpoint of  $\overline{IJ}$ , and  $IH = 0.75$ . Find  $HJ$ . \_\_\_\_\_  
 11.  $H$  is the midpoint of  $\overline{IJ}$ , and  $IJ = 9.4$ . Find  $IH$ . \_\_\_\_\_

Find the measurements.



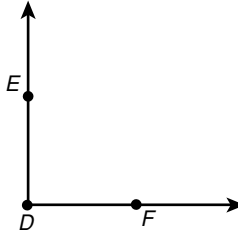
Find  $LM$ . \_\_\_\_\_

13. A pole-vaulter uses a 15-foot-long pole. She grips the pole so that the segment below her left hand is twice the length of the segment above her left hand. Her right hand grips the pole 1.5 feet above her left hand. How far up the pole is her right hand?  
 \_\_\_\_\_

**LESSON** **Practice B**  
**1-3** **Measuring and Constructing Angles**

Draw your answer on the figure.

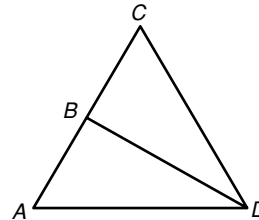
1. Use a compass and straightedge to construct angle bisector  $\overrightarrow{DG}$ .



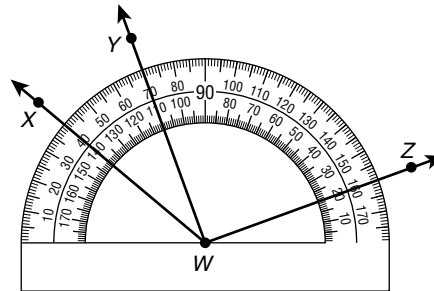
2. Name eight different angles in the figure.

\_\_\_\_\_

\_\_\_\_\_



Find the measure of each angle and classify each as acute, right, obtuse, or straight.



3.  $\angle YWZ$

4.  $\angle XWZ$

5.  $\angle YWX$

\_\_\_\_\_

$T$  is in the interior of  $\angle PQR$ . Find each of the following.

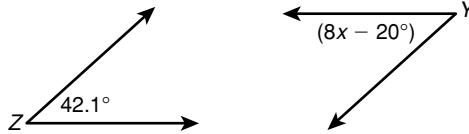
6.  $m\angle PQT$  if  $m\angle PQR = 25^\circ$  and  $m\angle RQT = 11^\circ$ . \_\_\_\_\_
7.  $m\angle PQR$  if  $m\angle PQR = (10x - 7)^\circ$ ,  $m\angle RQT = 5x^\circ$ , and  $m\angle PQT = (4x + 6)^\circ$ . \_\_\_\_\_
8.  $m\angle PQR$  if  $\overrightarrow{QT}$  bisects  $\angle PQR$ ,  $m\angle RQT = (10x - 13)^\circ$ , and  $m\angle PQT = (6x + 1)^\circ$ . \_\_\_\_\_
9. Longitude is a measurement of position around the equator of Earth. Longitude is measured in degrees, minutes, and seconds. Each degree contains 60 minutes, and each minute contains 60 seconds. Minutes are indicated by the symbol ' and seconds are indicated by the symbol ". Williamsburg, VA, is located at  $76^\circ 42' 25''$ . Roanoke, VA, is located at  $79^\circ 57' 30''$ . Find the difference of their longitudes in degrees, minutes, and seconds. \_\_\_\_\_
10. To convert minutes and seconds into decimal parts of a degree, divide the number of minutes by 60 and the number of seconds by 3,600. Then add the numbers together. Write the location of Roanoke, VA, as a decimal to the nearest thousandths of a degree. \_\_\_\_\_

**LESSON**  
**1-4** **Practice B**  
**Pairs of Angles**

- $\angle PQR$  and  $\angle SQR$  form a linear pair. Find the sum of their measures. \_\_\_\_\_
- Name the ray that  $\angle PQR$  and  $\angle SQR$  share. \_\_\_\_\_

Use the figures for Exercises 3 and 4.

- supplement of  $\angle Z$  \_\_\_\_\_
- complement of  $\angle Y$  \_\_\_\_\_

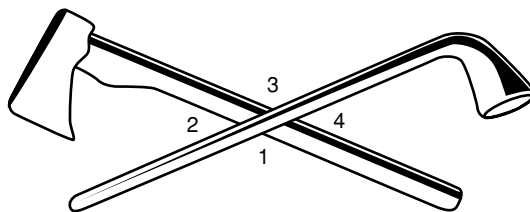


- An angle measures 12 degrees less than three times its supplement. Find the measure of the angle. \_\_\_\_\_
- An angle is its own complement. Find the measure of a supplement to this angle.  
\_\_\_\_\_
- $\angle DEF$  and  $\angle FEG$  are complementary.  $m\angle DEF = (3x - 4)^\circ$ , and  $m\angle FEG = (5x + 6)^\circ$ .  
Find the measures of both angles. \_\_\_\_\_
- $\angle DEF$  and  $\angle FEG$  are supplementary.  $m\angle DEF = (9x + 1)^\circ$ , and  $m\angle FEG = (8x + 9)^\circ$ .  
Find the measures of both angles. \_\_\_\_\_

Use the figure for Exercises 9 and 10.

In 2004, several nickels were minted to commemorate the Louisiana Purchase and Lewis and Clark's expedition into the American West. One nickel shows a pipe and a hatchet crossed to symbolize peace between the American government and Native American tribes.

- Name a pair of vertical angles.  
\_\_\_\_\_  
\_\_\_\_\_



- Name a linear pair of angles.  
\_\_\_\_\_
- $\angle ABC$  and  $\angle CBD$  form a linear pair and have equal measures. Tell if  $\angle ABC$  is acute, right, or obtuse. \_\_\_\_\_
- $\angle KLM$  and  $\angle MLN$  are complementary.  $\overrightarrow{LM}$  bisects  $\angle KLN$ . Find the measures of  $\angle KLM$  and  $\angle MLN$ . \_\_\_\_\_

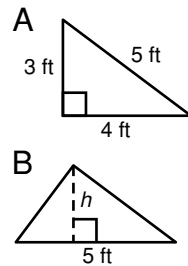
**LESSON**

**Practice B**

**1-5 Using Formulas in Geometry**

Use the figures for Exercises 1–3.

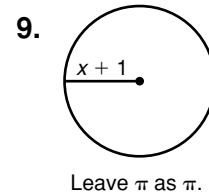
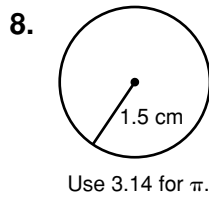
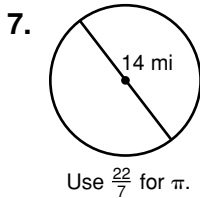
1. Find the perimeter of triangle A. \_\_\_\_\_
2. Find the area of triangle A. \_\_\_\_\_
3. Triangle A is identical to triangle B.  
Find the height  $h$  of triangle B. \_\_\_\_\_



Find the perimeter and area of each shape.

4. square with a side 2.4 m in length  
\_\_\_\_\_
5. rectangle with length  $(x + 3)$  and width 7  
\_\_\_\_\_
6. Although a circle does not have sides, it does have a perimeter.  
What is the term for the perimeter of a circle? \_\_\_\_\_

Find the circumference and area of each circle.

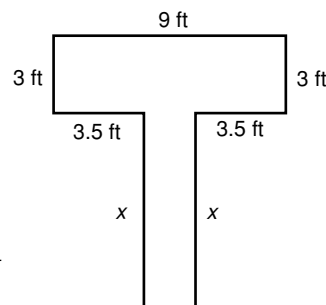


10. The area of a square is  $\frac{1}{4}$  in<sup>2</sup>. Find the perimeter. \_\_\_\_\_
11. The area of a triangle is 152 m<sup>2</sup>, and the height is 16 m. Find the base. \_\_\_\_\_
12. The circumference of a circle is  $25\pi$  mm. Find the radius. \_\_\_\_\_

Use the figure for Exercises 13 and 14.

Lucas has a 39-foot-long rope. He uses all the rope to outline this T-shape in his backyard. All the angles in the figure are right angles.

13. Find  $x$ . \_\_\_\_\_
14. Find the area enclosed by the rope. \_\_\_\_\_



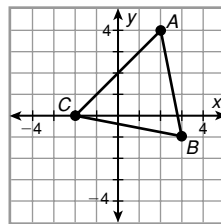


**LESSON** **Practice B**  
**1-6** **Midpoint and Distance in the Coordinate Plane**

Find the coordinates of the midpoint of each segment.

1.  $\overline{TU}$  with endpoints  $T(5, -1)$  and  $U(1, -5)$  \_\_\_\_\_
2.  $\overline{VW}$  with endpoints  $V(-2, -6)$  and  $W(x + 2, y + 3)$  \_\_\_\_\_
3.  $Y$  is the midpoint of  $\overline{XZ}$ .  $X$  has coordinates  $(2, 4)$ , and  $Y$  has coordinates  $(-1, 1)$ . Find the coordinates of  $Z$ . \_\_\_\_\_

Use the figure for Exercises 4–7.



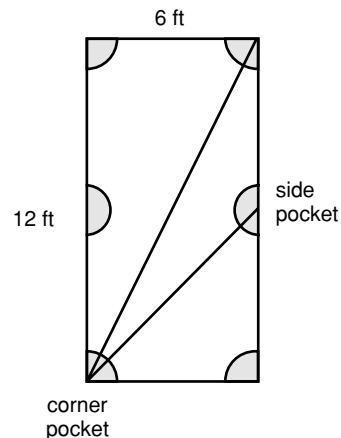
4. Find  $AB$ . \_\_\_\_\_
5. Find  $BC$ . \_\_\_\_\_
6. Find  $CA$ . \_\_\_\_\_
7. Name a pair of congruent segments. \_\_\_\_\_

Find the distances.

8. Use the Distance Formula to find the distance, to the nearest tenth, between  $K(-7, -4)$  and  $L(-2, 0)$ . \_\_\_\_\_
9. Use the Pythagorean Theorem to find the distance, to the nearest tenth, between  $F(9, 5)$  and  $G(-2, 2)$ . \_\_\_\_\_

Use the figure for Exercises 10 and 11.

Snooker is a kind of pool or billiards played on a 6-foot-by-12-foot table. The side pockets are halfway down the rails (long sides).

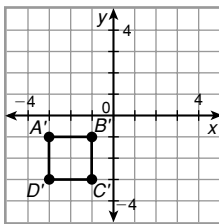
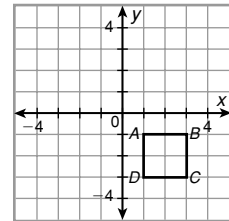


10. Find the distance, to the nearest tenth of a foot, diagonally across the table from corner pocket to corner pocket.  
\_\_\_\_\_
11. Find the distance, to the nearest tenth of an inch, diagonally across the table from corner pocket to side pocket.  
\_\_\_\_\_

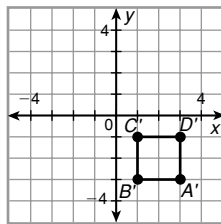
**LESSON** **1-7** **Practice B**  
**Transformations in the Coordinate Plane**

Use the figure for Exercises 1–3.

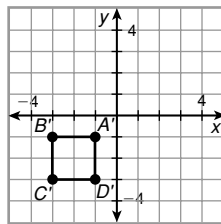
The figure in the plane at right shows the preimage in the transformation  $ABCD \rightarrow A'B'C'D'$ . Match the number of the image (below) with the name of the correct transformation.



1



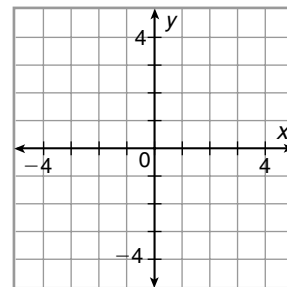
2



3

1. rotation \_\_\_\_\_      2. translation \_\_\_\_\_      3. reflection \_\_\_\_\_

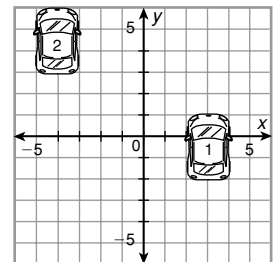
4. A figure has vertices at  $D(-2, 1)$ ,  $E(-3, 3)$ , and  $F(0, 3)$ . After a transformation, the image of the figure has vertices at  $D'(-1, -2)$ ,  $E'(-3, -3)$ , and  $F'(-3, 0)$ . Draw the preimage and the image. Then identify the transformation.



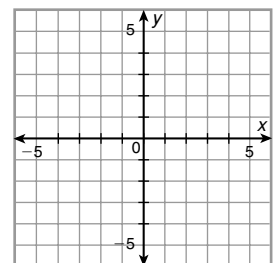
5. A figure has vertices at  $G(0, 0)$ ,  $H(-1, -2)$ ,  $I(-1.5, 0)$ , and  $J(-2.5, 2)$ . Find the coordinates for the image of  $GHIJ$  after the translation  $(x, y) \rightarrow (x - 2.5, y + 4)$ .

Use the figure for Exercise 6.

6. A parking garage attendant will make the most money when the maximum number of cars fits in the parking garage. To fit one more car in, the attendant moves a car from position 1 to position 2. Write a rule for this translation.



7. A figure has vertices at  $X(-1, 1)$ ,  $Y(-2, 3)$ , and  $Z(0, 4)$ . Draw the image of  $XYZ$  after the translation  $(x, y) \rightarrow (x - 2, y)$  and a  $180^\circ$  rotation around  $X$ .



**LESSON**

**Practice B**

**2-1**

**Using Inductive Reasoning to Make Conjectures**

Find the next item in each pattern.

1. 100, 81, 64, 49, . . .

\_\_\_\_\_

2.  . . .

\_\_\_\_\_

3. Alabama, Alaska, Arizona, . . .

\_\_\_\_\_

4. west, south, east, . . .

\_\_\_\_\_

Complete each conjecture.

5. The square of any negative number is \_\_\_\_\_.
6. The number of segments determined by  $n$  points is \_\_\_\_\_.

Show that each conjecture is false by finding a counterexample.

7. For any integer  $n$ ,  $n^3 > 0$ .

\_\_\_\_\_

8. Each angle in a right triangle has a different measure.

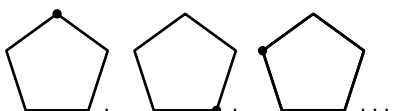
9. For many years in the United States, each bank printed its own currency. The variety of different bills led to widespread counterfeiting. By the time of the Civil War, a significant fraction of the currency in circulation was counterfeit. If one Civil War soldier had 48 bills, 16 of which were counterfeit, and another soldier had 39 bills, 13 of which were counterfeit, make a conjecture about what fraction of bills were counterfeit at the time of the Civil War.

\_\_\_\_\_

Make a conjecture about each pattern. Write the next two items.

10. 1, 2, 2, 4, 8, 32, . . .

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

11.  . . .

\_\_\_\_\_  
 \_\_\_\_\_

**LESSON** **Practice B**  
**2-2** **Conditional Statements**

Identify the hypothesis and conclusion of each conditional.

- |  |   |
|--|---|
| 1. If you can see the stars, then it is night. | 2. A pencil writes well if it is sharp. |
| Hypothesis: _____                              | Hypothesis: _____                       |
| Conclusion: _____                              | Conclusion: _____                       |

Write a conditional statement from each of the following.

3. Three noncollinear points determine a plane.

4.  \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Determine if each conditional is true. If false, give a counterexample.

5. If two points are noncollinear, then a right triangle contains one obtuse angle.

\_\_\_\_\_

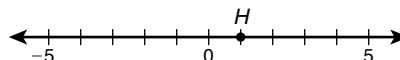
6. If a liquid is water, then it is composed of hydrogen and oxygen.

\_\_\_\_\_

7. If a living thing is green, then it is a plant.

\_\_\_\_\_

8. "If  $G$  is at 4, then  $GH$  is 3." Write the converse, inverse, and contrapositive of this statement. Find the truth value of each.

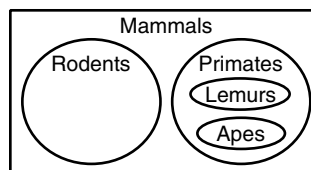


Converse: \_\_\_\_\_

Inverse: \_\_\_\_\_

Contrapositive: \_\_\_\_\_

This chart shows a small part of the *Mammalia* class of animals, the mammals. Write a conditional to describe the relationship between each given pair.



9. primates and mammals \_\_\_\_\_

10. lemurs and rodents \_\_\_\_\_

11. rodents and apes \_\_\_\_\_

12. apes and mammals \_\_\_\_\_

**LESSON** **Practice B**  
**2-3** **Using Deductive Reasoning to Verify Conjectures**

**Tell whether each conclusion is a result of inductive or deductive reasoning.**

1. The United States Census Bureau collects data on the earnings of American citizens. Using data for the three years from 2001 to 2003, the bureau concluded that the national average median income for a four-person family was \$43,527.  
 \_\_\_\_\_

2. A speeding ticket costs \$40 plus \$5 per mi/h over the speed limit. Lynne mentions to Frank that she was given a ticket for \$75. Frank concludes that Lynne was driving 7 mi/h over the speed limit.  
 \_\_\_\_\_

**Determine if each conjecture is valid by the Law of Detachment.**

3. Given: If  $m\angle ABC = m\angle CBD$ , then  $\overrightarrow{BC}$  bisects  $\angle ABD$ .  $\overrightarrow{BC}$  bisects  $\angle ABD$ .  
 Conjecture:  $m\angle ABC = m\angle CBD$ . \_\_\_\_\_
4. Given: You will catch a catfish if you use stink bait. Stuart caught a catfish.  
 Conjecture: Stuart used stink bait. \_\_\_\_\_
5. Given: An obtuse triangle has two acute angles. Triangle  $ABC$  is obtuse.  
 Conjecture: Triangle  $ABC$  has two acute angles. \_\_\_\_\_

**Determine if each conjecture is valid by the Law of Syllogism.**

6. Given: If the gossip said it, then it must be true. If it is true, then somebody is in big trouble.  
 Conjecture: Somebody is in big trouble because the gossip said it. \_\_\_\_\_
7. Given: No human is immortal. Fido the dog is not human.  
 Conjecture: Fido the dog is immortal. \_\_\_\_\_
8. Given: The radio is distracting when I am studying. If it is 7:30 P.M. on a weeknight, I am studying.  
 Conjecture: If it is 7:30 P.M. on a weeknight, the radio is distracting. \_\_\_\_\_

**Draw a conclusion from the given information.**

9. Given: If two segments intersect, then they are not parallel. If two segments are not parallel, then they could be perpendicular.  $\overline{EF}$  and  $\overline{MN}$  intersect.  
 \_\_\_\_\_
10. Given: When you are relaxed, your blood pressure is relatively low. If you are sailing, you are relaxed. Becky is sailing.  
 \_\_\_\_\_

**LESSON**  
**2-4**

**Practice B**  
***Biconditional Statements and Definitions***

**Write the conditional statement and converse within each biconditional.**

1. The tea kettle is whistling if and only if the water is boiling.

Conditional: \_\_\_\_\_

Converse: \_\_\_\_\_

2. A biconditional is true if and only if the conditional and converse are both true.

Conditional: \_\_\_\_\_

Converse: \_\_\_\_\_

**For each conditional, write the converse and a biconditional statement.**

3. Conditional: If  $n$  is an odd number, then  $n - 1$  is divisible by 2.

Converse: \_\_\_\_\_

Biconditional: \_\_\_\_\_

4. Conditional: An angle is obtuse when it measures between  $90^\circ$  and  $180^\circ$ .

Converse: \_\_\_\_\_

Biconditional: \_\_\_\_\_

**Determine whether a true biconditional can be written from each conditional statement. If not, give a counterexample.**

5. If the lamp is unplugged, then the bulb does not shine.

\_\_\_\_\_

6. The date can be the 29th if and only if it is not February.

\_\_\_\_\_

**Write each definition as a biconditional.**

7. A cube is a three-dimensional solid with six square faces.

\_\_\_\_\_

\_\_\_\_\_

8. Tanya claims that the definition of *doofus* is “her younger brother.”

\_\_\_\_\_

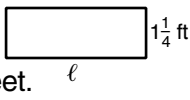
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**LESSON** **Practice B**  
**2-5 Algebraic Proof**

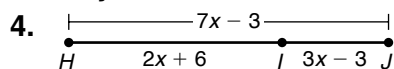
Solve each equation. Show all your steps and write a justification for each step.

1.  $\frac{1}{5}(a + 10) = -3$

2.  $t + 6.5 = 3t - 1.3$

3. The formula for the perimeter  $P$  of a rectangle with length  $\ell$  and width  $w$  is  $P = 2(\ell + w)$ . Find the length of the rectangle shown here if the perimeter is  $9\frac{1}{2}$  feet.  Solve the equation for  $\ell$  and justify each step.

Write a justification for each step.



$HJ = HI + IJ$  \_\_\_\_\_

$7x - 3 = (2x + 6) + (3x - 3)$  \_\_\_\_\_

$7x - 3 = 5x + 3$  \_\_\_\_\_

$7x = 5x + 6$  \_\_\_\_\_

$2x = 6$  \_\_\_\_\_

$x = 3$  \_\_\_\_\_

Identify the property that justifies each statement.

5.  $m = n$ , so  $n = m$ .

6.  $\angle ABC \cong \angle ABC$

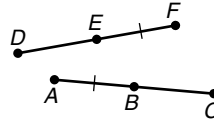
7.  $\overline{KL} \cong \overline{LK}$

8.  $p = q$  and  $q = -1$ , so  $p = -1$ .

**LESSON**  
**2-6** **Practice B**  
**Geometric Proof**

Write a justification for each step.

**Given:**  $AB = EF$ ,  $B$  is the midpoint of  $\overline{AC}$ ,  
and  $E$  is the midpoint of  $\overline{DF}$ .



1.  $B$  is the midpoint of  $\overline{AC}$ ,  
and  $E$  is the midpoint of  $\overline{DF}$ .
2.  $\overline{AB} \cong \overline{BC}$ , and  $\overline{DE} \cong \overline{EF}$ .
3.  $AB = BC$ , and  $DE = EF$ .
4.  $AB + BC = AC$ , and  $DE + EF = DF$ .
5.  $2AB = AC$ , and  $2EF = DF$ .
6.  $AB = EF$
7.  $2AB = 2EF$
8.  $AC = DF$
9.  $\overline{AC} \cong \overline{DF}$

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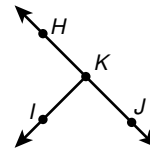
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Fill in the blanks to complete the two-column proof.

**10. Given:**  $\angle HKJ$  is a straight angle.  
 $\overrightarrow{KI}$  bisects  $\angle HKJ$ .

**Prove:**  $\angle IKJ$  is a right angle.

**Proof:**



Statements	Reasons
1. a. _____	1. Given
2. $m\angle HKJ = 180^\circ$	2. b. _____
3. c. _____	3. Given
4. $\angle IKJ \cong \angle IKH$	4. Def. of $\angle$ bisector
5. $m\angle IKJ = m\angle IKH$	5. Def. of $\cong \angle$ s
6. d. _____	6. $\angle$ Add. Post.
7. $2m\angle IKJ = 180^\circ$	7. e. Subst. (Steps _____)
8. $m\angle IKJ = 90^\circ$	8. Div. Prop. of =
9. $\angle IKJ$ is a right angle.	9. f. _____



**LESSON**

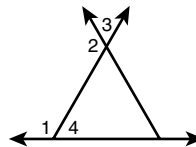
**Practice B**

**2-7** *Flowchart and Paragraph Proofs*

1. Use the given two-column proof to write a flowchart proof.

**Given:**  $\angle 4 \cong \angle 3$

**Prove:**  $m\angle 1 = m\angle 2$

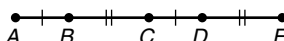


Statements	Reasons
1. $\angle 1$ and $\angle 4$ are supplementary, $\angle 2$ and $\angle 3$ are supplementary.	1. Linear Pair Thm.
2. $\angle 4 \cong \angle 3$	2. Given
3. $\angle 1 \cong \angle 2$	3. $\cong$ Supps. Thm.
4. $m\angle 1 = m\angle 2$	4. Def. of $\cong \angle$

2. Use the given two-column proof to write a paragraph proof.

**Given:**  $AB = CD, BC = DE$

**Prove:**  $C$  is the midpoint of  $\overline{AE}$ .



Statements	Reasons
1. $AB = CD, BC = DE$	1. Given
2. $AB + BC = CD + DE$	2. Add. Prop. of =
3. $AB + BC = AC, CD + DE = CE$	3. Seg. Add. Post.
4. $AC = CE$	4. Subst.
5. $\overline{AC} \cong \overline{CE}$	5. Def. of $\cong$ segs.
6. $C$ is the midpoint of $\overline{AE}$ .	6. Def. of mdpt.

