Name _____ Date _____ Class _____

Additional Practice

Investigation 1

Looking for Pythagoras

For Exercises 1–3, refer to the map on the following page.

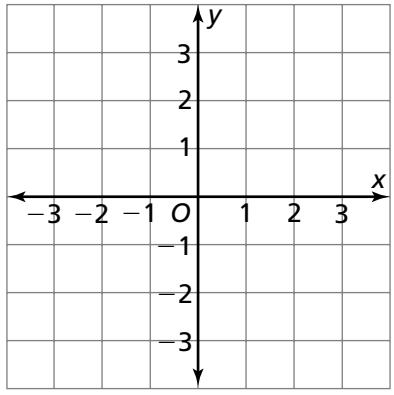
1. Which landmarks are 5 blocks apart by car?

2. The taxi stand is 5 blocks by car from the hospital and 5 blocks by car from the police station. Give the coordinates of the taxi stand.

3. The airport is halfway between City Hall and the hospital by helicopter. Give the coordinates of the airport.

4. Let a right triangle with vertices at $(0, 0)$, $(1, 0)$ and $(0, 1)$ be the unit for measuring area in the following questions.

a. Draw a square with vertices $(0, 1)$, $(1, 0)$, $(0, -1)$, and $(-1, 0)$. What is the area of this square in the triangle units described above?



b. Draw a square around the square you made in part (a) with two of the vertices at $(1, 1)$ and $(-1, 1)$. What are the other two vertices? What is the area of this square in triangle units?

c. Draw the square of the next size. One of its vertices is $(0, -2)$. What are the other three vertices? What is the area of this square in triangle units?

d. What are the four vertices of the square of the next size? What is its area in triangle units?

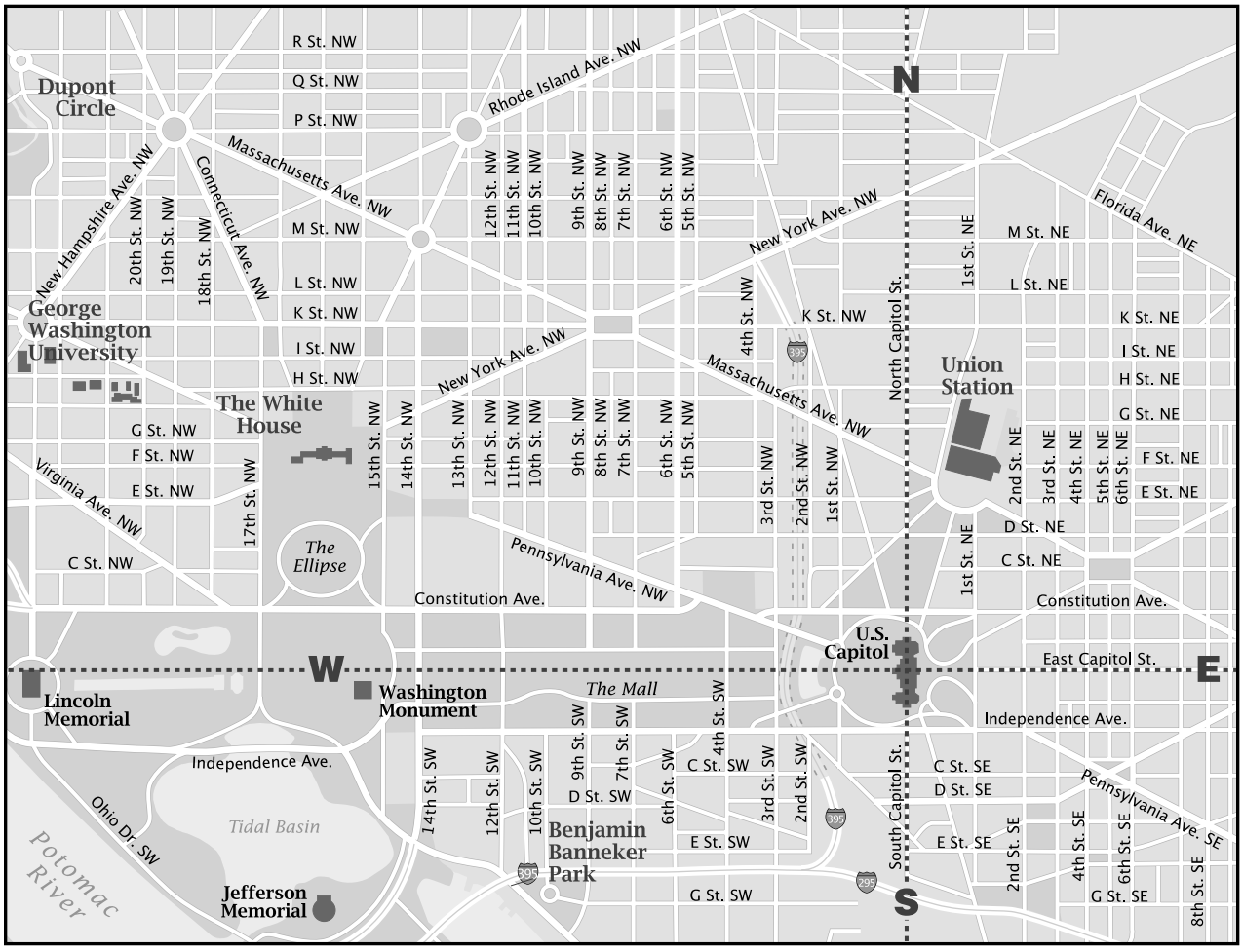
e. What do you notice about the areas of the squares, as the squares get larger?