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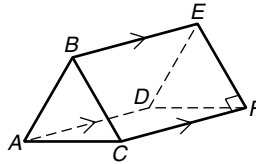
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**LESSON**  
**3-1**

**Practice B**  
**Lines and Angles**

For Exercises 1–4, identify each of the following in the figure.

1. a pair of parallel segments
2. a pair of skew segments
3. a pair of perpendicular segments
4. a pair of parallel planes



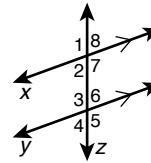
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In Exercises 5–10, give one example of each from the figure.



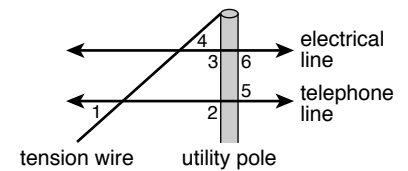
- |                  |                   |                         |
|------------------|-------------------|-------------------------|
| 5. a transversal | 6. parallel lines | 7. corresponding angles |
|------------------|-------------------|-------------------------|

\_\_\_\_\_

- |                              |                              |                               |
|------------------------------|------------------------------|-------------------------------|
| 8. alternate interior angles | 9. alternate exterior angles | 10. same-side interior angles |
|------------------------------|------------------------------|-------------------------------|

\_\_\_\_\_

Use the figure for Exercises 11–14. The figure shows a utility pole with an electrical line and a telephone line. The angled wire is a tension wire. For each angle pair given, identify the transversal and classify the angle pair. (*Hint: Think of the utility pole as a line for these problems.*)



- |                               |                               |
|-------------------------------|-------------------------------|
| 11. $\angle 5$ and $\angle 6$ | 12. $\angle 1$ and $\angle 4$ |
|-------------------------------|-------------------------------|

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\_\_\_\_\_

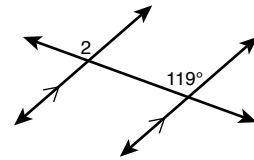
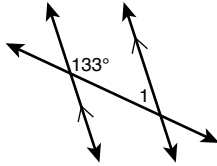
- |                               |                               |
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| 13. $\angle 1$ and $\angle 2$ | 14. $\angle 5$ and $\angle 3$ |
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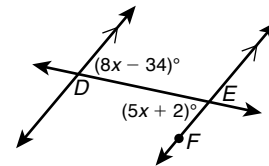
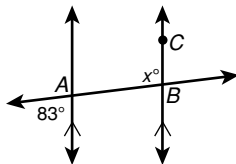
**LESSON** **Practice B**  
**3-2** **Angles Formed by Parallel Lines and Transversals**

Find each angle measure.



1.  $m\angle 1$  \_\_\_\_\_

2.  $m\angle 2$  \_\_\_\_\_



3.  $m\angle ABC$  \_\_\_\_\_

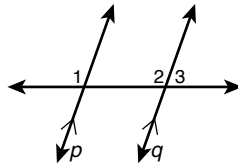
4.  $m\angle DEF$  \_\_\_\_\_

Complete the two-column proof to show that same-side exterior angles are supplementary.

5. Given:  $p \parallel q$

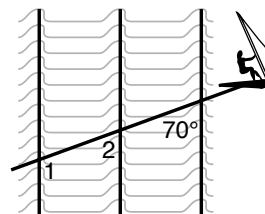
Prove:  $m\angle 1 + m\angle 3 = 180^\circ$

Proof:



Statements	Reasons
1. $p \parallel q$	1. Given
2. a. _____	2. Lin. Pair Thm.
3. $\angle 1 \cong \angle 2$	3. b. _____
4. c. _____	4. Def. of $\cong \angle$ s
5. d. _____	5. e. _____

6. Ocean waves move in parallel lines toward the shore. The figure shows Sandy Beaches windsurfing across several waves. For this exercise, think of Sandy's wake as a line.  $m\angle 1 = (2x + 2y)^\circ$  and  $m\angle 2 = (2x + y)^\circ$ . Find  $x$  and  $y$ .



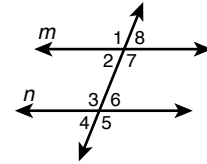
$x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_

**LESSON**  
**3-3**

**Practice B**  
**Proving Lines Parallel**

Use the figure for Exercises 1–8. Tell whether lines  $m$  and  $n$  must be parallel from the given information. If they are, state your reasoning. (*Hint: The angle measures may change for each exercise, and the figure is for reference only.*)



1.  $\angle 7 \cong \angle 3$

\_\_\_\_\_

2.  $m\angle 3 = (15x + 22)^\circ$ ,  $m\angle 1 = (19x - 10)^\circ$ ,  
 $x = 8$

\_\_\_\_\_

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

\_\_\_\_\_

4.  $m\angle 2 = (5x + 3)^\circ$ ,  $m\angle 3 = (8x - 5)^\circ$ ,  
 $x = 14$

\_\_\_\_\_

5.  $m\angle 8 = (6x - 1)^\circ$ ,  $m\angle 4 = (5x + 3)^\circ$ ,  $x = 9$

\_\_\_\_\_

6.  $\angle 5 \cong \angle 7$

\_\_\_\_\_

7.  $\angle 1 \cong \angle 5$

\_\_\_\_\_

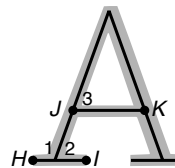
8.  $m\angle 6 = (x + 10)^\circ$ ,  $m\angle 2 = (x + 15)^\circ$

\_\_\_\_\_

9. Look at some of the printed letters in a textbook. The small horizontal and vertical segments attached to the ends of the letters are called *serifs*. Most of the letters in a textbook are in a serif typeface. The letters on this page do not have serifs, so these letters are in a sans-serif typeface. (*Sans* means “without” in French.) The figure shows a capital letter  $A$  with serifs. Use the given information to write a paragraph proof that the serif, segment  $\overline{HI}$ , is parallel to segment  $\overline{JK}$ .

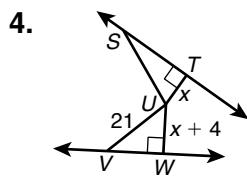
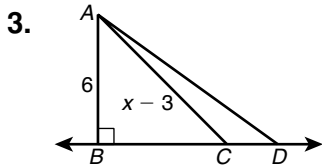
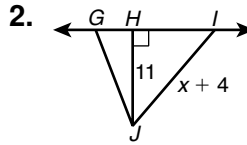
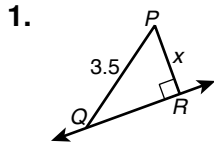
**Given:**  $\angle 1$  and  $\angle 3$  are supplementary.

**Prove:**  $\overline{HI} \parallel \overline{JK}$



**LESSON** **Practice B**  
**3-4** **Perpendicular Lines**

For Exercises 1–4, name the shortest segment from the point to the line and write an inequality for  $x$ . (*Hint: One answer is a double inequality.*)

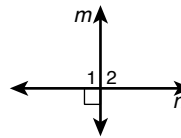


Complete the two-column proof.

5. **Given:**  $m \perp n$

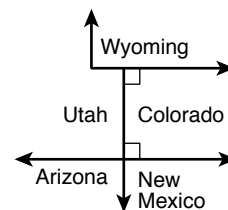
**Prove:**  $\angle 1$  and  $\angle 2$  are a linear pair of congruent angles.

**Proof:**



Statements	Reasons
1. a. _____	1. Given
2. b. _____	2. Def. of $\perp$
3. $\angle 1 \cong \angle 2$	3. c. _____
4. $m\angle 1 + m\angle 2 = 180^\circ$	4. Add. Prop. of =
5. d. _____	5. Def. of linear pair

6. The Four Corners National Monument is at the intersection of the borders of Arizona, Colorado, New Mexico, and Utah. It is called the four corners because the intersecting borders are perpendicular. If you were to lie down on the intersection, you could be in four states at the same time—the only place in the United States where this is possible. The figure shows the Colorado-Utah border extending north in a straight line until it intersects the Wyoming border at a right angle. Explain why the Colorado-Wyoming border must be parallel to the Colorado–New Mexico border.



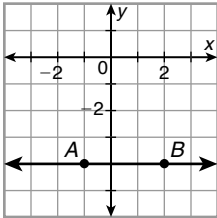
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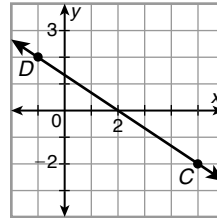
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**LESSON** **Practice B**  
**3-5** **Slopes of Lines**

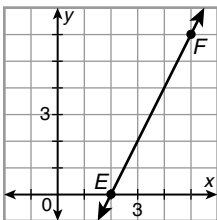
Use the slope formula to determine the slope of each line.



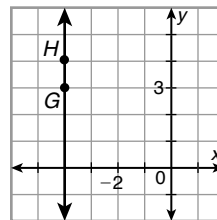
1.  $\vec{AB}$  \_\_\_\_\_



2.  $\vec{CD}$  \_\_\_\_\_

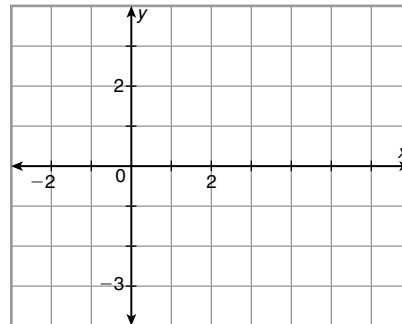
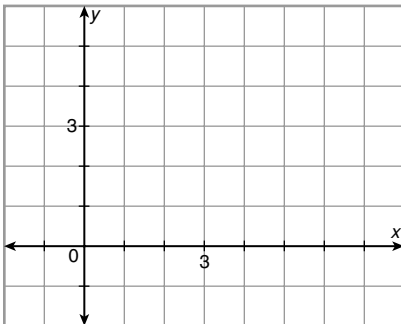


3.  $\vec{EF}$  \_\_\_\_\_



4.  $\vec{GH}$  \_\_\_\_\_

Graph each pair of lines. Use slopes to determine whether the lines are parallel, perpendicular, or neither.



5.  $\vec{IJ}$  and  $\vec{KL}$  for  $I(1, 0)$ ,  $J(5, 3)$ ,  $K(6, -1)$ ,  
 and  $L(0, 2)$  \_\_\_\_\_

6.  $\vec{PQ}$  and  $\vec{RS}$  for  $P(5, 1)$ ,  $Q(-1, -1)$ ,  $R(2, 1)$ ,  
 and  $S(3, -2)$  \_\_\_\_\_

7. At a ski resort, the different ski runs down the mountain are color-coded according to difficulty. Green is easy, blue is medium, and black is hard. Assume that the ski runs below are rated only according to their slope (steeper is harder) and that there is one green, one blue, and one black run. Assign a color to each ski run.

Emerald ( $m = \frac{4}{7}$ )

Diamond ( $m = \frac{5}{4}$ )

Ruby ( $m = \frac{5}{8}$ )

**LESSON** **Practice B**  
**3-6** *Lines in the Coordinate Plane*

Write the equation of each line in the given form.

1. the horizontal line through (3, 7) in point-slope form  
 2. the line with slope  $-\frac{8}{5}$  through (1, -5) in point-slope form

\_\_\_\_\_

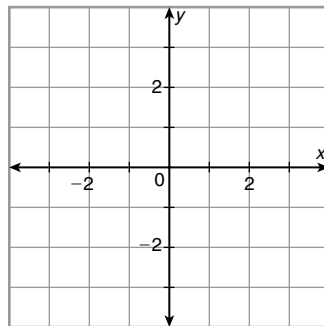
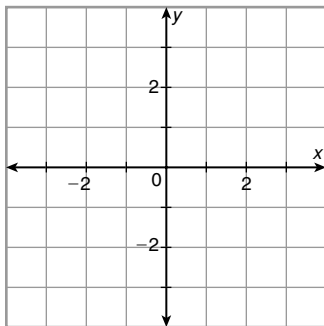
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3. the line through  $(-\frac{1}{2}, -\frac{7}{2})$  and (2, 14) in slope-intercept form  
 4. the line with x-intercept -2 and y-intercept -1 in slope-intercept form

\_\_\_\_\_

\_\_\_\_\_

Graph each line.



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

Determine whether the lines are parallel, intersect, or coincide.

7.  $x - 5y = 0, y + 1 = \frac{1}{5}(x + 5)$  \_\_\_\_\_  
 8.  $2y + 2 = x, \frac{1}{2}x = -1 + y$  \_\_\_\_\_  
 9.  $y = 4(x - 3), \frac{3}{4} + 4y = -\frac{1}{4}x$  \_\_\_\_\_

An *aquifer* is an underground storehouse of water. The water is in tiny crevices and pockets in the rock or sand, but because aquifers underlay large areas of land, the amount of water in an aquifer can be vast. Wells and springs draw water from aquifers.

10. Two relatively small aquifers are the Rush Springs (RS) aquifer and the Arbuckle-Simpson (AS) aquifer, both in Oklahoma. Suppose that starting on a certain day in 1985, 52 million gallons of water per day were taken from the RS aquifer, and 8 million gallons of water per day were taken from the AS aquifer. If the RS aquifer began with 4500 million gallons of water and the AS aquifer began with 3000 million gallons of water and no rain fell, write a slope-intercept equation for each aquifer and find how many days passed until both aquifers held the same amount of water. (Round to the nearest day.)

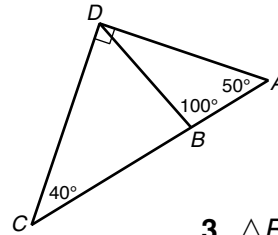
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**LESSON**

**Practice B**

**4-1 Classifying Triangles**

Classify each triangle by its angle measures.  
 (Note: Some triangles may belong to more than one class.)



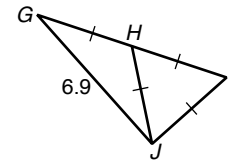
1.  $\triangle ABD$

2.  $\triangle ADC$

3.  $\triangle BCD$

\_\_\_\_\_

Classify each triangle by its side lengths.  
 (Note: Some triangles may belong to more than one class.)



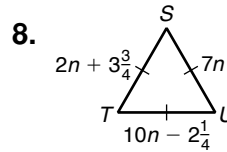
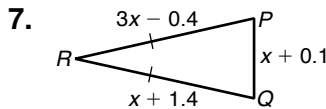
4.  $\triangle GIJ$

5.  $\triangle HIJ$

6.  $\triangle GHJ$

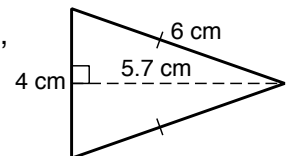
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Find the side lengths of each triangle.



\_\_\_\_\_

9. Min works in the kitchen of a catering company. Today her job is to cut whole pita bread into small triangles. Min uses a cutting machine, so every pita triangle comes out the same. The figure shows an example. Min has been told to cut 3 pita triangles for every guest. There will be 250 guests. If the pita bread she uses comes in squares with 20-centimeter sides and she doesn't waste any bread, how many squares of whole pita bread will Min have to cut up?



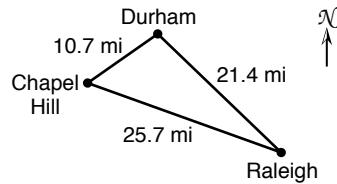
10. Follow these instructions and use a protractor to draw a triangle with sides of 3 cm, 4 cm, and 5 cm. First draw a 5-cm segment. Set your compass to 3 cm and make an arc from one end of the 5-cm segment. Now set your compass to 4 cm and make an arc from the other end of the 5-cm segment. Mark the point where the arcs intersect. Connect this point to the ends of the 5-cm segment. Classify the triangle by sides and by angles. Use the Pythagorean Theorem to check your answer.

\_\_\_\_\_



**LESSON**  
**4-2** **Practice B**  
**Angle Relationships in Triangles**

1. An area in central North Carolina is known as the Research Triangle because of the relatively large number of high-tech companies and research universities located there. Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University are all within this area. The Research Triangle is roughly bounded by the cities of Chapel Hill, Durham, and Raleigh. From Chapel Hill, the angle between Durham and Raleigh measures  $54.8^\circ$ . From Raleigh, the angle between Chapel Hill and Durham measures  $24.1^\circ$ . Find the angle between Chapel Hill and Raleigh from Durham.



\_\_\_\_\_

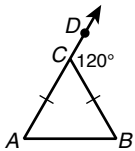
2. The acute angles of right triangle  $ABC$  are congruent. Find their measures.

\_\_\_\_\_

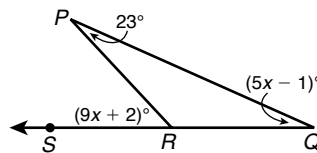
The measure of one of the acute angles in a right triangle is given. Find the measure of the other acute angle.

3.  $44.9^\circ$  \_\_\_\_\_      4.  $(90 - z)^\circ$  \_\_\_\_\_      5.  $0.3^\circ$  \_\_\_\_\_

Find each angle measure.



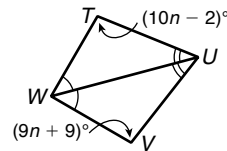
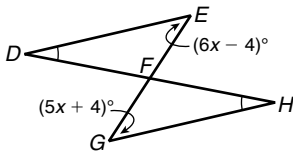
6.  $m\angle B$  \_\_\_\_\_



7.  $m\angle PRS$  \_\_\_\_\_

8. In  $\triangle LMN$ , the measure of an exterior angle at  $N$  measures  $99^\circ$ .  $m\angle L = \frac{1}{3}x^\circ$  and  $m\angle M = \frac{2}{3}x^\circ$ . Find  $m\angle L$ ,  $m\angle M$ , and  $m\angle LNM$ . \_\_\_\_\_

9.  $m\angle E$  and  $m\angle G$  \_\_\_\_\_      10.  $m\angle T$  and  $m\angle V$  \_\_\_\_\_



11. In  $\triangle ABC$  and  $\triangle DEF$ ,  $m\angle A = m\angle D$  and  $m\angle B = m\angle E$ . Find  $m\angle F$  if an exterior angle at  $A$  measures  $107^\circ$ ,  $m\angle B = (5x + 2)^\circ$ , and  $m\angle C = (5x + 5)^\circ$ . \_\_\_\_\_

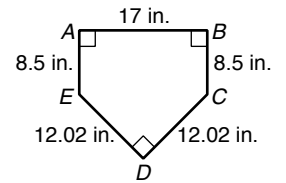
12. The angle measures of a triangle are in the ratio  $3 : 4 : 3$ . Find the angle measures of the triangle. \_\_\_\_\_

**LESSON**

**Practice B**

**4-3 Congruent Triangles**

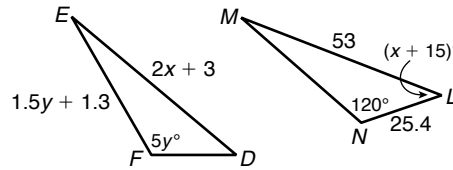
In baseball, home plate is a pentagon. Pentagon  $ABCDE$  is a diagram of a regulation home plate. The baseball rules are very specific about the exact dimensions of this pentagon so that every home plate is congruent to every other home plate. If pentagon  $PQRST$  is another home plate, identify each congruent corresponding part.



1.  $\angle S \cong$  \_\_\_\_\_
2.  $\angle B \cong$  \_\_\_\_\_
3.  $\overline{EA} \cong$  \_\_\_\_\_
4.  $\angle E \cong$  \_\_\_\_\_
5.  $\overline{PQ} \cong$  \_\_\_\_\_
6.  $\overline{TS} \cong$  \_\_\_\_\_

Given:  $\triangle DEF \cong \triangle LMN$ . Find each value.

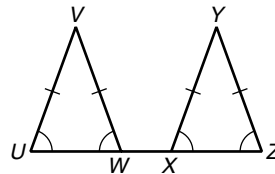
7.  $m\angle L =$  \_\_\_\_\_
8.  $EF =$  \_\_\_\_\_
9. Write a two-column proof.



Given:  $\angle U \cong \angle UWV \cong \angle ZXY \cong \angle Z$ ,  
 $\overline{UV} \cong \overline{WV}$ ,  $\overline{XY} \cong \overline{ZY}$ ,  $\overline{UX} \cong \overline{WZ}$

Prove:  $\triangle UVW \cong \triangle XYZ$

Proof:

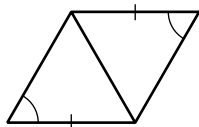


10. Given:  $\triangle CDE \cong \triangle HIJ$ ,  $DE = 9x$ , and  $IJ = 7x + 3$ . Find  $x$  and  $DE$ .

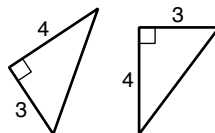
11. Given:  $\triangle CDE \cong \triangle HIJ$ ,  $m\angle D = (5y + 1)^\circ$ , and  $m\angle I = (6y - 25)^\circ$ . Find  $y$  and  $m\angle D$ .

**LESSON** **Practice B**  
**4-4 Triangle Congruence: SSS and SAS**

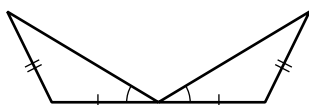
Write which of the SSS or SAS postulates, if either, can be used to prove the triangles congruent. If no triangles can be proved congruent, write *neither*.



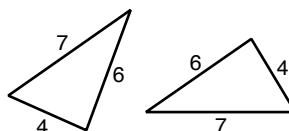
1. \_\_\_\_\_



2. \_\_\_\_\_

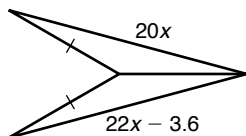


3. \_\_\_\_\_

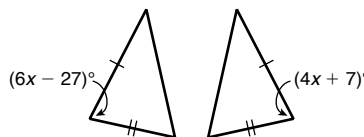


4. \_\_\_\_\_

Find the value of  $x$  so that the triangles are congruent.



5.  $x =$  \_\_\_\_\_



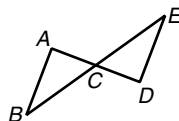
6.  $x =$  \_\_\_\_\_

The Hatfield and McCoy families are feuding over some land. Neither family will be satisfied unless the two triangular fields are exactly the same size. You know that  $C$  is the midpoint of each of the intersecting segments. Write a two-column proof that will settle the dispute.

7. **Given:**  $C$  is the midpoint of  $\overline{AD}$  and  $\overline{BE}$ .

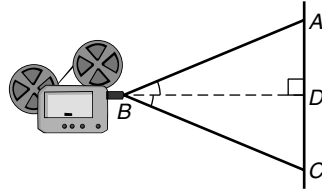
**Prove:**  $\triangle ABC \cong \triangle DEC$

**Proof:**



**LESSON** **Practice B**  
**4-5** **Triangle Congruence: ASA, AAS, and HL**

Students in Mrs. Marquez’s class are watching a film on the uses of geometry in architecture. The film projector casts the image on a flat screen as shown in the figure. The dotted line is the bisector of  $\angle ABC$ . Tell whether you can use each congruence theorem to prove that  $\triangle ABD \cong \triangle CBD$ . If not, tell what else you need to know.



1. Hypotenuse-Leg

\_\_\_\_\_

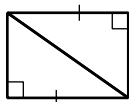
2. Angle-Side-Angle

\_\_\_\_\_

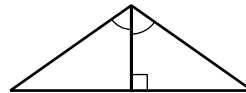
3. Angle-Angle-Side

\_\_\_\_\_

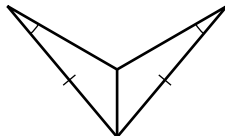
Write which postulate, if any, can be used to prove the pair of triangles congruent.



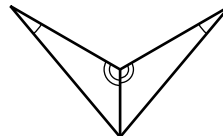
4. \_\_\_\_\_



5. \_\_\_\_\_



6. \_\_\_\_\_

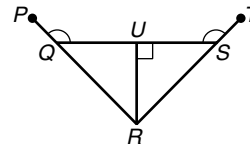


7. \_\_\_\_\_

Write a paragraph proof.

8. **Given:**  $\angle PQU \cong \angle TSU$ ,  
 $\angle QUR$  and  $\angle SUR$  are right angles.

**Prove:**  $\triangle RUQ \cong \triangle RUS$

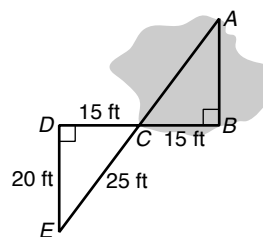


**LESSON**

**Practice B**

**4-6 Triangle Congruence: CPCTC**

1. Heike Dreschler set the Woman's World Junior Record for the long jump in 1983. She jumped about 23.4 feet. The diagram shows two triangles and a pond. Explain whether Heike could have jumped the pond along path  $BA$  or along path  $CA$ .




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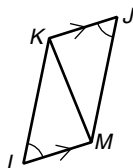
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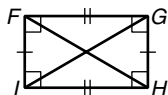
Write a flowchart proof.

2. **Given:**  $\angle L \cong \angle J$ ,  $\overline{KJ} \parallel \overline{LM}$   
**Prove:**  $\angle LKM \cong \angle JMK$



Write a two-column proof.

3. **Given:**  $FGHI$  is a rectangle.



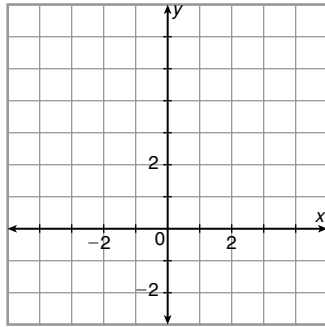
**Prove:** The diagonals of a rectangle have equal lengths.

**LESSON**  
**4-7**

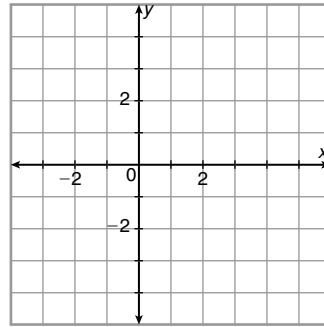
**Practice B**  
**Introduction to Coordinate Proof**

Position an isosceles triangle with sides of 8 units, 5 units, and 5 units in the coordinate plane. Label the coordinates of each vertex.  
(Hint: Use the Pythagorean Theorem.)

1. Center the long side on the  $x$ -axis at the origin.



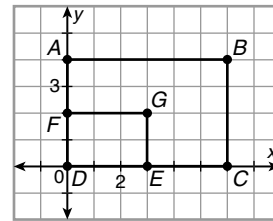
2. Place the long side on the  $y$ -axis centered at the origin.



Write a coordinate proof.

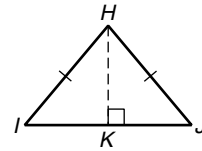
3. **Given:** Rectangle  $ABCD$  has vertices  $A(0, 4)$ ,  $B(6, 4)$ ,  $C(6, 0)$ , and  $D(0, 0)$ .  $E$  is the midpoint of  $\overline{DC}$ .  $F$  is the midpoint of  $\overline{DA}$ .

**Prove:** The area of rectangle  $DEGF$  is one-fourth the area of rectangle  $ABCD$ .



**LESSON** **Practice B**  
**4-8** **Isosceles and Equilateral Triangles**

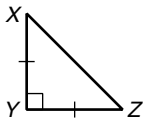
An altitude of a triangle is a perpendicular segment from a vertex to the line containing the opposite side. Write a paragraph proof that the altitude to the base of an isosceles triangle bisects the base.



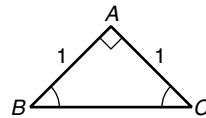
1. Given:  $\overline{HI} \cong \overline{HJ}$ ,  $\overline{HK} \perp \overline{IJ}$   
 Prove:  $\overline{HK}$  bisects  $\overline{IJ}$ .

2. An *obelisk* is a tall, thin, four-sided monument that tapers to a pyramidal top. The most well-known obelisk to Americans is the Washington Monument on the National Mall in Washington, D.C. Each face of the pyramidal top of the Washington Monument is an isosceles triangle. The height of each triangle is 55.5 feet, and the base of each triangle measures 34.4 feet. Find the length, to the nearest tenth of a foot, of one of the two equal legs of the triangle. \_\_\_\_\_

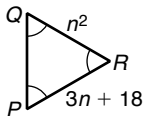
Find each value.



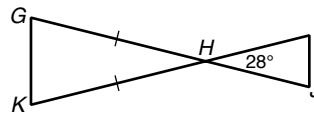
3.  $m\angle X =$  \_\_\_\_\_



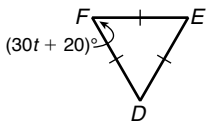
4.  $BC =$  \_\_\_\_\_



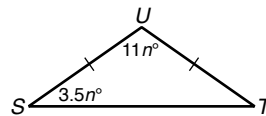
5.  $PQ =$  \_\_\_\_\_



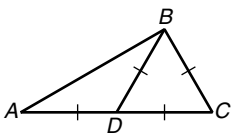
6.  $m\angle K =$  \_\_\_\_\_



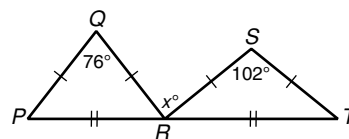
7.  $t =$  \_\_\_\_\_



8.  $n =$  \_\_\_\_\_



9.  $m\angle A =$  \_\_\_\_\_



10.  $x =$  \_\_\_\_\_

**LESSON** **Practice B**  
**5-1** **Perpendicular and Angle Bisectors**

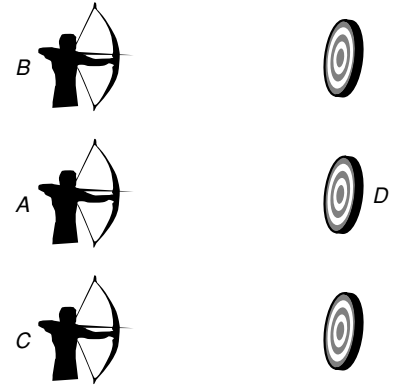
Diana is in an archery competition. She stands at *A*, and the target is at *D*. Her competitors stand at *B* and *C*.

1. The distance from each of her competitors to her target is equal. Explain whether the flight path of Diana's arrow,  $\overline{AD}$ , must be a perpendicular bisector of  $\overline{BC}$ .

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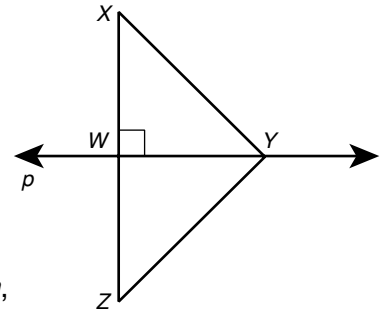
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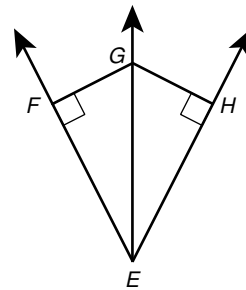
Use the figure for Exercises 2–5.

2. Given that line  $p$  is the perpendicular bisector of  $\overline{XZ}$  and  $XY = 15.5$ , find  $ZY$ . \_\_\_\_\_
3. Given that  $XZ = 38$ ,  $YX = 27$ , and  $YZ = 27$ , find  $ZW$ . \_\_\_\_\_
4. Given that line  $p$  is the perpendicular bisector of  $\overline{XZ}$ ;  $XY = 4n$ , and  $YZ = 14$ , find  $n$ . \_\_\_\_\_
5. Given that  $XY = ZY$ ,  $WX = 6x - 1$ , and  $XZ = 10x + 16$ , find  $ZW$ . \_\_\_\_\_



Use the figure for Exercises 6–9.

6. Given that  $FG = HG$  and  $m\angle FEH = 55^\circ$ , find  $m\angle GEH$ . \_\_\_\_\_
7. Given that  $\overrightarrow{EG}$  bisects  $\angle FEH$  and  $GF = \sqrt{2}$ , find  $GH$ . \_\_\_\_\_
8. Given that  $\angle FEG \cong \angle GEH$ ,  $FG = 10z - 30$ , and  $HG = 7z + 6$ , find  $FG$ . \_\_\_\_\_
9. Given that  $GF = GH$ ,  $m\angle GEF = \frac{8}{3}a^\circ$ , and  $m\angle GEH = 24^\circ$ , find  $a$ . \_\_\_\_\_



Write an equation in point-slope form for the perpendicular bisector of the segment with the given endpoints.

10.  $L(4, 0)$ ,  $M(-2, 3)$

11.  $T(0, -3)$ ,  $U(0, 1)$

12.  $A(-1, 6)$ ,  $B(-3, -4)$

\_\_\_\_\_

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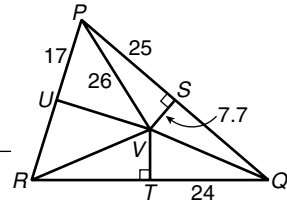


**LESSON**

**Practice B**

**5-2 Bisectors of Triangles**

Use the figure for Exercises 1 and 2.  $\overline{SV}$ ,  $\overline{TV}$ , and  $\overline{UV}$  are perpendicular bisectors of the sides of  $\triangle PQR$ . Find each length.

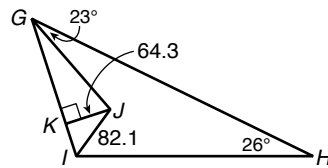


1.  $RV$  \_\_\_\_\_ 2.  $TR$  \_\_\_\_\_

Find the circumcenter of the triangle with the given vertices.

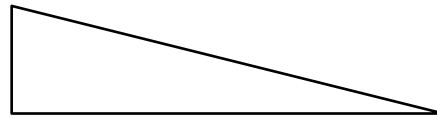
3.  $A(0, 0)$ ,  $B(0, 5)$ ,  $C(5, 0)$       4.  $D(0, 7)$ ,  $E(-3, 1)$ ,  $F(3, 1)$   
 ( \_\_\_\_\_, \_\_\_\_\_ )      ( \_\_\_\_\_, \_\_\_\_\_ )

Use the figure for Exercises 7 and 8.  $\overline{GJ}$  and  $\overline{IJ}$  are angle bisectors of  $\triangle GHI$ . Find each measure.



5. the distance from  $J$  to  $\overline{GH}$  \_\_\_\_\_  
 6.  $m\angle JGK$  \_\_\_\_\_

Raleigh designs the interiors of cars. He is given two tasks to complete on a new production model.



7. A triangular surface as shown in the figure is molded into the driver's side door as an armrest. Raleigh thinks he can fit a cup holder into the triangle, but he'll have to put the largest possible circle into the triangle. Explain how Raleigh can do this. Sketch his design on the figure.

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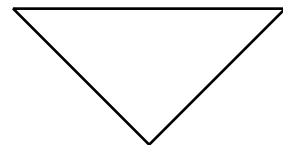
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8. The car's logo is the triangle shown in the figure. Raleigh has to use this logo as the center of the steering wheel. Explain how Raleigh can do this. Sketch his design on the figure.




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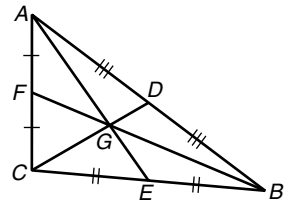
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**LESSON**

**Practice B**

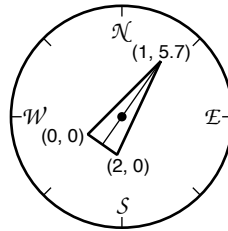
**5-3 Medians and Altitudes of Triangles**

Use the figure for Exercises 1–4.  $GB = 12\frac{2}{3}$  and  $CD = 10$ . Find each length.



1.  $FG$  \_\_\_\_\_
2.  $BF$  \_\_\_\_\_
3.  $GD$  \_\_\_\_\_
4.  $CG$  \_\_\_\_\_

5. A triangular compass needle will turn most easily if it is attached to the compass face through its centroid. Find the coordinates of the centroid.

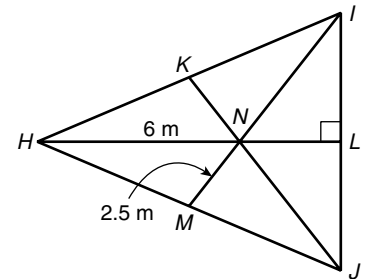


(\_\_\_\_\_, \_\_\_\_\_)

Find the orthocenter of the triangle with the given vertices.

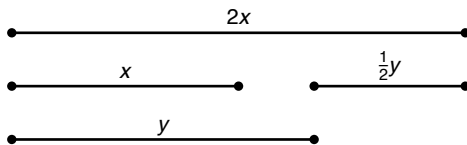
6.  $X(-5, 4)$ ,  $Y(2, -3)$ ,  $Z(1, 4)$  (\_\_\_\_\_, \_\_\_\_\_)
7.  $A(0, -1)$ ,  $B(2, -3)$ ,  $C(4, -1)$  (\_\_\_\_\_, \_\_\_\_\_)

Use the figure for Exercises 8 and 9.  $\overline{HL}$ ,  $\overline{IM}$ , and  $\overline{JK}$  are medians of  $\triangle HIJ$ .



8. Find the area of the triangle. \_\_\_\_\_
9. If the perimeter of the triangle is 49 meters, then find the length of  $\overline{MH}$ . (Hint: What kind of a triangle is it?) \_\_\_\_\_

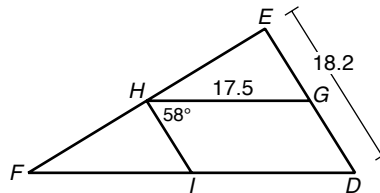
10. Two medians of a triangle were cut apart at the centroid to make the four segments shown below. Use what you know about the Centroid Theorem to reconstruct the original triangle from the four segments shown. Measure the side lengths of your triangle to check that you constructed medians. (Note: There are many possible answers.)



**LESSON** **Practice B**  
**5-4** **The Triangle Midsegment Theorem**

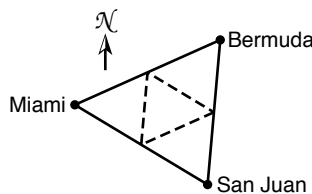
Use the figure for Exercises 1–6. Find each measure.

1.  $HI$  \_\_\_\_\_
2.  $DF$  \_\_\_\_\_
3.  $GE$  \_\_\_\_\_
4.  $m\angle HIF$  \_\_\_\_\_
5.  $m\angle HGD$  \_\_\_\_\_
6.  $m\angle D$  \_\_\_\_\_



The Bermuda Triangle is a region in the Atlantic Ocean off the southeast coast of the United States. The triangle is bounded by Miami, Florida; San Juan, Puerto Rico; and Bermuda. In the figure, the dotted lines are midsegments.

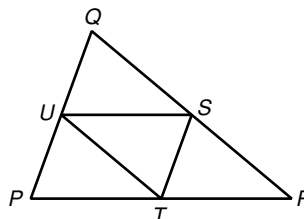
	Dist. (mi)
Miami to San Juan	1038
Miami to Bermuda	1042
Bermuda to San Juan	965



7. Use the distances in the chart to find the perimeter of the Bermuda Triangle.  
\_\_\_\_\_
8. Find the perimeter of the midsegment triangle within the Bermuda Triangle.  
\_\_\_\_\_
9. How does the perimeter of the midsegment triangle compare to the perimeter of the Bermuda Triangle?  
\_\_\_\_\_

Write a two-column proof that the perimeter of a midsegment triangle is half the perimeter of the triangle.

10. **Given:**  $\overline{US}$ ,  $\overline{ST}$ , and  $\overline{TU}$  are midsegments of  $\triangle PQR$ .  
**Prove:** The perimeter of  $\triangle STU = \frac{1}{2}(PQ + QR + RP)$ .



**LESSON**  
**5-5**

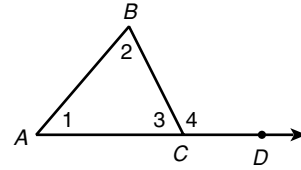
**Practice B**

**Indirect Proof and Inequalities in One Triangle**

Write an indirect proof that the angle measures of a triangle cannot add to more than  $180^\circ$ .

1. State the assumption that starts the indirect proof.

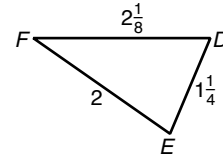
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2. Use the Exterior Angle Theorem and the Linear Pair Theorem to write the indirect proof.

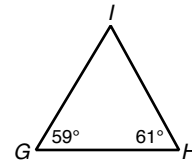
3. Write the angles of  $\triangle DEF$  in order from smallest to largest.

\_\_\_\_\_



4. Write the sides of  $\triangle GHI$  in order from shortest to longest.

\_\_\_\_\_



Tell whether a triangle can have sides with the given lengths. If not, explain why not.

5. 8, 8, 16 \_\_\_\_\_      6. 0.5, 0.7, 0.3 \_\_\_\_\_      7.  $10\frac{1}{2}$ , 4, 14 \_\_\_\_\_
8.  $3x + 2$ ,  $x^2$ ,  $2x$  when  $x = 4$  \_\_\_\_\_
9.  $3x + 2$ ,  $x^2$ ,  $2x$  when  $x = 6$  \_\_\_\_\_

The lengths of two sides of a triangle are given. Find the range of possible lengths for the third side.

10. 8.2 m, 3.5 m      11. 298 ft, 177 ft      12.  $3\frac{1}{2}$  mi, 4 mi

\_\_\_\_\_

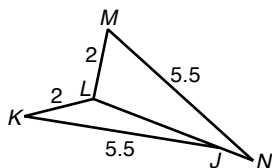
13. The annual Cheese Rolling happens in May at Gloucestershire, England. As the name suggests, large, 7–9 pound wheels of cheese are rolled down a steep hill, and people chase after them. The first person to the bottom wins cheese. Renaldo wants to go to the Cheese Rolling. He plans to leave from Atlanta and fly into London (4281 miles). On the return, he will fly back from London to New York City (3470 miles) to visit his aunt. Then Renaldo heads back to Atlanta. Atlanta, New York City, and London do not lie on the same line. Find the range of the total distance Renaldo could travel on his trip.

**LESSON**

**Practice B**

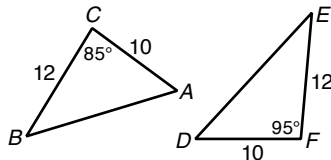
**5-6 Inequalities in Two Triangles**

Compare the given measures.



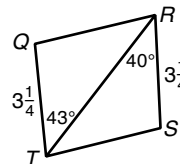
1.  $m\angle K$  and  $m\angle M$

\_\_\_\_\_



2.  $AB$  and  $DE$

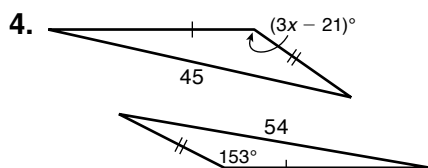
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3.  $QR$  and  $ST$

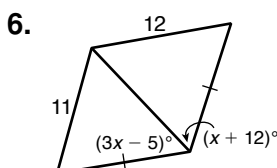
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Find the range of values for  $x$ .



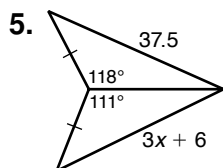
4.

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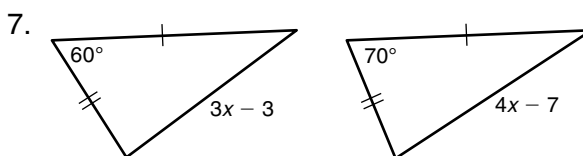
6.

\_\_\_\_\_



5.

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7.

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8. You have used a compass to copy and bisect segments and angles and to draw arcs and circles. A compass has a drawing leg, a pivot leg, and a hinge at the angle between the legs. Explain why and how the measure of the angle at the hinge changes if you draw two circles with different diameters.

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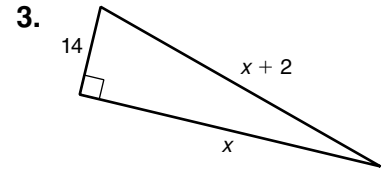
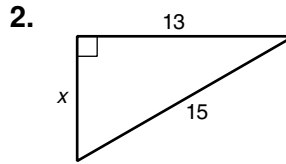
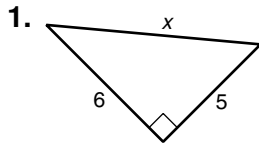
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**LESSON**  
**5-7**

**Practice B**  
**The Pythagorean Theorem**

Find the value of  $x$ . Give your answer in simplest radical form.



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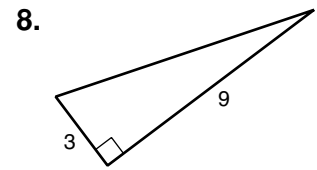
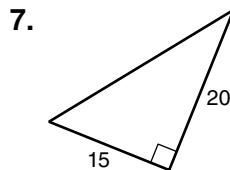
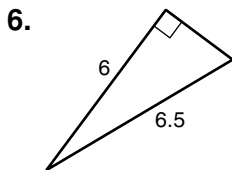
4. The aspect ratio of a TV screen is the ratio of the width to the height of the image. A regular TV has an aspect ratio of 4 : 3. Find the height and width of a 42-inch TV screen to the nearest tenth of an inch. (The measure given is the length of the diagonal across the screen.)

\_\_\_\_\_

5. A “wide-screen” TV has an aspect ratio of 16 : 9. Find the length of a diagonal on a wide-screen TV screen that has the same height as the screen in Exercise 4.

\_\_\_\_\_

Find the missing side lengths. Give your answer in simplest radical form. Tell whether the side lengths form a Pythagorean Triple.



\_\_\_\_\_

Tell whether the measures can be the side lengths of a triangle. If so, classify the triangle as acute, obtuse, or right.

9. 15, 18, 20

10. 7, 8, 11

11. 6, 7,  $3\sqrt{13}$

\_\_\_\_\_

12. Kitty has a triangle with sides that measure 16, 8, and 13. She does some calculations and finds that  $256 + 64 > 169$ . Kitty concludes that the triangle is obtuse. Evaluate Kitty’s conclusion and Kitty’s reasoning.

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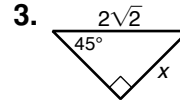
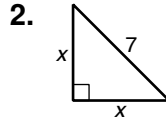
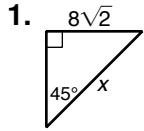
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**LESSON**

**Practice B**

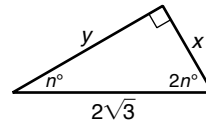
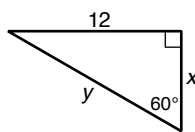
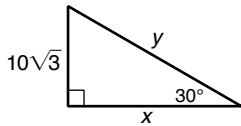
**5-8 Applying Special Right Triangles**

Find the value of  $x$  in each figure. Give your answer in simplest radical form.