Name _____ Date _____ Class _____

Additional Practice *(continued)*

Investigation 1

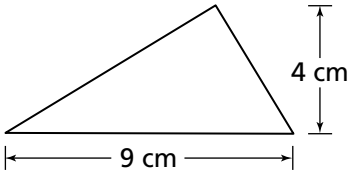
Looking for Pythagoras



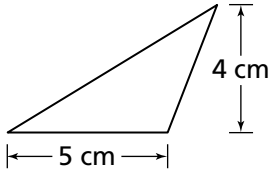
Additional Practice *(continued)*

For Exercises 5–10, use the given lengths to find the area of each figure. Show your calculations. Record which formulas you can use as part of your reasoning.

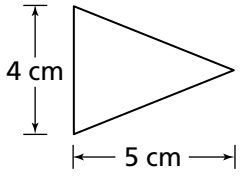
5.



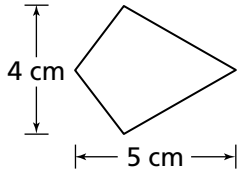
6.



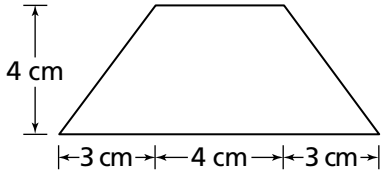
7.



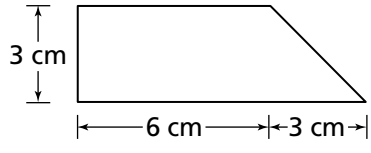
8.



9.



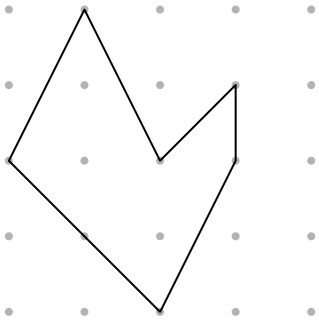
10.



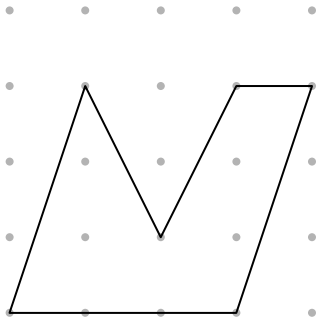
Additional Practice *(continued)*

For Exercises 11–14, find the area of the figure. Explain our reasoning.