\_\_\_\_\_

Find the values of  $x$  and  $y$ . Give your answers in simplest radical form.



4.  $x =$  \_\_\_\_\_  $y =$  \_\_\_\_\_      5.  $x =$  \_\_\_\_\_  $y =$  \_\_\_\_\_      6.  $x =$  \_\_\_\_\_  $y =$  \_\_\_\_\_

Lucia is an archaeologist trekking through the jungle of the Yucatan Peninsula. She stumbles upon a stone structure covered with creeper vines and ferns. She immediately begins taking measurements of her discovery. (*Hint: Drawing some figures may help.*)

7. Around the perimeter of the building, Lucia finds small alcoves at regular intervals carved into the stone. The alcoves are triangular in shape with a horizontal base and two sloped equal-length sides that meet at a right angle. Each of the sloped sides measures  $14\frac{1}{4}$  inches. Lucia has also found several stone tablets inscribed with characters. The stone tablets measure  $22\frac{1}{8}$  inches long. Lucia hypothesizes that the alcoves once held the stone tablets. Tell whether Lucia's hypothesis may be correct. Explain your answer.

\_\_\_\_\_

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8. Lucia also finds several statues around the building. The statues measure  $9\frac{7}{16}$  inches tall. She wonders whether the statues might have been placed in the alcoves. Tell whether this is possible. Explain your answer.

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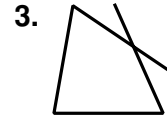
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**LESSON** **Practice B**  
**6-1** **Properties and Attributes of Polygons**

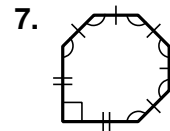
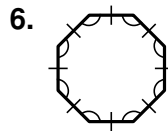
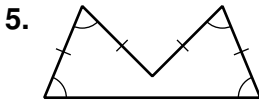
Tell whether each figure is a polygon. If it is a polygon, name it by the number of its sides.



\_\_\_\_\_

4. For a polygon to be regular, it must be both equiangular and equilateral.  
 Name the only type of polygon that must be regular if it is equiangular. \_\_\_\_\_

Tell whether each polygon is regular or irregular. Then tell whether it is concave or convex.

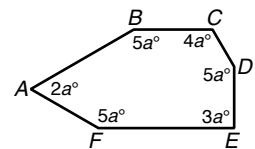


\_\_\_\_\_

8. Find the sum of the interior angle measures of a 14-gon. \_\_\_\_\_

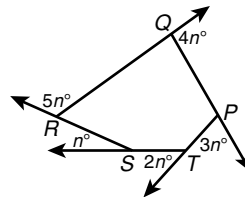
9. Find the measure of each interior angle of hexagon  $ABCDEF$ .

\_\_\_\_\_

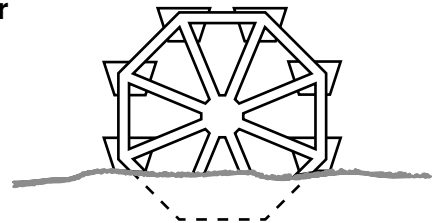


10. Find the value of  $n$  in pentagon  $PQRST$ .

\_\_\_\_\_



Before electric or steam power, a common way to power machinery was with a waterwheel. The simplest form of waterwheel is a series of paddles on a frame partially submerged in a stream. The current in the stream pushes the paddles forward and turns the frame. The power of the turning frame can then be used to drive machinery to saw wood or grind grain. The waterwheel shown has a frame in the shape of a regular octagon.



11. Find the measure of one interior angle of the waterwheel. \_\_\_\_\_

12. Find the measure of one exterior angle of the waterwheel. \_\_\_\_\_

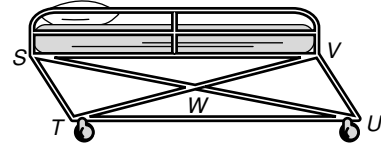


**LESSON**

**Practice B**

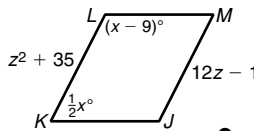
**6-2 Properties of Parallelograms**

A gurney is a wheeled cot or stretcher used in hospitals. Many gurneys are made so that the base will fold up for easy storage in an ambulance. When partially folded, the base forms a parallelogram. In  $\square STUV$ ,  $VU = 91$  centimeters,  $UW = 108.8$  centimeters, and  $m\angle TSV = 57^\circ$ . Find each measure.



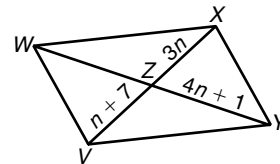
- |                  |                  |                  |
|------------------|------------------|------------------|
| 1. $SW$          | 2. $TS$          | 3. $US$          |
| _____            | _____            | _____            |
| 4. $m\angle SVU$ | 5. $m\angle STU$ | 6. $m\angle TUV$ |
| _____            | _____            | _____            |

$JKLM$  is a parallelogram. Find each measure.



- |                |                |         |
|----------------|----------------|---------|
| 7. $m\angle L$ | 8. $m\angle K$ | 9. $MJ$ |
| _____          | _____          | _____   |

$VWXY$  is a parallelogram. Find each measure.



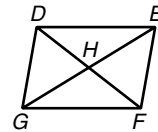
- |          |          |
|----------|----------|
| 10. $VX$ | 11. $XZ$ |
| _____    | _____    |
| 12. $ZW$ | 13. $WY$ |
| _____    | _____    |

14. Three vertices of  $\square ABCD$  are  $B(-3, 3)$ ,  $C(2, 7)$ , and  $D(5, 1)$ . Find the coordinates of vertex  $A$ .

\_\_\_\_\_

Write a two-column proof.

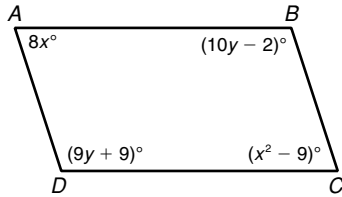
15. **Given:**  $DEFG$  is a parallelogram.  
**Prove:**  $m\angle DHG = m\angle EDH + m\angle FGH$



**LESSON** **Practice B**  
**6-3** **Conditions for Parallelograms**

For Exercises 1 and 2, determine whether the figure is a parallelogram for the given values of the variables. Explain your answers.

1.  $x = 9$  and  $y = 11$

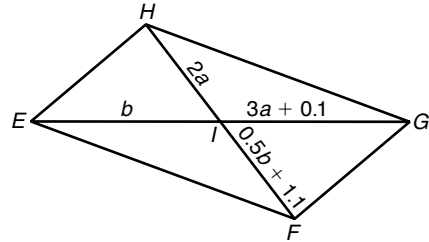


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2.  $a = 4.3$  and  $b = 13$



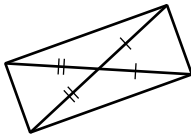
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Determine whether each quadrilateral must be a parallelogram. Justify your answers.

3.



\_\_\_\_\_

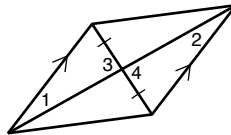
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4.



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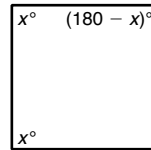
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5.



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Use the given method to determine whether the quadrilateral with the given vertices is a parallelogram.

6. Find the slopes of all four sides:  $J(-4, -1)$ ,  $K(-7, -4)$ ,  $L(2, -10)$ ,  $M(5, -7)$

\_\_\_\_\_

\_\_\_\_\_

7. Find the lengths of all four sides:  $P(2, 2)$ ,  $Q(1, -3)$ ,  $R(-4, 2)$ ,  $S(-3, 7)$

\_\_\_\_\_

8. Find the slopes and lengths of one pair of opposite sides:

$T(\frac{3}{2}, -2)$ ,  $U(\frac{3}{2}, 4)$ ,  $V(-\frac{1}{2}, 0)$ ,  $W(-\frac{1}{2}, -6)$

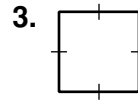
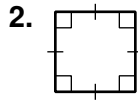
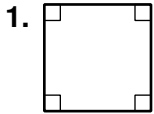
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**LESSON**

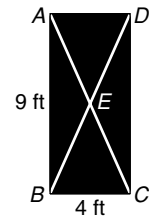
**Practice B**

**6-4 Properties of Special Parallelograms**

Tell whether each figure must be a rectangle, rhombus, or square based on the information given. Use the most specific name possible.

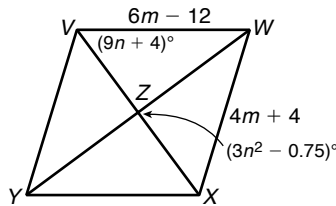


A modern artist's sculpture has rectangular faces. The face shown here is 9 feet long and 4 feet wide. Find each measure in simplest radical form. (*Hint: Use the Pythagorean Theorem.*)



4.  $DC =$  \_\_\_\_\_      5.  $AD =$  \_\_\_\_\_  
 6.  $DB =$  \_\_\_\_\_      7.  $AE =$  \_\_\_\_\_

$VWXY$  is a rhombus. Find each measure.

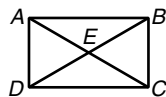


8.  $XY =$  \_\_\_\_\_  
 9.  $m\angle YVW =$  \_\_\_\_\_  
 10.  $m\angle VYX =$  \_\_\_\_\_  
 11.  $m\angle XYZ =$  \_\_\_\_\_  
 12. The vertices of square  $JKLM$  are  $J(-2, 4)$ ,  $K(-3, -1)$ ,  $L(2, -2)$ , and  $M(3, 3)$ . Find each of the following to show that the diagonals of square  $JKLM$  are congruent perpendicular bisectors of each other.

- $JL =$  \_\_\_\_\_       $KM =$  \_\_\_\_\_  
 slope of  $\overline{JL} =$  \_\_\_\_\_      slope of  $\overline{KM} =$  \_\_\_\_\_  
 midpoint of  $\overline{JL} =$  (\_\_\_\_\_, \_\_\_\_\_)      midpoint of  $\overline{KM} =$  (\_\_\_\_\_, \_\_\_\_\_)

Write a paragraph proof.

13. **Given:**  $ABCD$  is a rectangle.  
**Prove:**  $\angle EDC \cong \angle ECD$



**LESSON**

**Practice B**

**6-5 Conditions for Special Parallelograms**

1. On the National Mall in Washington, D.C., a reflecting pool lies between the Lincoln Memorial and the World War II Memorial. The pool has two 2300-foot-long sides and two 150-foot-long sides. Tell what additional information you need to know in order to determine whether the reflecting pool is a rectangle. (*Hint:* Remember that you have to show it is a parallelogram first.)

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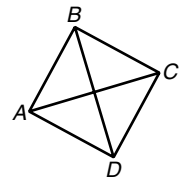


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Use the figure for Exercises 2–5. Determine whether each conclusion is valid. If not, tell what additional information is needed to make it valid.



2. **Given:**  $\overline{AC}$  and  $\overline{BD}$  bisect each other.  $\overline{AC} \cong \overline{BD}$   
**Conclusion:**  $ABCD$  is a square.

---

3. **Given:**  $\overline{AC} \perp \overline{BD}$ ,  $\overline{AB} \cong \overline{BC}$   
**Conclusion:**  $ABCD$  is a rhombus.

---

4. **Given:**  $\overline{AB} \cong \overline{DC}$ ,  $\overline{AD} \cong \overline{BC}$ ,  $m\angle ADB = m\angle ABD = 45^\circ$   
**Conclusion:**  $ABCD$  is a square.

---

5. **Given:**  $\overline{AB} \parallel \overline{DC}$ ,  $\overline{AD} \cong \overline{BC}$ ,  $\overline{AC} \cong \overline{BD}$   
**Conclusion:**  $ABCD$  is a rectangle.

---

Find the lengths and slopes of the diagonals to determine whether a parallelogram with the given vertices is a rectangle, rhombus, or square. Give all names that apply.

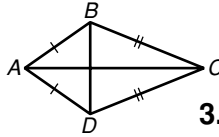
6.  $E(-2, -4)$ ,  $F(0, -1)$ ,  $G(-3, 1)$ ,  $H(-5, -2)$ 

$EG =$ _____	$FH =$ _____
slope of $\overline{EG} =$ _____	slope of $\overline{FH} =$ _____
7.  $P(-1, 3)$ ,  $Q(-2, 5)$ ,  $R(0, 4)$ ,  $S(1, 2)$ 

$PR =$ _____	$QS =$ _____
slope of $\overline{PR} =$ _____	slope of $\overline{QS} =$ _____

**LESSON 6-6 Practice B**  
**6-6 Properties of Kites and Trapezoids**

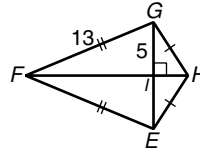
In kite  $ABCD$ ,  $m\angle BAC = 35^\circ$  and  $m\angle BCD = 44^\circ$ .  
 For Exercises 1–3, find each measure.



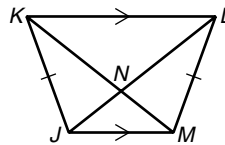
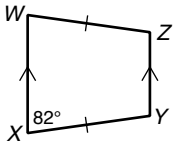
1.  $m\angle ABD$     2.  $m\angle DCA$     3.  $m\angle ABC$

\_\_\_\_\_

4. Find the area of  $\triangle EFG$ . \_\_\_\_\_

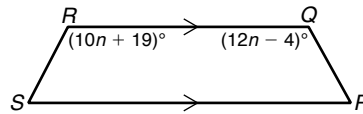


5. Find  $m\angle Z$ .    6.  $KM = 7.5$ , and  $NM = 2.6$ . Find  $LN$ .



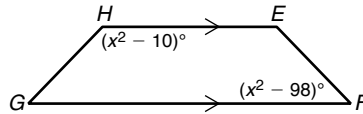
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7. Find the value of  $n$  so that  $PQRS$  is isosceles.



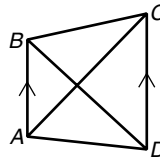
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8. Find the value of  $x$  so that  $EFGH$  is isosceles.



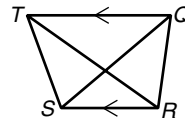
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9.  $BD = 7a - 0.5$ , and  $AC = 5a + 2.3$ . Find the value of  $a$  so that  $ABCD$  is isosceles.



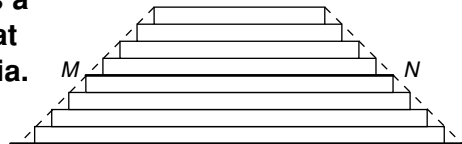
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10.  $QS = 8z^2$ , and  $RT = 6z^2 + 38$ . Find the value of  $z$  so that  $QRST$  is isosceles.



\_\_\_\_\_

Use the figure for Exercises 11 and 12. The figure shows a **ziggurat**. A ziggurat is a stepped, flat-topped pyramid that was used as a temple by ancient peoples of Mesopotamia. The dashed lines show that a ziggurat has sides roughly in the shape of a trapezoid.



11. Each “step” in the ziggurat has equal height. Give the vocabulary term for  $\overline{MN}$ .

\_\_\_\_\_

12. The bottom of the ziggurat is 27.3 meters long, and the top of the ziggurat is 11.6 meters long. Find  $MN$ .

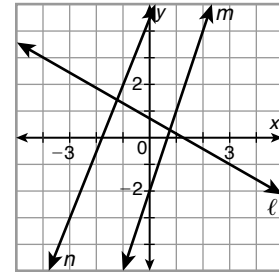
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**LESSON**

**Practice B**

**7-1 Ratio and Proportion**

Use the graph for Exercises 1–3. Write a ratio expressing the slope of each line.



1.  $\ell$  \_\_\_\_\_

2.  $m$  \_\_\_\_\_

3.  $n$  \_\_\_\_\_

4. The ratio of the angle measures in a quadrilateral is 1 : 4 : 5 : 6. Find each angle measure. \_\_\_\_\_

5. The ratio of the side lengths in a rectangle is 5 : 2 : 5 : 2, and its area is 90 square feet. Find the side lengths. \_\_\_\_\_

For part of her homework, Celia measured the angles and the lengths of the sides of two triangles. She wrote down the ratios for angle measures and side lengths. Two of the ratios were 4 : 7 : 8 and 3 : 8 : 13.

6. When Celia got to school the next day, she couldn't remember which ratio was for angles and which was for sides. Tell which must be the ratio of the lengths of the sides. Explain your answer.

\_\_\_\_\_

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7. Find the measures of the angles of one of Celia's triangles. \_\_\_\_\_

Solve each proportion.

8.  $\frac{28}{p} = \frac{42}{3}$

$p =$  \_\_\_\_\_

9.  $\frac{28}{24} = \frac{q}{102}$

$q =$  \_\_\_\_\_

10.  $\frac{3}{4.5} = \frac{7}{r}$

$r =$  \_\_\_\_\_

11.  $\frac{9}{s} = \frac{s}{25}$

$s =$  \_\_\_\_\_

12.  $\frac{50}{2t + 4} = \frac{2t + 4}{2}$

$t =$  \_\_\_\_\_

13.  $\frac{u + 3}{8} = \frac{5}{u - 3}$

$u =$  \_\_\_\_\_

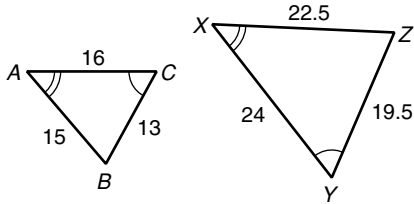
14. Given that  $12a = 20b$ , find the ratio of  $a$  to  $b$  in simplest form. \_\_\_\_\_

15. Given that  $34x = 51y$ , find the ratio  $x : y$  in simplest form. \_\_\_\_\_

**LESSON** **Practice B**  
**7-2 Ratios in Similar Polygons**

Identify the pairs of congruent corresponding angles and the corresponding sides.

1.

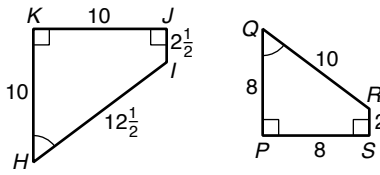


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2.



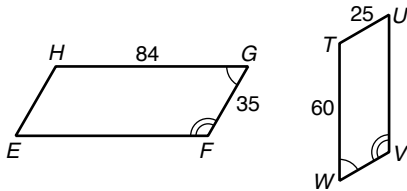
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Determine whether the polygons are similar. If so, write the similarity ratio and a similarity statement. If not, explain why not.

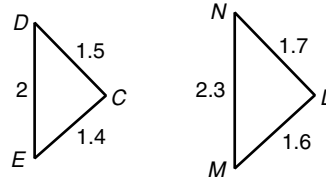
3. parallelograms *EFGH* and *TUVW*



\_\_\_\_\_

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4.  $\triangle CDE$  and  $\triangle LMN$

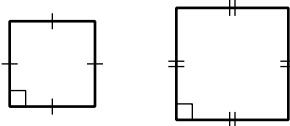


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Tell whether the polygons must be similar based on the information given in the figures.

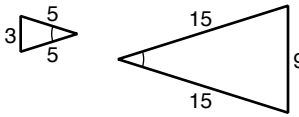
5.



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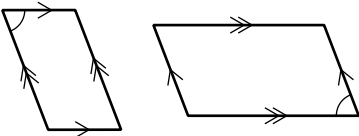
6.



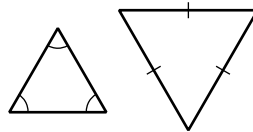
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7.

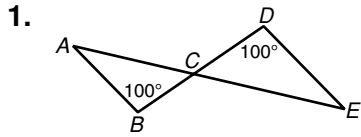


8.



**LESSON 7-3 Practice B**  
**Triangle Similarity: AA, SSS, SAS**

For Exercises 1 and 2, explain why the triangles are similar and write a similarity statement.




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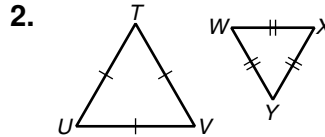
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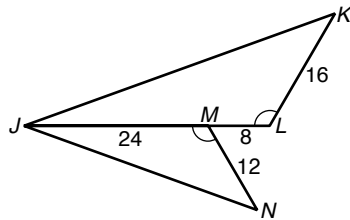
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For Exercises 3 and 4, verify that the triangles are similar. Explain why.

3.  $\triangle JLK$  and  $\triangle JMN$

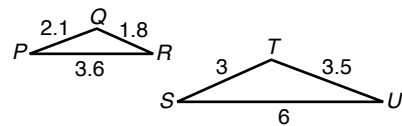



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4.  $\triangle PQR$  and  $\triangle STU$



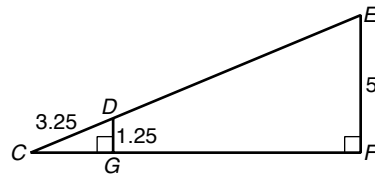

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For Exercise 5, explain why the triangles are similar and find the stated length.

5.  $DE$




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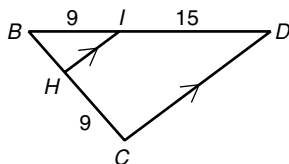
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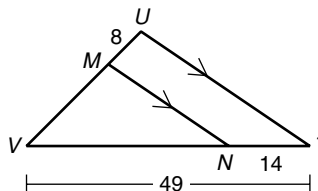


**LESSON** **Practice B**  
**7-4** **Applying Properties of Similar Triangles**

Find each length.



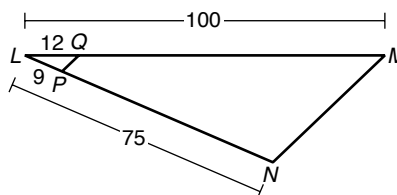
1.  $BH$  \_\_\_\_\_



2.  $MV$  \_\_\_\_\_

Verify that the given segments are parallel.

3.  $\overline{PQ}$  and  $\overline{NM}$

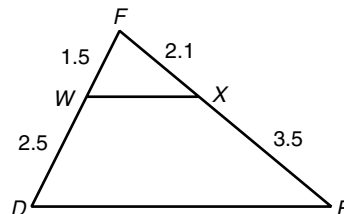


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4.  $\overline{WX}$  and  $\overline{DE}$

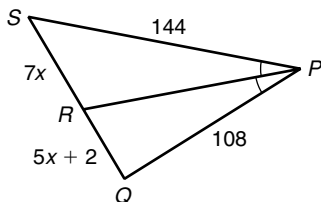


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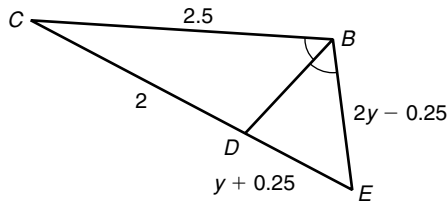
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\_\_\_\_\_

Find each length.



5.  $SR$  and  $RQ$  \_\_\_\_\_



6.  $BE$  and  $DE$  \_\_\_\_\_

7. In  $\triangle ABC$ ,  $\overline{BD}$  bisects  $\angle ABC$  and  $\overline{AD} \cong \overline{CD}$ . Tell what kind of  $\triangle ABC$  must be.

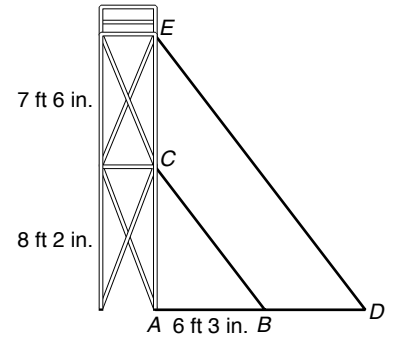
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**LESSON**

**Practice B**

**7-5 Using Proportional Relationships**

Refer to the figure for Exercises 1–3. A city is planning an outdoor concert for an Independence Day celebration. To hold speakers and lights, a crew of technicians sets up a scaffold with two platforms by the stage. The first platform is 8 feet 2 inches off the ground. The second platform is 7 feet 6 inches above the first platform. The shadow of the first platform stretches 6 feet 3 inches across the ground.



1. Explain why  $\triangle ABC$  is similar to  $\triangle ADE$ .  
(Hint: The sun's rays are parallel.)

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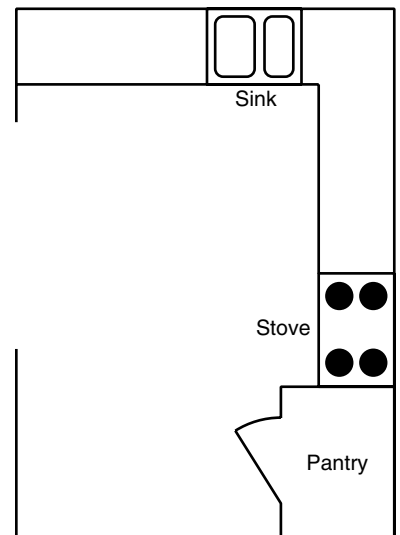
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2. Find the length of the shadow of the second platform in feet and inches to the nearest inch.
3. A 5-foot-8-inch-tall technician is standing on top of the second platform. Find the length of the shadow the scaffold and the technician cast in feet and inches to the nearest inch.

\_\_\_\_\_

\_\_\_\_\_

Refer to the figure for Exercises 4–6. Ramona wants to renovate the kitchen in her house. The figure shows a blueprint of the new kitchen drawn to a scale of 1 cm : 2 ft. Use a centimeter ruler and the figure to find each actual measure in feet.



4. width of the kitchen
5. length of the kitchen

\_\_\_\_\_

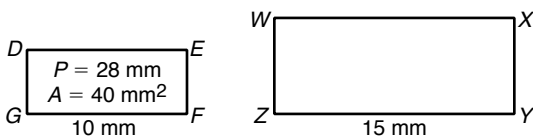
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6. width of the sink
7. area of the pantry

\_\_\_\_\_

\_\_\_\_\_

Given that  $DEFG \sim WXYZ$ , find each of the following.



8. perimeter of  $WXYZ$  \_\_\_\_\_

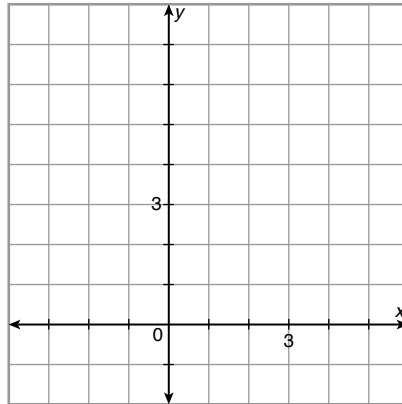
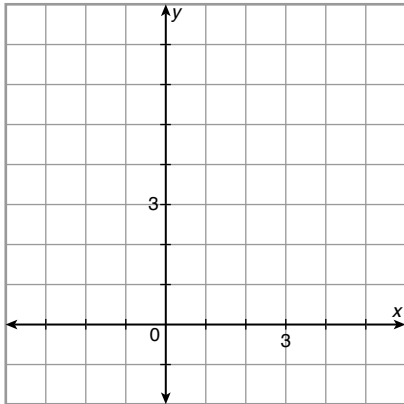
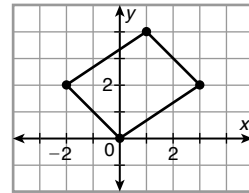
9. area of  $WXYZ$  \_\_\_\_\_

**LESSON**

**Practice B**

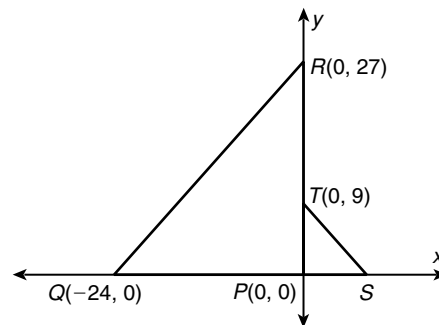
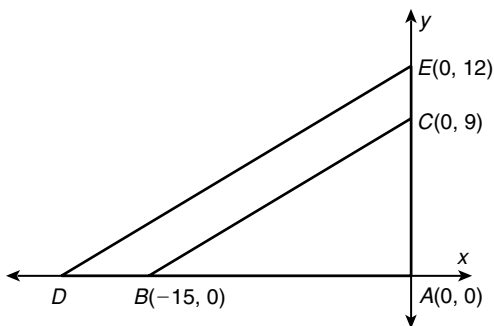
**7-6 Dilations and Similarity in the Coordinate Plane**

A jeweler designs a setting that can hold a gem in the shape of a parallelogram. The figure shows the outline of the gem. The client, however, wants a gem and setting that is slightly larger.



1. Draw the gem after a dilation with a scale factor of  $\frac{3}{2}$ .

2. The client is so pleased with her ring that she decides to have matching but smaller earrings made using the same pattern. Draw the gem after a dilation from the original pattern with a scale factor of  $\frac{1}{2}$ .



3. Given that  $\triangle ABC \sim \triangle ADE$ , find the scale factor and the coordinates of  $D$ .

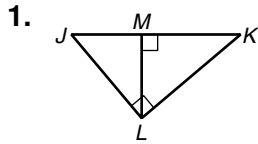
4. Given that  $\triangle PQR \sim \triangle PST$ , find the scale factor and the coordinates of  $S$ .

\_\_\_\_\_

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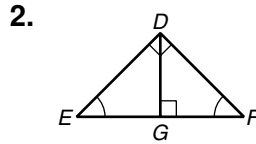
**LESSON** **Practice B**  
**8-1** **Similarity in Right Triangles**

Write a similarity statement comparing the three triangles in each diagram.



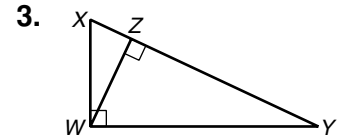
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Find the geometric mean of each pair of numbers. If necessary, give the answer in simplest radical form.

4.  $\frac{1}{4}$  and 4 \_\_\_\_\_

5. 3 and 75 \_\_\_\_\_

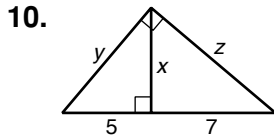
6. 4 and 18 \_\_\_\_\_

7.  $\frac{1}{2}$  and 9 \_\_\_\_\_

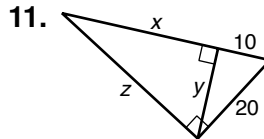
8. 10 and 14 \_\_\_\_\_

9. 4 and 12.25 \_\_\_\_\_

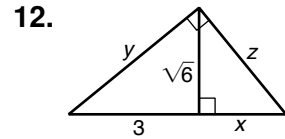
Find  $x$ ,  $y$ , and  $z$ .



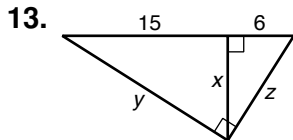
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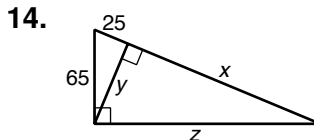
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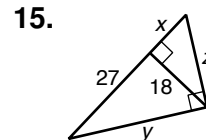
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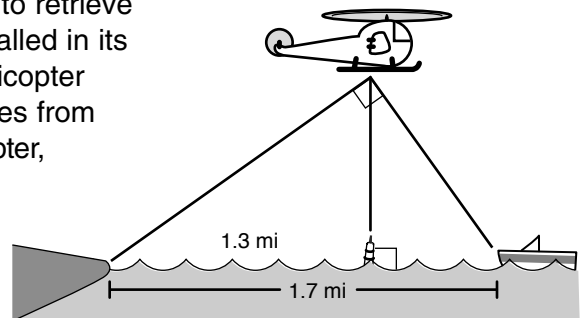


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16. The Coast Guard has sent a rescue helicopter to retrieve passengers off a disabled ship. The ship has called in its position as 1.7 miles from shore. When the helicopter passes over a buoy that is known to be 1.3 miles from shore, the angle formed by the shore, the helicopter, and the disabled ship is  $90^\circ$ . Determine what the altimeter would read to the nearest foot when the helicopter is directly above the buoy.

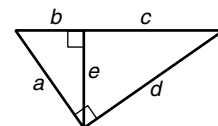


Use the diagram to complete each equation.

17.  $\frac{e}{b} = \frac{\square}{e}$

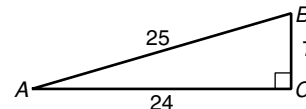
18.  $\frac{d}{b+c} = \frac{\square}{a}$

19.  $\frac{d}{\square} = \frac{a}{e}$



**LESSON** **Practice B**  
**8-2** **Trigonometric Ratios**

Use the figure for Exercises 1–6. Write each trigonometric ratio as a simplified fraction and as a decimal rounded to the nearest hundredth.



1.  $\sin A$

2.  $\cos B$

3.  $\tan B$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.  $\sin B$

5.  $\cos A$

6.  $\tan A$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Use special right triangles to write each trigonometric ratio as a simplified fraction.

7.  $\sin 30^\circ$  \_\_\_\_\_

8.  $\cos 30^\circ$  \_\_\_\_\_

9.  $\tan 45^\circ$  \_\_\_\_\_

10.  $\tan 30^\circ$  \_\_\_\_\_

11.  $\cos 45^\circ$  \_\_\_\_\_

12.  $\tan 60^\circ$  \_\_\_\_\_

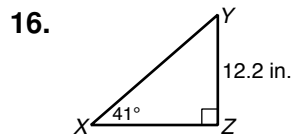
Use a calculator to find each trigonometric ratio. Round to the nearest hundredth.

13.  $\sin 64^\circ$  \_\_\_\_\_

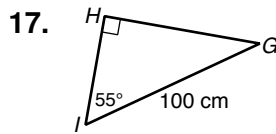
14.  $\cos 58^\circ$  \_\_\_\_\_

15.  $\tan 15^\circ$  \_\_\_\_\_

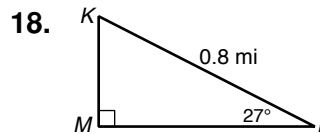
Find each length. Round to the nearest hundredth.



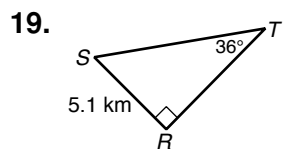
$XZ$  \_\_\_\_\_



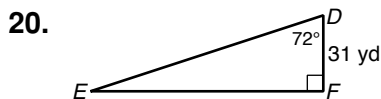
$HI$  \_\_\_\_\_



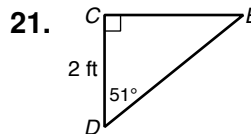
$KM$  \_\_\_\_\_



$ST$  \_\_\_\_\_



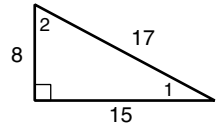
$EF$  \_\_\_\_\_



$DE$  \_\_\_\_\_

**LESSON** **8-3** **Practice B**  
**Solving Right Triangles**

Use the given trigonometric ratio to determine which angle of the triangle is  $\angle A$ .

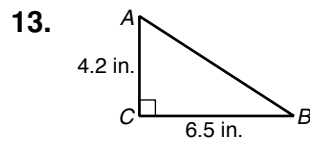


- |                                   |                                   |                                  |
|-----------------------------------|-----------------------------------|----------------------------------|
| 1. $\sin A = \frac{8}{17}$ _____  | 2. $\cos A = \frac{15}{17}$ _____ | 3. $\tan A = \frac{15}{8}$ _____ |
| 4. $\sin A = \frac{15}{17}$ _____ | 5. $\cos A = \frac{8}{17}$ _____  | 6. $\tan A = \frac{8}{15}$ _____ |

Use a calculator to find each angle measure to the nearest degree.

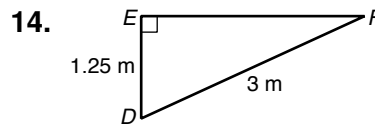
- |   |  |   |
|---|--|---|
| 7. $\sin^{-1}(0.82)$ _____                    | 8. $\cos^{-1}\left(\frac{11}{12}\right)$ _____ | 9. $\tan^{-1}(5.03)$ _____                    |
| 10. $\sin^{-1}\left(\frac{3}{8}\right)$ _____ | 11. $\cos^{-1}(0.23)$ _____                    | 12. $\tan^{-1}\left(\frac{1}{9}\right)$ _____ |

Find the unknown measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.



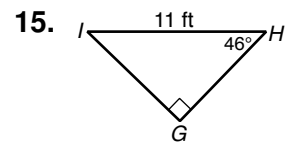
\_\_\_\_\_

\_\_\_\_\_



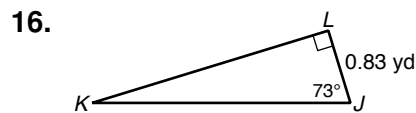
\_\_\_\_\_

\_\_\_\_\_



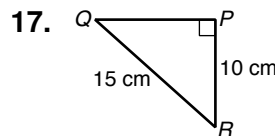
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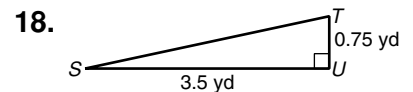
\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_

For each triangle, find all three side lengths to the nearest hundredth and all three angle measures to the nearest degree.

19.  $B(-2, -4)$ ,  $C(3, 3)$ ,  $D(-2, 3)$

\_\_\_\_\_

20.  $L(-1, -6)$ ,  $M(1, -6)$ ,  $N(-1, 1)$

\_\_\_\_\_

21.  $X(-4, 5)$ ,  $Y(-3, 5)$ ,  $Z(-3, 4)$

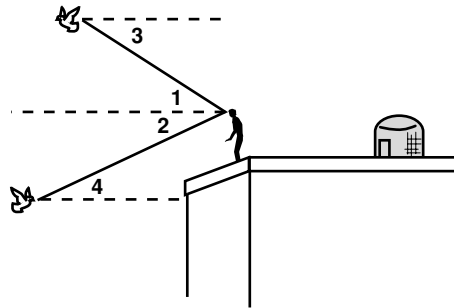
\_\_\_\_\_

**LESSON**

**Practice B**

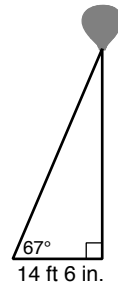
**8-4 Angles of Elevation and Depression**

Marco breeds and trains homing pigeons on the roof of his building. Classify each angle as an angle of elevation or an angle of depression.



1.  $\angle 1$  \_\_\_\_\_
2.  $\angle 2$  \_\_\_\_\_
3.  $\angle 3$  \_\_\_\_\_
4.  $\angle 4$  \_\_\_\_\_

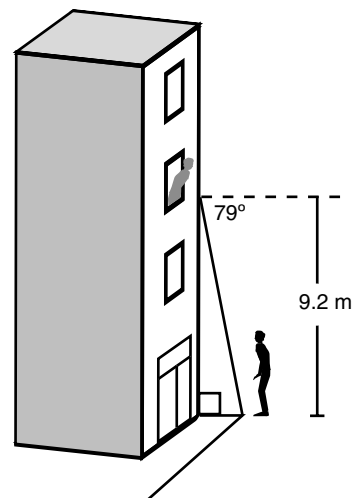
To attract customers to his car dealership, Frank tethers a large red balloon to the ground. In Exercises 5–7, give answers in feet and inches to the nearest inch. (*Note: Assume the cord that attaches to the balloon makes a straight segment.*)



5. The sun is directly overhead. The shadow of the balloon falls 14 feet 6 inches from the tether. Frank sights an angle of elevation of  $67^\circ$ . Find the height of the balloon.  
\_\_\_\_\_
6. Find the length of the cord that tethers the balloon.  
\_\_\_\_\_
7. The wind picks up and the angle of elevation changes to  $59^\circ$ . Find the height of the balloon.  
\_\_\_\_\_

Lindsey shouts down to Pete from her third-story window.

8. Lindsey is 9.2 meters up, and the angle of depression from Lindsey to Pete is  $79^\circ$ . Find the distance from Pete to the base of the building to the nearest tenth of a meter.  
\_\_\_\_\_
9. To see Lindsey better, Pete walks out into the street so he is 4.3 meters from the base of the building. Find the angle of depression from Lindsey to Pete to the nearest degree.  
\_\_\_\_\_



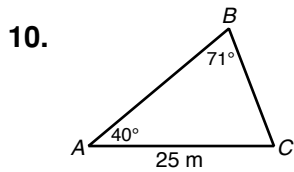
10. Mr. Shea lives in Lindsey's building. While Pete is still out in the street, Mr. Shea leans out his window to tell Lindsey and Pete to stop all the shouting. The angle of elevation from Pete to Mr. Shea is  $72^\circ$ . Tell whether Mr. Shea lives above or below Lindsey.  
\_\_\_\_\_

**LESSON** **Practice B**  
**8-5** **Law of Sines and Law of Cosines**

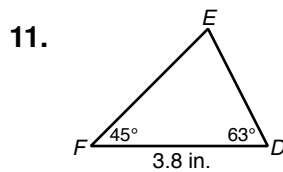
Use a calculator to find each trigonometric ratio. Round to the nearest hundredth.

- |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| 1. $\sin 111^\circ$ _____ | 2. $\cos 150^\circ$ _____ | 3. $\tan 163^\circ$ _____ |
| 4. $\sin 92^\circ$ _____  | 5. $\cos 129^\circ$ _____ | 6. $\tan 99^\circ$ _____  |
| 7. $\sin 170^\circ$ _____ | 8. $\cos 96^\circ$ _____  | 9. $\tan 117^\circ$ _____ |

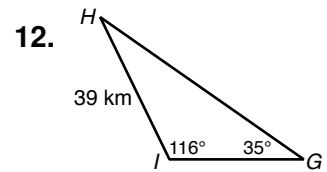
Use the Law of Sines to find each measure. Round lengths to the nearest tenth and angle measures to the nearest degree.



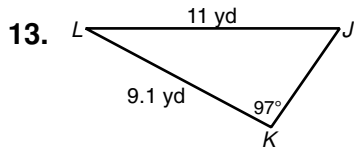
$BC$  \_\_\_\_\_



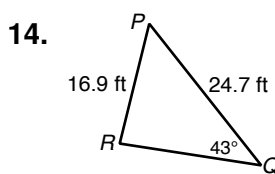
$DE$  \_\_\_\_\_



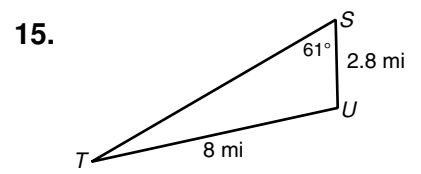
$GH$  \_\_\_\_\_



$m\angle J$  \_\_\_\_\_

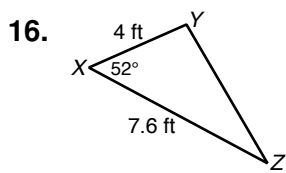


$m\angle R$  \_\_\_\_\_

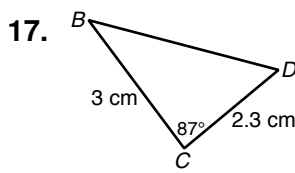


$m\angle T$  \_\_\_\_\_

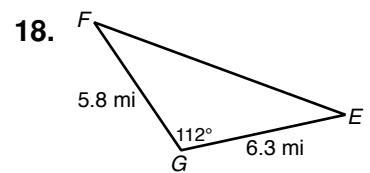
Use the Law of Cosines to find each measure. Round lengths to the nearest tenth and angle measures to the nearest degree.



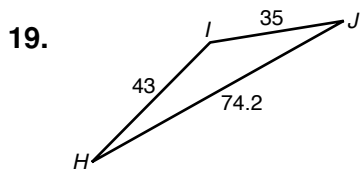
$YZ$  \_\_\_\_\_



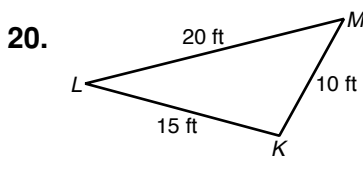
$BD$  \_\_\_\_\_



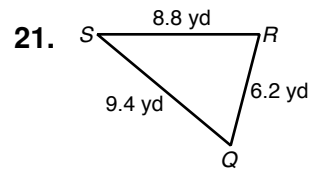
$EF$  \_\_\_\_\_



$m\angle I$  \_\_\_\_\_



$m\angle M$  \_\_\_\_\_

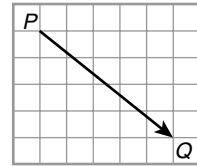


$m\angle S$  \_\_\_\_\_



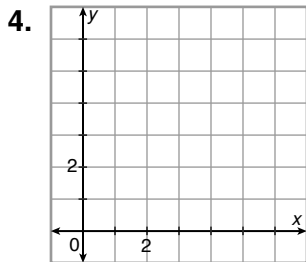
**LESSON** **Practice B**  
**8-6** **Vectors**

Write each vector in component form.

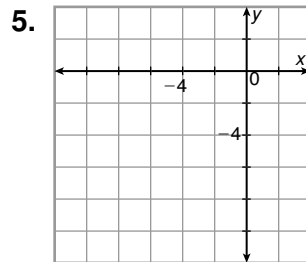


- $\vec{PQ}$  \_\_\_\_\_
- $\vec{EF}$  with  $E(-1, 2)$  and  $F(-10, -3)$  \_\_\_\_\_
- the vector with initial point  $V(7, 3)$  and terminal point  $W(0, -1)$  \_\_\_\_\_

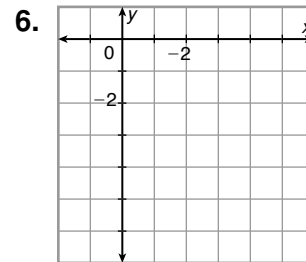
Draw each vector on a coordinate plane. Find its magnitude to the nearest tenth.



$\langle 5, 2 \rangle$  \_\_\_\_\_

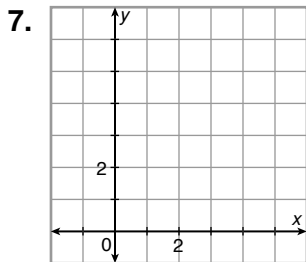


$\langle -4, -7 \rangle$  \_\_\_\_\_

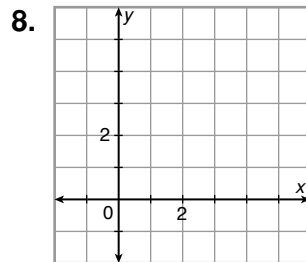


$\langle 3, -6 \rangle$  \_\_\_\_\_

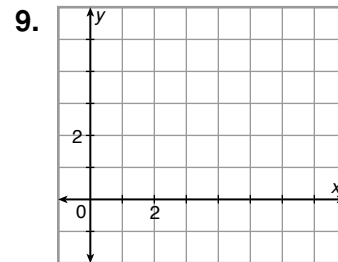
Draw each vector on a coordinate plane. Find the direction of the vector to the nearest degree.



$\langle 4, 6 \rangle$  \_\_\_\_\_



$\langle 3, 2 \rangle$  \_\_\_\_\_

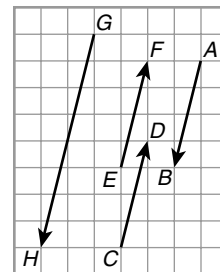


$\langle 7, 2 \rangle$  \_\_\_\_\_

Identify each of the following in the figure.

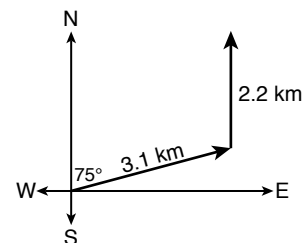
10. equal vectors \_\_\_\_\_

11. parallel vectors \_\_\_\_\_



In Exercise 12, round directions to the nearest degree and speeds to the nearest tenth.

- Becky is researching her family history. She has found an old map that shows the site of her great grandparents' farmhouse outside of town. To get to the site, Becky walks for 3.1 km at a bearing of  $N 75^\circ E$ . Then she walks 2.2 km due north. Find the distance and direction Becky could have walked to get straight to the site.



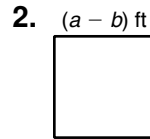
**LESSON** **Practice B**  
**9-1** *Developing Formulas for Triangles and Quadrilaterals*

Find each measurement.



the perimeter of the rectangle in which  
 $A = 2xy \text{ mi}^2$

\_\_\_\_\_

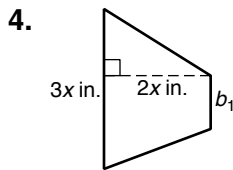


the area of the square

\_\_\_\_\_

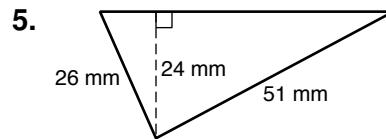
3. the height of a parallelogram in which  $A = 96 \text{ cm}^2$  and  $b = 8x \text{ cm}$

\_\_\_\_\_



$b_1$  of the trapezoid in which  $A = 4x^2 \text{ in}^2$

\_\_\_\_\_

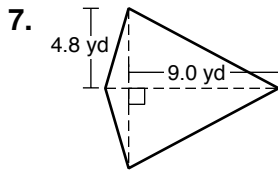


the area of the triangle

\_\_\_\_\_

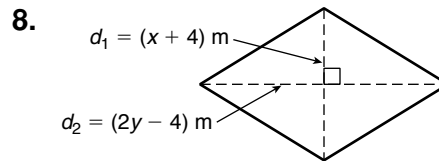
6. the area of a trapezoid in which  $b_1 = 3a \text{ km}$ ,  $b_2 = 6a \text{ km}$ , and  $h = (10 + 4c) \text{ km}$

\_\_\_\_\_



the perimeter of the kite in which  
 $A = 49.92 \text{ yd}^2$

\_\_\_\_\_



the area of the rhombus

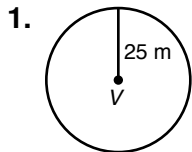
\_\_\_\_\_

9.  $d_2$  of the kite in which  $d_1 = (a - 4) \text{ ft}$  and  $A = (2a^2 - 8a) \text{ ft}^2$

\_\_\_\_\_

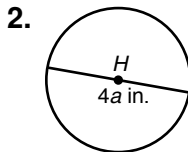
**LESSON 9-2 Practice B**  
**Developing Formulas for Circles and Regular Polygons**

Find each measurement. Give your answers in terms of  $\pi$ .



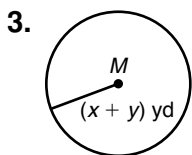
the area of  $\odot V$

\_\_\_\_\_



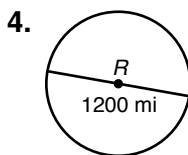
the area of  $\odot H$

\_\_\_\_\_



the circumference of  $\odot M$

\_\_\_\_\_



the circumference of  $\odot R$

\_\_\_\_\_

5. the radius of  $\odot D$  in which  $C = 2\pi^2$  cm \_\_\_\_\_

6. the diameter of  $\odot K$  in which  $A = (x^2 + 2x + 1)\pi$  km<sup>2</sup> \_\_\_\_\_

**Stella wants to cover a tabletop with nickels, dimes, or quarters. She decides to find which coin would cost the least to use.**

7. Stella measures the diameters of a nickel, a dime, and a quarter. They are 21.2 mm, 17.8 mm, and 24.5 mm. Find the areas of the nickel, the dime, and the quarter. Round to the nearest tenth.

\_\_\_\_\_

8. Divide each coin's value in cents by the coin's area. Round to the nearest hundredth.

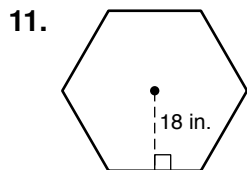
\_\_\_\_\_

9. Tell which coin has the least value per unit of area. \_\_\_\_\_

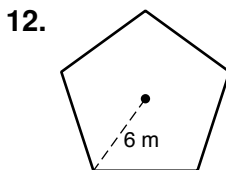
10. Tell about how many nickels would cover a square tabletop that measures 1 square meter. Then find the cost of the coins.

\_\_\_\_\_

**Find the area of each regular polygon. Round to the nearest tenth.**



\_\_\_\_\_

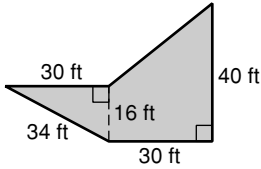


\_\_\_\_\_

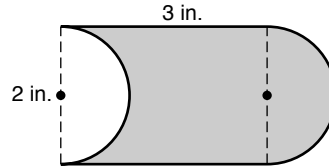
**LESSON**  
**9-3** **Practice B**  
**Composite Figures**

Find the shaded area. Round to the nearest tenth if necessary.

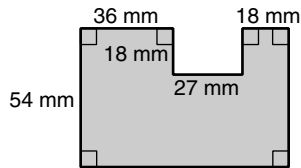
1.



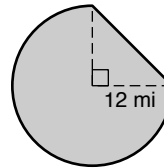
2.



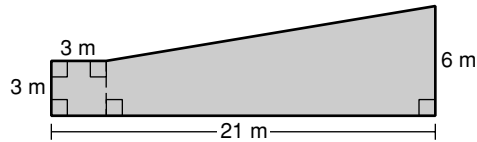
3.



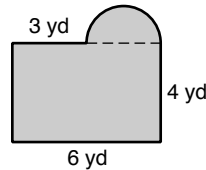
4.



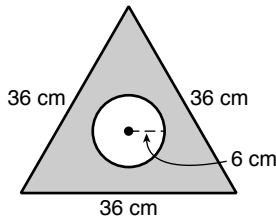
5.



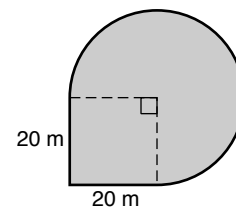
6.



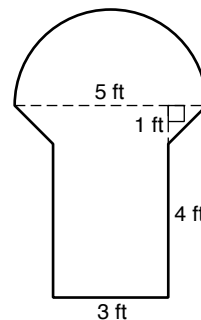
7.



8.

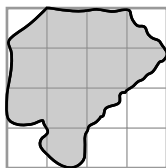


9. Osman broke the unusually shaped picture window in his parents' living room. The figure shows the dimensions of the window. Replacement glass costs \$8 per square foot, and there will be a \$35 installation fee. Find the cost to replace the window to the nearest cent.

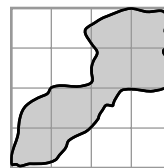


Estimate the area of each shaded irregular shape. The grid has squares with side lengths of 1 cm.

10.

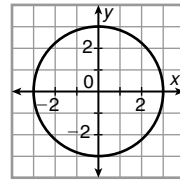


11.

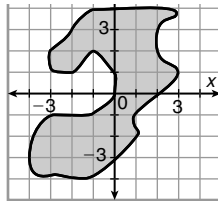


**LESSON** **Practice B**  
**9-4** **Perimeter and Area in the Coordinate Plane**

Lena and her older sister Margie love to play tetherball. They want to find how large the tetherball court is. They measure the court and find it has a 6-foot diameter.

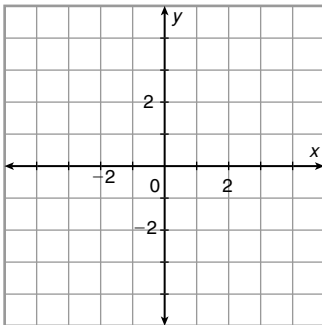


1. Lena sketches the court in a coordinate plane in which each square represents 1 square foot. Estimate the size of the court from the figure.  
\_\_\_\_\_
2. Margie has taken a geometry course, so she knows the formula for the area of a circle. Find the actual area of the court to the nearest tenth of a square foot.  
\_\_\_\_\_
3. Estimate the area of the irregular shape.  
\_\_\_\_\_

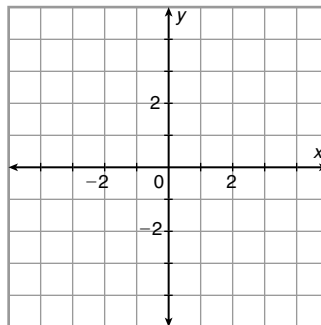


Draw and classify each polygon with the given vertices. Find the perimeter and area of the polygon. Round to the nearest tenth if necessary.

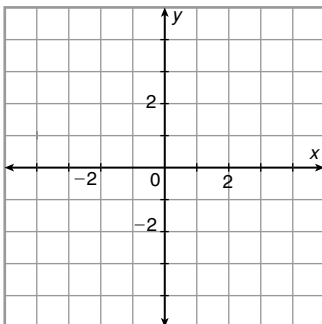
4.  $A(-2, 3)$ ,  $B(3, 1)$ ,  $C(-2, -1)$ ,  $D(-3, 1)$



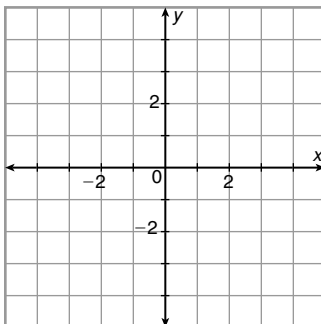
5.  $P(-3, -4)$ ,  $Q(3, -3)$ ,  $R(3, -2)$ ,  $S(-3, 2)$



6.  $E(-4, 1)$ ,  $F(-2, 3)$ ,  $G(-2, -4)$



7.  $T(1, -2)$ ,  $U(4, 1)$ ,  $V(2, 3)$ ,  $W(-1, 0)$



**LESSON**  
**9-5**

**Practice B**

**Effects of Changing Dimensions Proportionally**

Describe the effect of each change on the area of the given figure.

1. The base of the parallelogram is multiplied by  $\frac{3}{4}$ .

\_\_\_\_\_

2. The length of a rectangle with length 12 yd and width 11 yd is divided by 6.

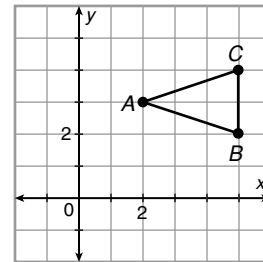
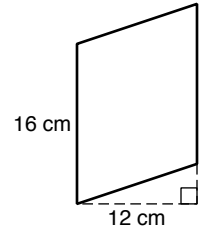
\_\_\_\_\_

3. The base of a triangle with vertices  $A(2, 3)$ ,  $B(5, 2)$ , and  $C(5, 4)$  is doubled.

\_\_\_\_\_

4. The height of a trapezoid with base lengths 4 mm and 7 mm and height 9 mm is multiplied by  $\frac{1}{3}$ .

\_\_\_\_\_



In Exercises 5–8, describe the effect of each change on the perimeter or circumference and the area of the given figure.

5. The length and width of the rectangle are multiplied by  $\frac{4}{3}$ .

\_\_\_\_\_

6. The base and height of a triangle with base 1.5 m and height 6 m are both tripled.

\_\_\_\_\_

7. The radius of a circle with center  $(2, 2)$  that passes through  $(0, 2)$  is divided by 2.

\_\_\_\_\_

\_\_\_\_\_

8. The bases and the height of a trapezoid with base lengths 4 in. and 8 in. and height 8 in. are all multiplied by  $\frac{1}{8}$ .

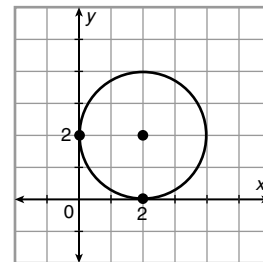
\_\_\_\_\_

9. A rhombus has an area of  $9 \text{ cm}^2$ . The area is multiplied by 5. Describe the effects on the diagonals of the rhombus.

\_\_\_\_\_

10. A circle has a circumference of  $14\pi$  ft. The area is halved. Describe the effects on the circumference of the circle.

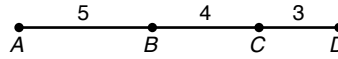
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**LESSON**  
**9-6**

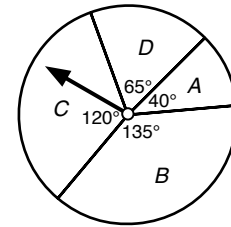
**Practice B**  
**Geometric Probability**

A point is randomly chosen on  $\overline{AD}$ . Find the fractional probability of each event.



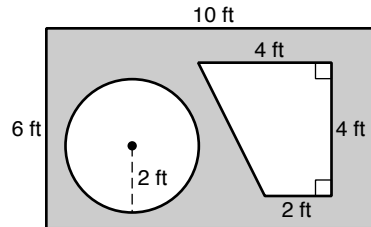
1. The point is on  $\overline{AB}$ . \_\_\_\_\_
2. The point is on  $\overline{BD}$ . \_\_\_\_\_
3. The point is on  $\overline{AD}$ . \_\_\_\_\_
4. The point is not on  $\overline{BC}$ . \_\_\_\_\_

Use the spinner to find the fractional probability of each event.



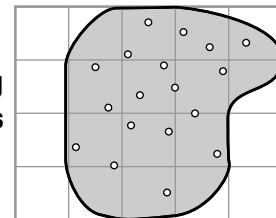
5. the pointer landing in region C \_\_\_\_\_
6. the pointer landing in region A \_\_\_\_\_
7. the pointer not landing in region D \_\_\_\_\_
8. the pointer landing in regions A or B \_\_\_\_\_

Find the probability that a point chosen randomly inside the rectangle is in each given shape. Round answers to the nearest hundredth.



9. the circle \_\_\_\_\_
10. the trapezoid \_\_\_\_\_
11. the circle or the trapezoid \_\_\_\_\_
12. not the circle and the trapezoid \_\_\_\_\_

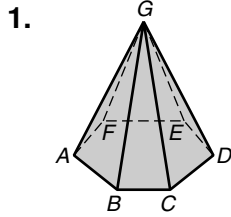
Barb is practicing her chip shots on the chipping green at the local golf club. Suppose Barb's ball drops randomly on the chipping green. The figure shows the chipping green in a grid whose squares have 1-yard sides. There are 18 different 4.5-inch diameter holes on the chipping green.



13. Estimate the probability that Barb will chip her ball into any hole. Round to the nearest thousandth. \_\_\_\_\_
14. Estimate the probability that Barb will chip her ball into the one hole she is aiming for. Round to the nearest thousandth. \_\_\_\_\_
15. Estimate how many chip shots Barb will have to take to ensure that one goes into a randomly selected hole. \_\_\_\_\_
16. Barb is getting frustrated, so her shots are even worse. Now the ball drops randomly anywhere in the grid shown in the figure. Estimate the probability that Barb will miss the chipping green. Round to the nearest thousandth. \_\_\_\_\_

**LESSON**  
**10-1** **Practice B**  
**Solid Geometry**

Classify each figure. Name the vertices, edges, and bases.



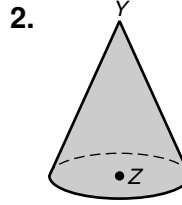
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\_\_\_\_\_

Name the type of solid each object is and sketch an example.

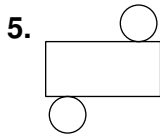
3. a shoe box

4. a can of tuna

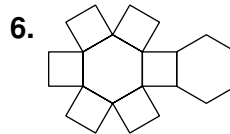
\_\_\_\_\_

\_\_\_\_\_

Describe the three-dimensional figure that can be made from the given net.

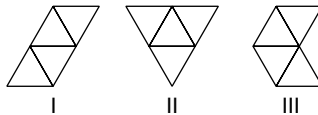


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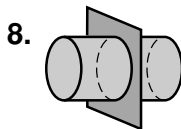


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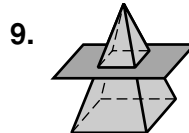
7. Two of the nets below make the same solid. Tell which one does not. \_\_\_\_\_



Describe each cross section.



\_\_\_\_\_



\_\_\_\_\_

10. After completing Exercises 8 and 9, Lloyd makes a conjecture about the shape of any cross section parallel to the base of a solid. Write your own conjecture.

\_\_\_\_\_

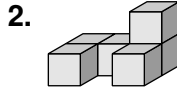
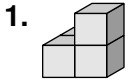
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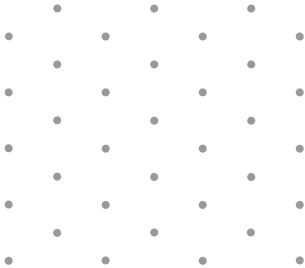
**LESSON**  
**10-2**

**Practice B**  
**Representations of Three-Dimensional Figures**

Draw all six orthographic views of each object. Assume there are no hidden cubes. In your answers, use a dashed line to show that the edges touch and a solid line to show that the edges do not touch.



3. Draw an isometric view of the object in Exercise 1.



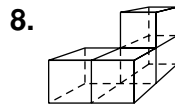
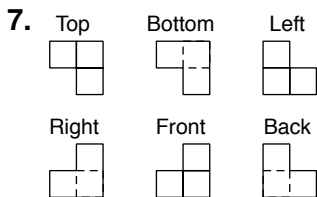
4. Draw an isometric view of the object in Exercise 2.



5. Draw a block letter T in one-point perspective.

6. Draw a block letter T in two-point perspective. (*Hint: Draw the vertical line segment that will be closest to the viewer first.*)

Determine whether each drawing represents the object at right. Assume there are no hidden cubes.

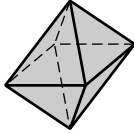


**LESSON**  
**10-3**

**Practice B**  
**Formulas in Three Dimensions**

Find the number of vertices, edges, and faces of each polyhedron.  
Use your results to verify Euler's Formula.

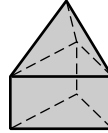
1.



\_\_\_\_\_

\_\_\_\_\_

2.



\_\_\_\_\_

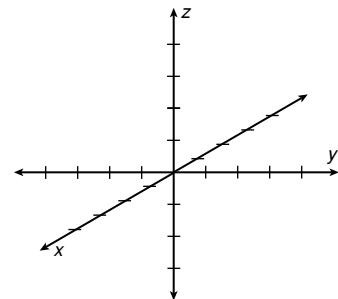
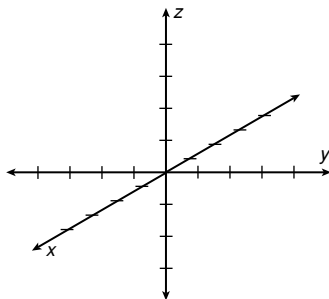
\_\_\_\_\_

Find the unknown dimension in each polyhedron. Round to the nearest tenth.

3. the edge length of a cube with a diagonal of 9 ft \_\_\_\_\_
4. the length of a diagonal of a 15-mm-by-20-mm-by-8-mm rectangular prism \_\_\_\_\_
5. the length of a rectangular prism with width 2 in., height 18 in., and a 21-in. diagonal \_\_\_\_\_

Graph each figure.

6. a square prism with base edge length 4 units, height 2 units, and one vertex at  $(0, 0, 0)$
7. a cone with base diameter 6 units, height 3 units, and base centered at  $(0, 0, 0)$

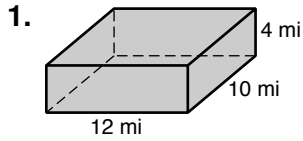


Find the distance between the given points. Find the midpoint of the segment with the given endpoints. Round to the nearest tenth if necessary.

8.  $(1, 10, 3)$  and  $(5, 5, 5)$  \_\_\_\_\_
9.  $(-8, 0, 11)$  and  $(2, -6, -17)$  \_\_\_\_\_

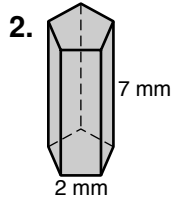
**LESSON** **Practice B**  
**10-4** **Surface Area of Prisms and Cylinders**

Find the lateral area and surface area of each right prism. Round to the nearest tenth if necessary.



the rectangular prism

\_\_\_\_\_

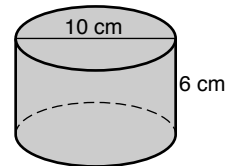


the regular pentagonal prism

\_\_\_\_\_

3. a cube with edge length 20 inches \_\_\_\_\_

Find the lateral area and surface area of each right cylinder. Give your answers in terms of  $\pi$ .



4. \_\_\_\_\_

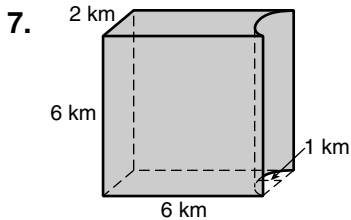
5. a cylinder with base area  $169\pi \text{ ft}^2$  and a height twice the radius

\_\_\_\_\_

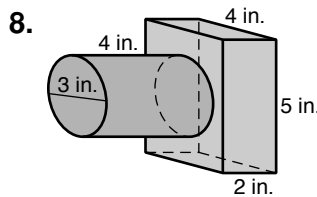
6. a cylinder with base circumference  $8\pi \text{ m}$  and a height one-fourth the radius

\_\_\_\_\_

Find the surface area of each composite figure. Round to the nearest tenth.

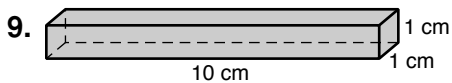


\_\_\_\_\_



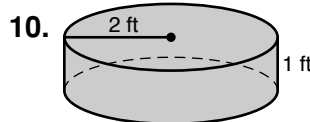
\_\_\_\_\_

Describe the effect of each change on the surface area of the given figure.



The dimensions are multiplied by 12.

\_\_\_\_\_



The dimensions are divided by 4.

\_\_\_\_\_

Toby has eight cubes with edge length 1 inch. He can stack the cubes into three different rectangular prisms: 2-by-2-by-2, 8-by-1-by-1, and 2-by-4-by-1. Each prism has a volume of 8 cubic inches.

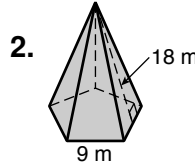
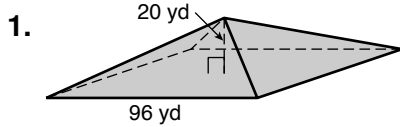
11. Tell which prism has the smallest surface-area-to-volume ratio. \_\_\_\_\_

12. Tell which prism has the greatest surface-area-to-volume ratio. \_\_\_\_\_

**LESSON**  
**10-5**

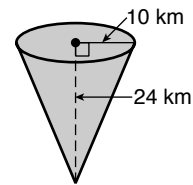
**Practice B**  
**Surface Area of Pyramids and Cones**

Find the lateral area and surface area of each regular right solid. Round to the nearest tenth if necessary.



3. a regular hexagonal pyramid with base edge length 12 mi and slant height 15 mi

Find the lateral area and surface area of each right cone. Give your answers in terms of  $\pi$ .

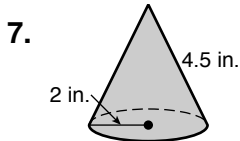


4. \_\_\_\_\_

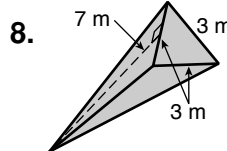
5. a right cone with base circumference  $14\pi$  ft and slant height 3 times the radius

6. a right cone with diameter 240 cm and altitude 35 cm

Describe the effect of each change on the surface area of the given figure.

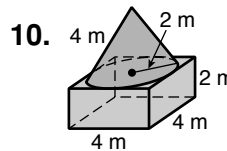
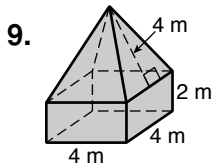


The dimensions are multiplied by  $\frac{1}{5}$ .

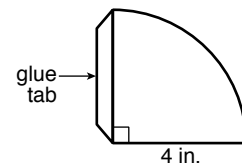


The dimensions are multiplied by  $\frac{3}{2}$ .

Find the surface area of each composite figure. Round to the nearest tenth if necessary.

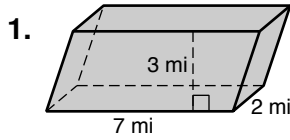


11. The water cooler at Mohammed's office has small conical paper cups for drinking. He uncurls one of the cups and measures the paper. Based on the diagram of the uncurled cup, find the diameter of the cone.



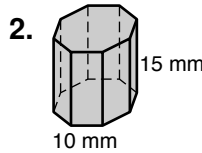
**LESSON** **Practice B**  
**10-6** *Volume of Prisms and Cylinders*

Find the volume of each prism. Round to the nearest tenth if necessary.



the oblique rectangular prism

\_\_\_\_\_

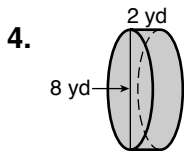


the regular octagonal prism

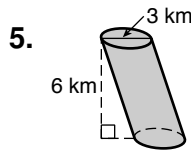
\_\_\_\_\_

3. a cube with edge length 0.75 m \_\_\_\_\_

Find the volume of each cylinder. Give your answers both in terms of  $\pi$  and rounded to the nearest tenth.



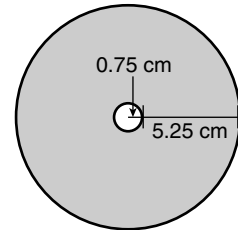
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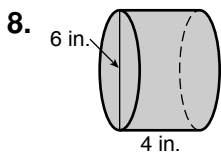
6. a cylinder with base circumference  $18\pi$  ft and height 10 ft \_\_\_\_\_

7. CDs have the dimensions shown in the figure. Each CD is 1 mm thick. Find the volume in cubic centimeters of a stack of 25 CDs. Round to the nearest tenth.



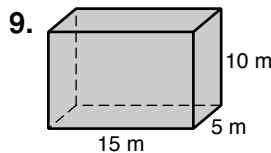
\_\_\_\_\_

Describe the effect of each change on the volume of the given figure.



The dimensions are halved.

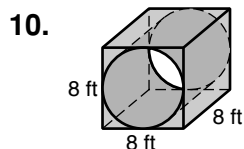
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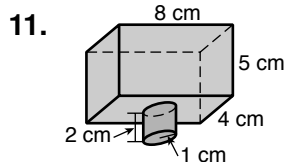
The dimensions are divided by 5.

\_\_\_\_\_

Find the volume of each composite figure. Round to the nearest tenth.



\_\_\_\_\_

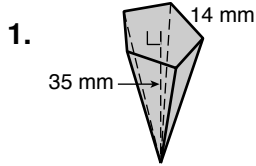


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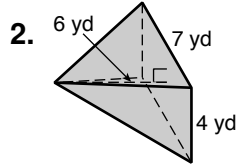
**LESSON**  
**10-7**

**Practice B**  
**Volume of Pyramids and Cones**

Find the volume of each pyramid. Round to the nearest tenth if necessary.



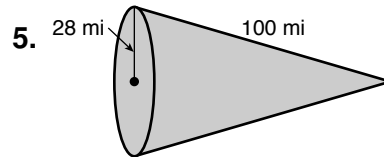
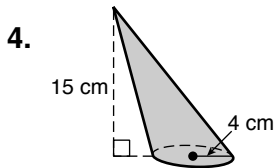
the regular pentagonal pyramid



the rectangular right pyramid

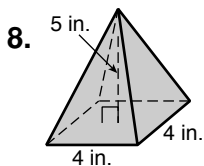
3. Giza in Egypt is the site of the three great Egyptian pyramids. Each pyramid has a square base. The largest pyramid was built for Khufu. When first built, it had base edges of 754 feet and a height of 481 feet. Over the centuries, some of the stone eroded away and some was taken for newer buildings. Khufu's pyramid today has base edges of 745 feet and a height of 471 feet. To the nearest cubic foot, find the difference between the original and current volumes of the pyramid.

Find the volume of each cone. Give your answers both in terms of  $\pi$  and rounded to the nearest tenth.

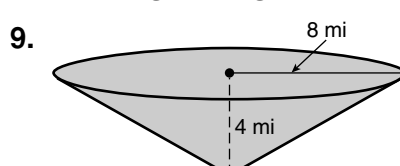


6. a cone with base circumference  $6\pi$  m and a height equal to half the radius
7. Compare the volume of a cone and the volume of a cylinder with equal height and base area.

Describe the effect of each change on the volume of the given figure.

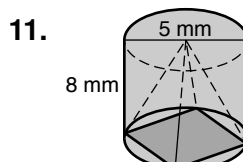
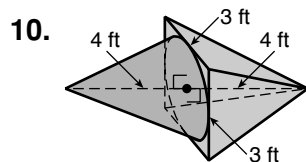


The dimensions are multiplied by  $\frac{2}{3}$ .



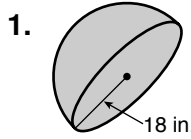
The dimensions are tripled.

Find the volume of each composite figure. Round to the nearest tenth.



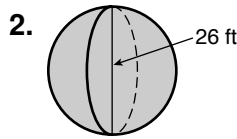
**LESSON** **Practice B**  
**10-8** **Spheres**

Find each measurement. Give your answers in terms of  $\pi$ .



the volume of the hemisphere

\_\_\_\_\_



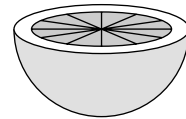
the volume of the sphere

\_\_\_\_\_

3. the diameter of a sphere with volume  $\frac{500\pi}{3} \text{ m}^3$

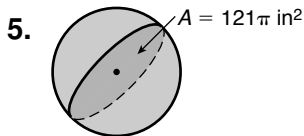
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4. The figure shows a grapefruit half. The radius to the outside of the rind is 5 cm. The radius to the inside of the rind is 4 cm. The edible part of the grapefruit is divided into 12 equal sections. Find the volume of the half grapefruit and the volume of one edible section. Give your answers in terms of  $\pi$ .



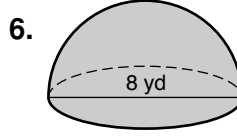
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Find each measurement. Give your answers in terms of  $\pi$ .



the surface area of the sphere

\_\_\_\_\_



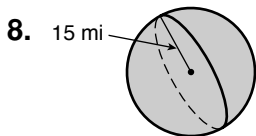
the surface area of the closed hemisphere and its circular base

\_\_\_\_\_

7. the volume of a sphere with surface area  $196\pi \text{ km}^2$

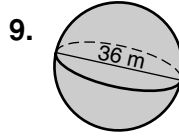
\_\_\_\_\_

Describe the effect of each change on the given measurement of the figure.



surface area  
 The dimensions are divided by 4.

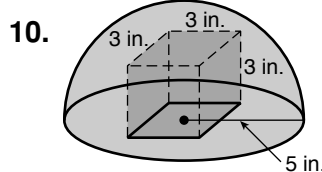
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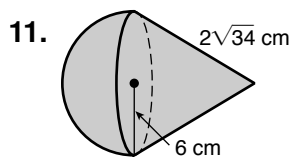
volume  
 The dimensions are multiplied by  $\frac{2}{5}$ .

\_\_\_\_\_

Find the surface area and volume of each composite figure. Round to the nearest tenth.



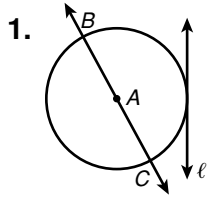
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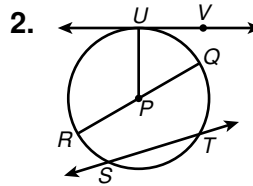
**LESSON** **Practice B**  
**11-1** *Lines That Intersect Circles*

Identify each line or segment that intersects each circle.



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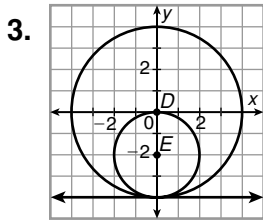
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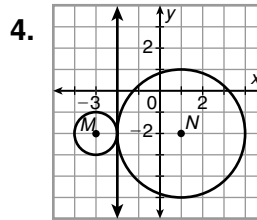
Find the length of each radius. Identify the point of tangency and write the equation of the tangent line at this point.



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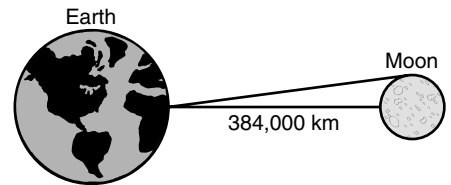


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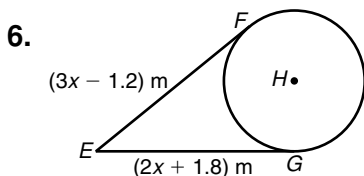
\_\_\_\_\_

5. The Moon's orbit is not exactly circular, but the average distance from its surface to Earth's surface is 384,000 kilometers. The diameter of the Moon is 3476 kilometers. Find the distance from the surface of Earth to the visible edge of the Moon if the Moon is directly above the observer. Round to the nearest kilometer. (Note: The figure is not drawn to scale.)

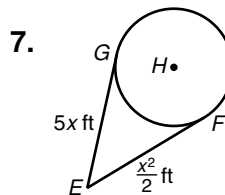


\_\_\_\_\_

In Exercises 6 and 7,  $\overline{EF}$  and  $\overline{EG}$  are tangent to  $\odot H$ . Find  $EF$ .



\_\_\_\_\_

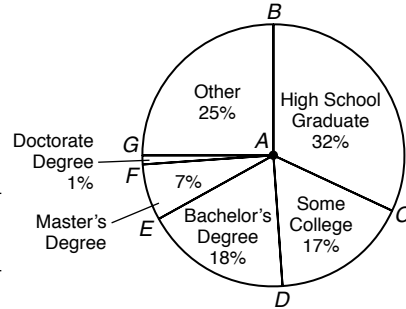


\_\_\_\_\_



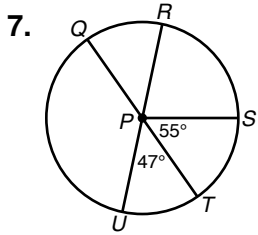
**LESSON** **Practice B**  
**11-2** **Arcs and Chords**

The circle graph shows data collected by the U.S. Census Bureau in 2004 on the highest completed educational level for people 25 and older. Use the graph to find each of the following. Round to the nearest tenth if necessary.

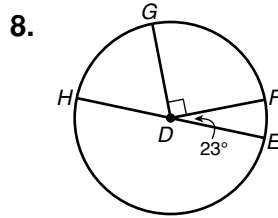


- $m\angle CAB$  \_\_\_\_\_
- $m\angle DAG$  \_\_\_\_\_
- $m\angle EAC$  \_\_\_\_\_
- $m\widehat{BG}$  \_\_\_\_\_
- $m\widehat{GF}$  \_\_\_\_\_
- $m\widehat{BDE}$  \_\_\_\_\_

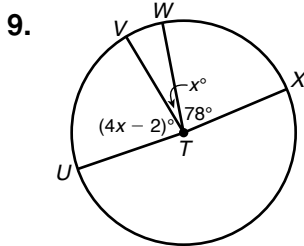
Find each measure.



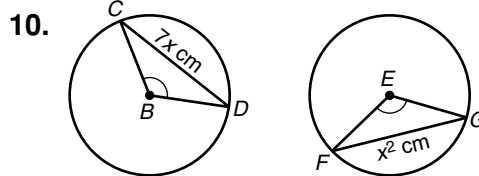
- $m\widehat{QS}$  \_\_\_\_\_  
 $m\widehat{RQT}$  \_\_\_\_\_



- $m\widehat{HG}$  \_\_\_\_\_  
 $m\widehat{FEH}$  \_\_\_\_\_



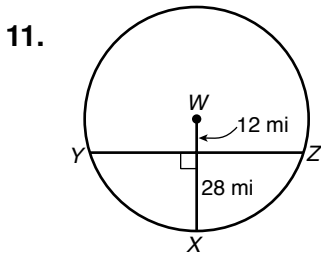
Find  $m\angle UTW$ . \_\_\_\_\_



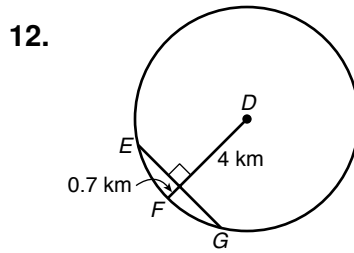
$\odot B \cong \odot E$ , and  $\angle CBD \cong \angle FEG$ .

Find  $FG$ . \_\_\_\_\_

Find each length. Round to the nearest tenth.



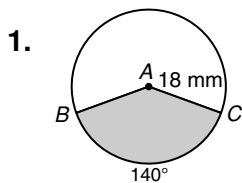
$ZY$  \_\_\_\_\_



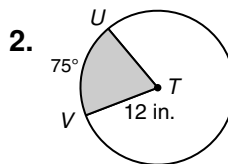
$EG$  \_\_\_\_\_

**LESSON** **Practice B**  
**11-3** **Sector Area and Arc Length**

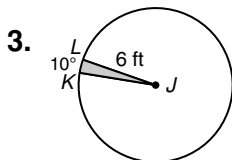
Find the area of each sector. Give your answer in terms of  $\pi$  and rounded to the nearest hundredth.



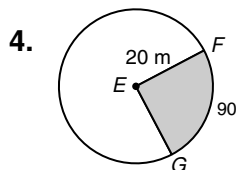
sector  $BAC$  \_\_\_\_\_



sector  $UTV$  \_\_\_\_\_



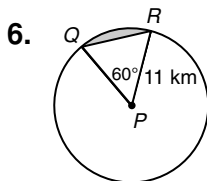
sector  $KJL$  \_\_\_\_\_



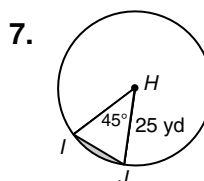
sector  $FEG$  \_\_\_\_\_

5. The speedometer needle in Ignacio's car is 2 inches long. The needle sweeps out a  $130^\circ$  sector during acceleration from 0 to 60 mi/h. Find the area of this sector. Round to the nearest hundredth. \_\_\_\_\_

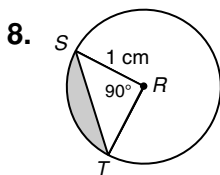
Find the area of each segment to the nearest hundredth.



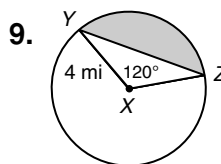
\_\_\_\_\_



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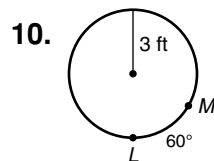


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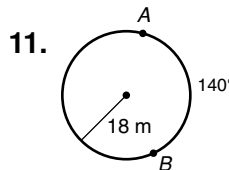


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Find each arc length. Give your answer in terms of  $\pi$  and rounded to the nearest hundredth.



\_\_\_\_\_



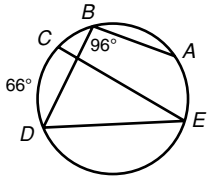
\_\_\_\_\_

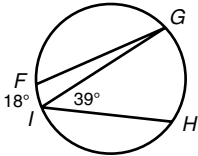
12. an arc with measure  $45^\circ$  in a circle with radius 2 mi \_\_\_\_\_

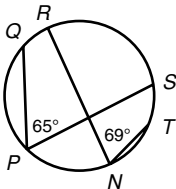
13. an arc with measure  $120^\circ$  in a circle with radius 15 mm \_\_\_\_\_

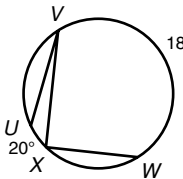
**LESSON 11-4** **Practice B**  
**Inscribed Angles**

Find each measure.

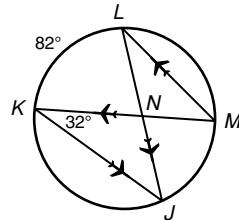
1.   $m\angle CED = \underline{\hspace{2cm}}$   
 $m\widehat{DEA} = \underline{\hspace{2cm}}$

2.   $m\angle FGI = \underline{\hspace{2cm}}$   
 $m\widehat{GH} = \underline{\hspace{2cm}}$

3.   $m\widehat{QRS} = \underline{\hspace{2cm}}$   
 $m\widehat{TSR} = \underline{\hspace{2cm}}$

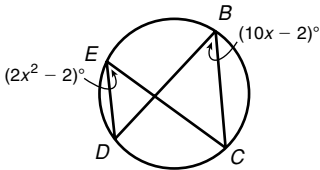
4.   $m\angle XVU = \underline{\hspace{2cm}}$   
 $m\angle VXW = \underline{\hspace{2cm}}$

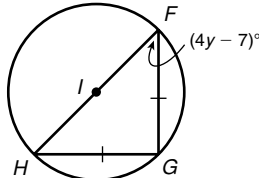
5. A circular radar screen in an air traffic control tower shows these flight paths. Find  $m\angle LNK$ .

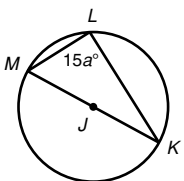


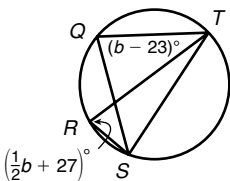
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Find each value.

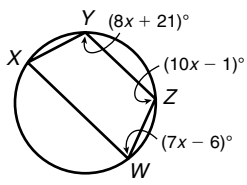
6.   $m\angle CED = \underline{\hspace{2cm}}$

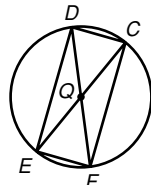
7.   $y = \underline{\hspace{2cm}}$

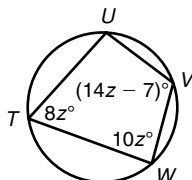
8.   $a = \underline{\hspace{2cm}}$

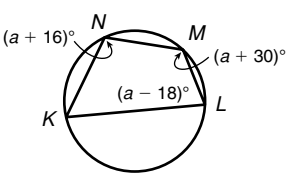
9.   $m\angle SRT = \underline{\hspace{2cm}}$

Find the angle measures of each inscribed quadrilateral.

10.   $m\angle X = \underline{\hspace{2cm}}$   
 $m\angle Y = \underline{\hspace{2cm}}$   
 $m\angle Z = \underline{\hspace{2cm}}$   
 $m\angle W = \underline{\hspace{2cm}}$

11.   $m\angle C = \underline{\hspace{2cm}}$   
 $m\angle D = \underline{\hspace{2cm}}$   
 $m\angle E = \underline{\hspace{2cm}}$   
 $m\angle F = \underline{\hspace{2cm}}$

12.   $m\angle T = \underline{\hspace{2cm}}$   
 $m\angle U = \underline{\hspace{2cm}}$   
 $m\angle V = \underline{\hspace{2cm}}$   
 $m\angle W = \underline{\hspace{2cm}}$

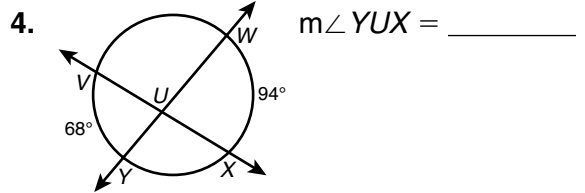
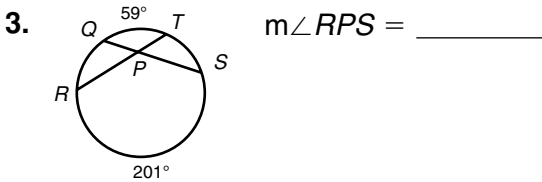
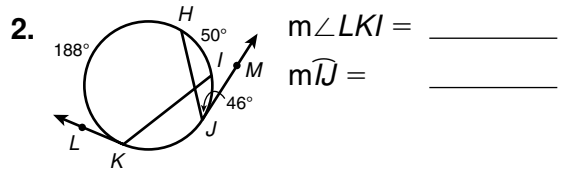
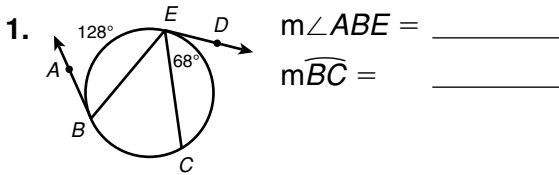
13.   $m\angle K = \underline{\hspace{2cm}}$   
 $m\angle L = \underline{\hspace{2cm}}$   
 $m\angle M = \underline{\hspace{2cm}}$   
 $m\angle N = \underline{\hspace{2cm}}$

**LESSON**

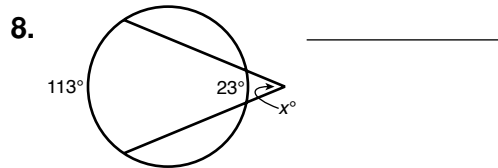
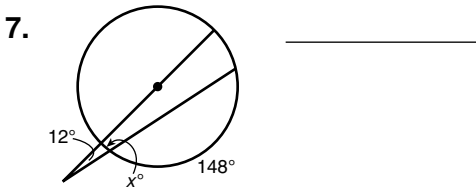
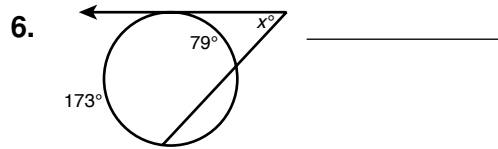
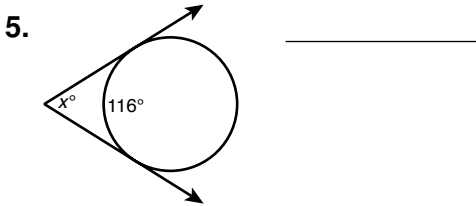
**Practice B**

**11-5 Angle Relationships in Circles**

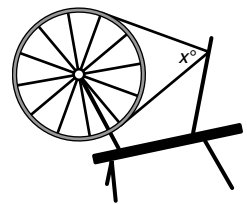
Find each measure.



Find the value of  $x$ .

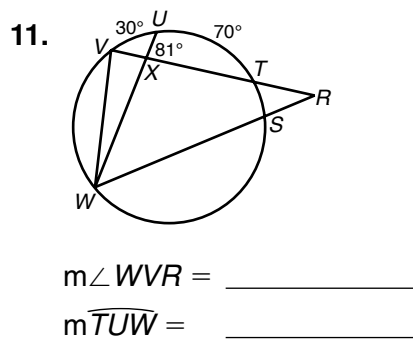
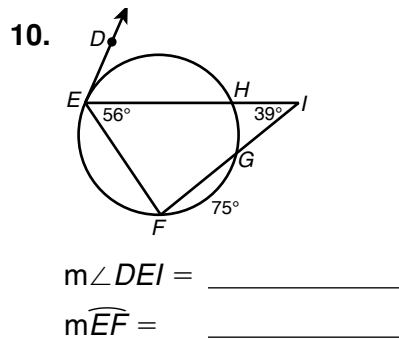


9. The figure shows a spinning wheel. The large wheel is turned by hand or with a foot trundle. A belt attaches to a small bobbin that turns very quickly. The bobbin twists raw materials into thread, twine, or yarn. Each pair of spokes intercepts a  $30^\circ$  arc. Find the value of  $x$ .



\_\_\_\_\_

Find each measure.

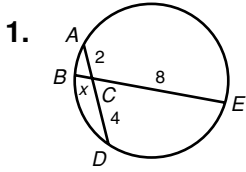


**LESSON**

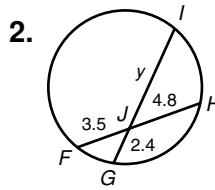
**Practice B**

**11-6 Segment Relationships in Circles**

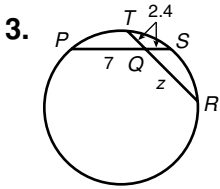
Find the value of the variable and the length of each chord.



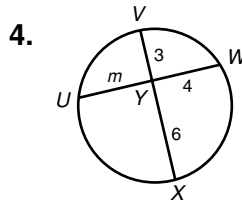
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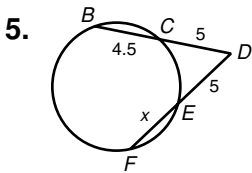


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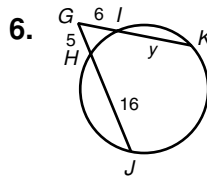


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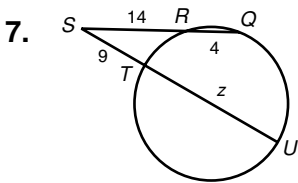
Find the value of the variable and the length of each secant segment.



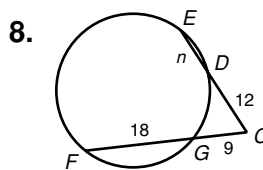
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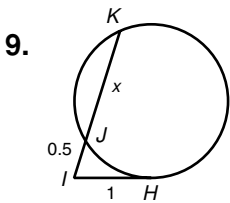


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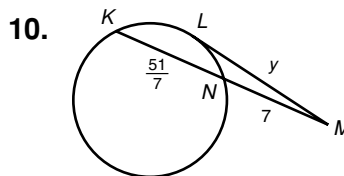


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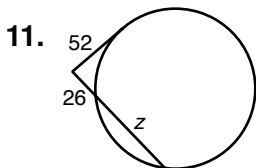
Find the value of the variable. Give answers in simplest radical form if necessary.



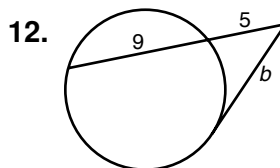
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**LESSON**

**Practice B**

**11-7** *Circles in the Coordinate Plane*

Write the equation of each circle.

1.  $\odot X$  centered at the origin with radius 10

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2.  $\odot R$  with center  $R(-1, 8)$  and radius 5

\_\_\_\_\_

3.  $\odot P$  with center  $P(-5, -5)$  and radius  $2\sqrt{5}$

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4.  $\odot O$  centered at the origin that passes through  $(9, -2)$

\_\_\_\_\_

5.  $\odot B$  with center  $B(0, -2)$  that passes through  $(-6, 0)$

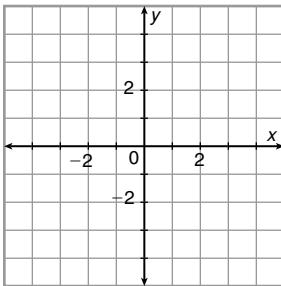
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6.  $\odot F$  with center  $F(11, 4)$  that passes through  $(-2, 5)$ .

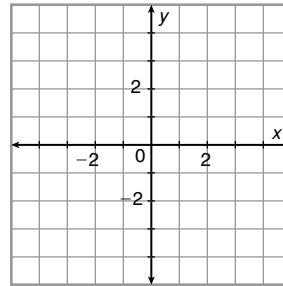
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Graph each equation.

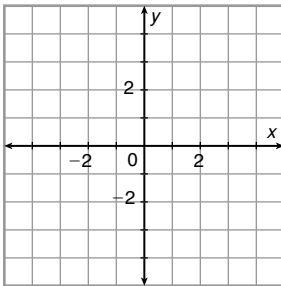
7.  $x^2 + y^2 = 25$



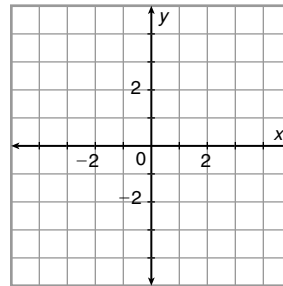
8.  $(x + 2)^2 + (y - 1)^2 = 4$



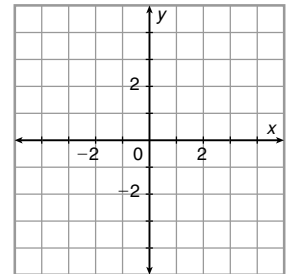
9.  $x^2 + (y + 3)^2 = 1$



10.  $(x - 1)^2 + (y - 1)^2 = 16$



Crater Lake in Oregon is a roughly circular lake. The lake basin formed about 7000 years ago when the top of a volcano exploded in an immense explosion. Hillman Peak, Garfield Peak, and Cloudcap are three mountain peaks on the rim of the lake. The peaks are located in a coordinate plane at  $H(-4, 1)$ ,  $G(-2, -3)$ , and  $C(5, -2)$ .



11. Find the coordinates of the center of the lake.

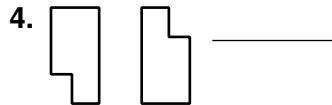
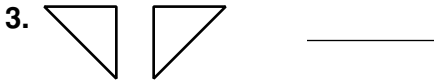
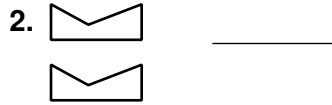
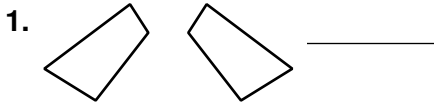
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12. Each unit of the coordinate plane represents  $\frac{3}{5}$  mile. Find the diameter of the lake.

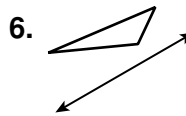
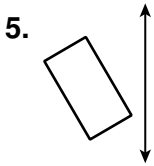
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**LESSON** **Practice B**  
**12-1 Reflections**

Tell whether each transformation appears to be a reflection.

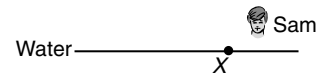


Draw the reflection of each figure across the line.



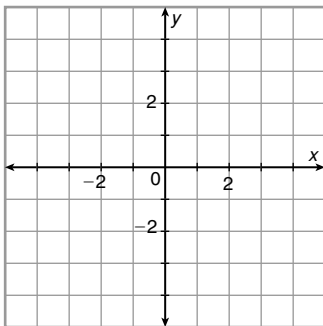
7. Sam is about to dive into a still pool, but some sunlight is reflected off the surface of the water into his eyes. On the figure, plot the exact point on the water's surface where the sunlight is reflected at Sam.

Sun •

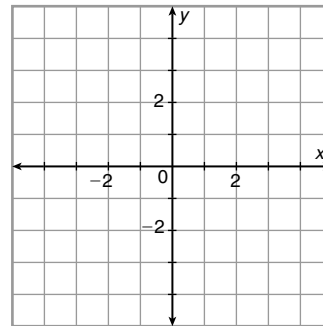


Reflect the figure with the given vertices across the given line.

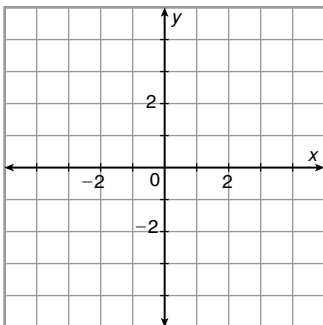
8.  $A(4, 4)$ ,  $B(3, -1)$ ,  $C(1, -2)$ ;  $y$ -axis



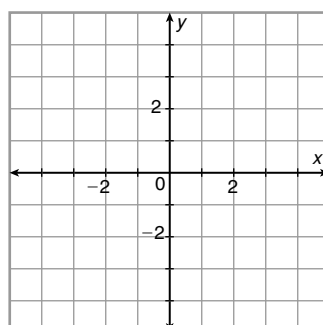
9.  $D(-4, -1)$ ,  $E(-2, 3)$ ,  $F(-1, 1)$ ;  $y = x$



10.  $P(1, 3)$ ,  $Q(-2, 3)$ ,  $R(-2, 1)$ ,  $S(1, 0)$ ;  $x$ -axis



11.  $J(3, -4)$ ,  $K(1, -1)$ ,  $L(-1, -1)$ ,  $M(-2, -4)$ ;  $y = x$

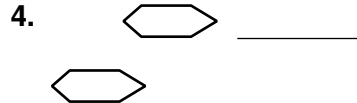


**LESSON**

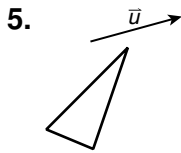
**Practice B**

**12-2** *Translations*

Tell whether each transformation appears to be a translation.

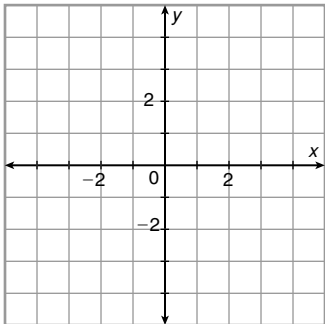


Draw the translation of each figure along the given vector.

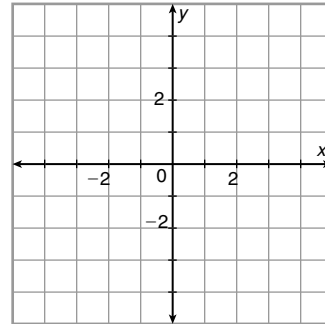


Translate the figure with the given vertices along the given vector.

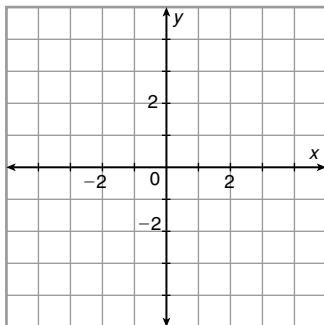
7.  $A(-1, 3), B(1, 1), C(4, 4); \langle 0, -5 \rangle$



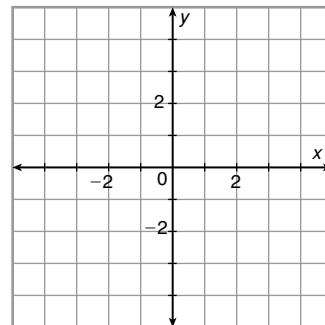
8.  $P(-1, 2), Q(0, 3), R(1, 2), S(0, 1); \langle 1, 0 \rangle$



9.  $L(3, 2), M(1, -3), N(-2, -2); \langle -2, 3 \rangle$



10.  $D(2, -2), E(2, -4), F(1, -4), G(-2, -2); \langle 2, 5 \rangle$

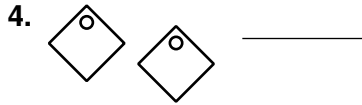
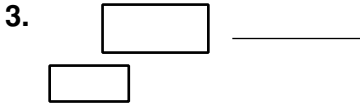
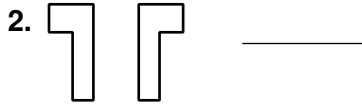


11. A builder is trying to level out some ground with a front-end loader. He picks up some excess dirt at  $(9, 16)$  and then maneuvers through the job site along the vectors  $\langle -6, 0 \rangle$ ,  $\langle 2, 5 \rangle$ , and  $\langle 8, 10 \rangle$  to get to the spot to unload the dirt. Find the coordinates of the unloading point. Find a single vector from the loading point to the unloading point.

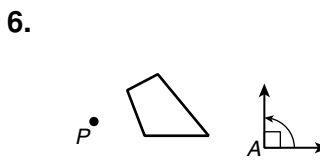
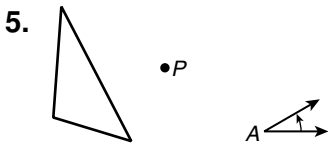


**LESSON** **Practice B**  
**12-3** **Rotations**

Tell whether each transformation appears to be a rotation.



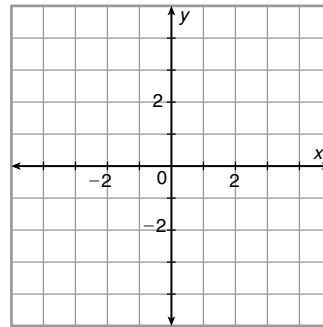
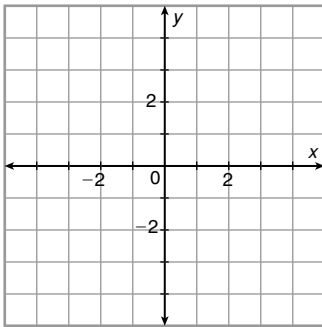
Draw the rotation of each figure about point  $P$  by  $m\angle A$ .



Rotate the figure with the given vertices about the origin using the given angle of rotation.

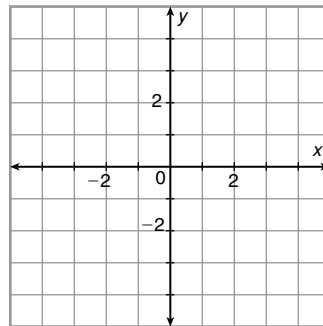
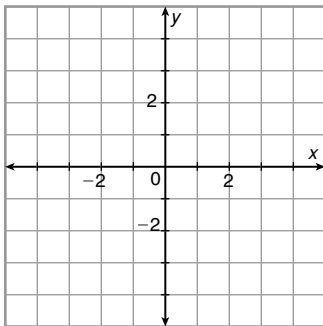
7.  $A(-2, 3), B(3, 4), C(0, 1); 90^\circ$

8.  $D(-3, 2), E(-4, 1), F(-2, -2), G(-1, -1); 90^\circ$



9.  $J(2, 3), K(3, 3), L(1, -2); 180^\circ$

10.  $P(0, 4), Q(0, 1), R(-2, 2), S(-2, 3); 180^\circ$



11. The steering wheel on Becky's car has a 15-inch diameter, and its center is at  $(0, 0)$ . Point  $X$  at the top of the wheel has coordinates  $(0, 7.5)$ . To turn left off her street, Becky must rotate the steering wheel by  $300^\circ$ . Find the coordinates of  $X$  when the steering wheel is rotated. Round to the nearest tenth. (*Hint*: How many degrees short of a full rotation is  $300^\circ$ ?) \_\_\_\_\_

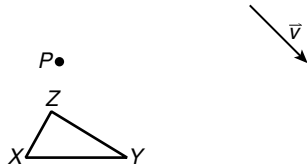
**LESSON**

**Practice B**

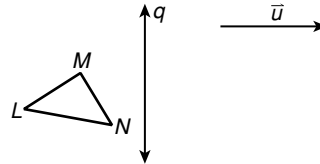
**12-4 Compositions of Transformations**

Draw the result of each composition of isometries.

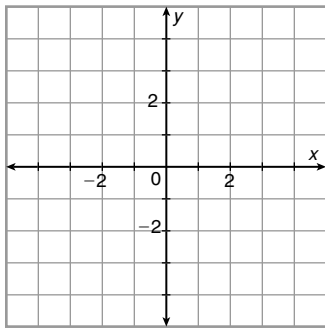
1. Rotate  $\triangle XYZ$   $90^\circ$  about point  $P$  and then translate it along  $\vec{v}$ .



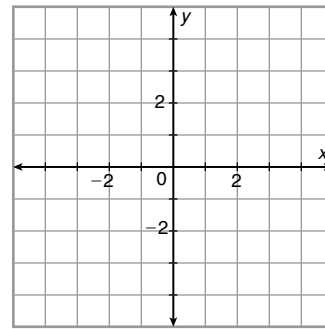
2. Reflect  $\triangle LMN$  across line  $q$  and then translate it along  $\vec{u}$ .



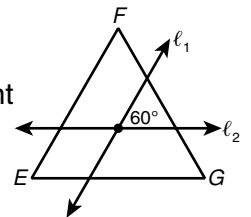
3.  $ABCD$  has vertices  $A(-3, 1)$ ,  $B(-1, 1)$ ,  $C(-1, -1)$ , and  $D(-3, -1)$ . Rotate  $ABCD$   $180^\circ$  about the origin and then translate it along the vector  $\langle 1, -3 \rangle$ .



4.  $\triangle PQR$  has vertices  $P(1, -1)$ ,  $Q(4, -1)$ , and  $R(3, 1)$ . Reflect  $\triangle PQR$  across the  $x$ -axis and then reflect it across  $y = x$ .



5. Ray draws equilateral  $\triangle EFG$ . He draws two lines that make a  $60^\circ$  angle through the triangle's center. Ray wants to reflect  $\triangle EFG$  across  $\ell_1$  and then across  $\ell_2$ . Describe what will be the same and what will be different about the image of  $\triangle E''F''G''$  compared to  $\triangle EFG$ .



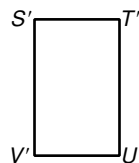
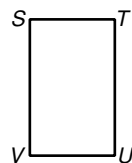
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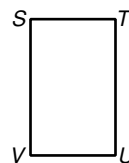
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Draw two lines of reflection that produce an equivalent transformation for each figure.

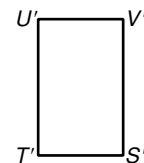
6. translation:  $STUV \rightarrow S'T'U'V'$



7. rotation with center  $P$ :  $STUV \rightarrow S'T'U'V'$



$P$

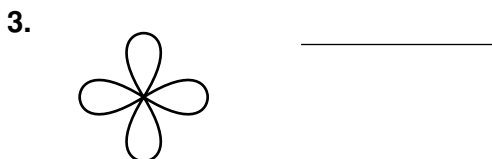
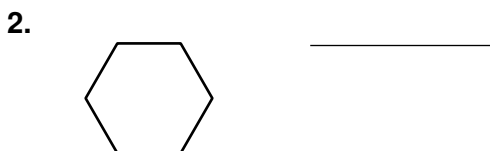
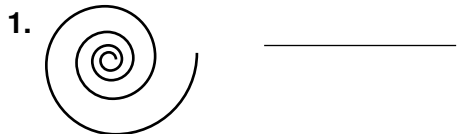


**LESSON**

**Practice B**

**12-5** *Symmetry*

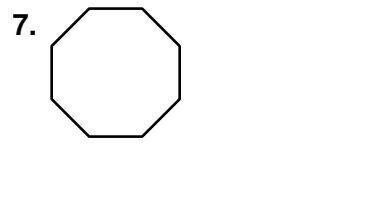
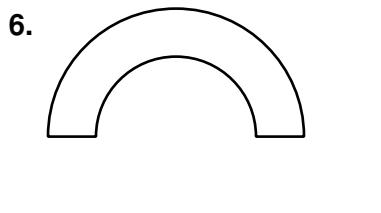
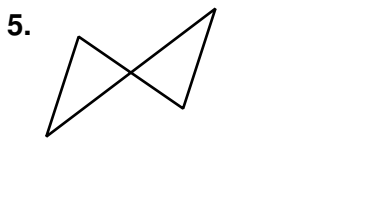
Tell whether each figure has line symmetry. If so, draw all lines of symmetry.



4. Anna, Bob, and Otto write their names in capital letters. Draw all lines of symmetry for each whole name if possible.

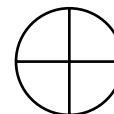
ANNA BOB OTTO

Tell whether each figure has rotational symmetry. If so, give the angle of rotational symmetry and the order of the symmetry.

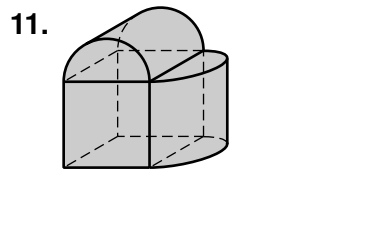
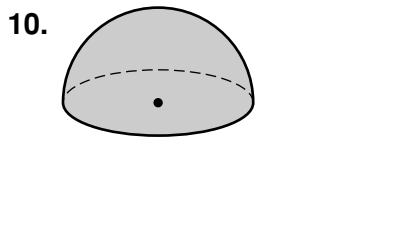
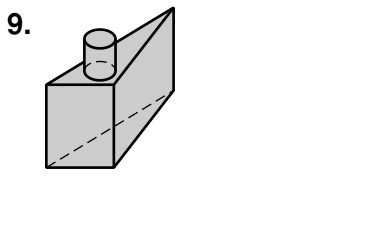


8. This figure shows the Roman symbol for Earth. Draw all lines of symmetry. Give the angle and order of any rotational symmetry.

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Tell whether each figure has plane symmetry, symmetry about an axis, both, or neither.

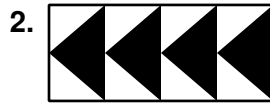


**LESSON**  
**12-6** **Practice B**  
*Tessellations*

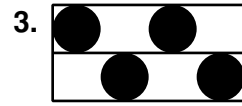
Tell whether each pattern has translation symmetry, glide reflection symmetry, or both.



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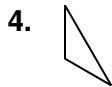


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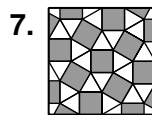
Use the given figure to create a tessellation.



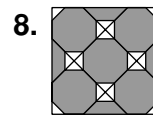
Classify each tessellation as regular, semiregular, or neither.



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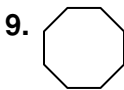


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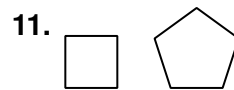
Determine whether the given regular polygon(s) can be used to form a tessellation. If so, draw the tessellation.



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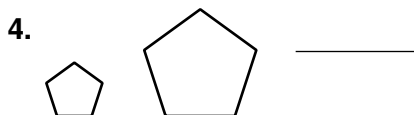
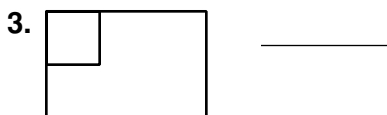
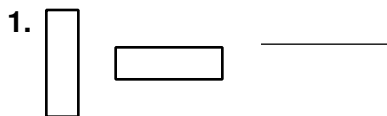
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**LESSON** **Practice B**  
**12-7** **Dilations**

Tell whether each transformation appears to be a dilation.



Draw the dilation of each figure under the given scale factor with center of dilation *P*.

5. scale factor:  $\frac{1}{2}$



*P*•

6. scale factor:  $-2$

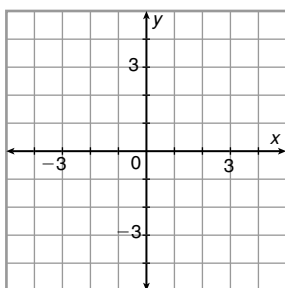


*P*•

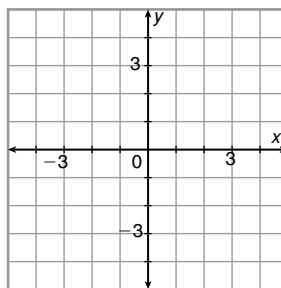
7. A sign painter creates a rectangular sign for Mom's Diner on his computer desktop. The desktop version is 12 inches by 4 inches. The actual sign will be 15 feet by 5 feet. If the capital *M* in "Mom's" will be 4 feet tall, find the height of the *M* on his desktop version. \_\_\_\_\_

Draw the image of the figure with the given vertices under a dilation with the given scale factor centered at the origin.

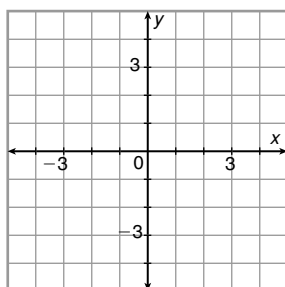
8.  $A(2, -2), B(2, 3), C(-3, 3), D(-3, -2)$ ;  
 scale factor:  $\frac{1}{2}$



9.  $P(-4, 4), Q(-3, 1), R(2, 3)$ ;  
 scale factor:  $-1$



10.  $J(0, 2), K(-2, 1), L(0, -2), M(2, -1)$ ;  
 scale factor: 2



11.  $D(0, 0), E(-1, 0), F(-1, -1)$ ;  
 scale factor:  $-2$