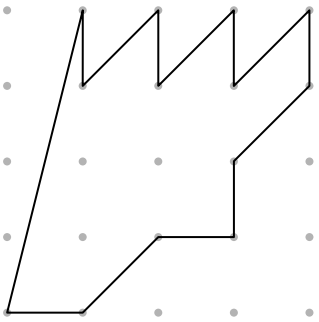
11.



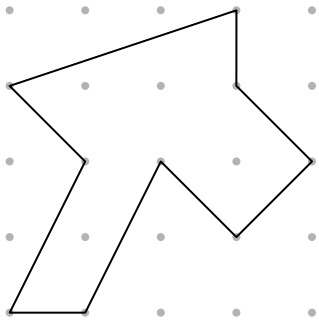
12.



13.



14.



Name _____ Date _____ Class _____

Skill: Graphing Equations

Investigation 1

Looking for Pythagoras

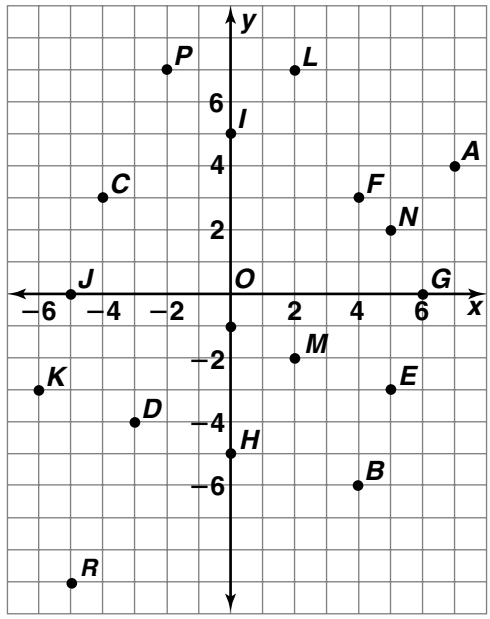
Name the coordinates of each point in the graph.

1. J **2.** R

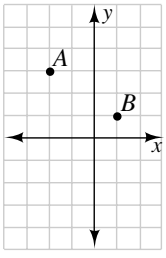
3. K **4.** M

5. I **6.** P

7. N **8.** L



9. Arnie plotted points on the graph below. He placed his pencil point at A. He can move either right or down any number of units until he reaches point B. In how many ways can he do this?



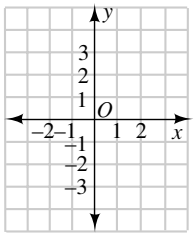
10. Marika had to draw $\triangle ABC$ that fit several requirements.

a. It must fit in the box shown.

b. The side $\overline{AB}$ has coordinates $A(-2, 0)$ and $B(2, 0)$.

c. Point C must be on the y-axis.

Name all the points that could be point C.



Name _____ Date _____ Class _____

Additional Practice

Investigation 2

Looking for Pythagoras

In Problem 2.3, you found the lengths of line segments drawn on 5-dot-by-5-dot grids. Some of those lengths were written as square roots, such as $\sqrt{2}$. When you enter $\sqrt{2}$ in your calculator, the result is a decimal with a value of approximately 1.4.

For Exercises 1–6, find the approximate value for the given length to the nearest tenth.

1. $\sqrt{5}$

2. $\sqrt{13}$

3. $\sqrt{20}$

4. $\sqrt{17}$

5. $\sqrt{2} + \sqrt{5}$

6. $\sqrt{8} + 6 + \sqrt{10}$

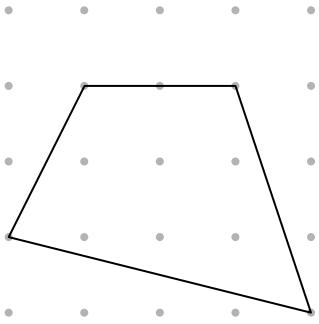
7. Is $\sqrt{8} + \sqrt{10}$ the same as $\sqrt{8 + 10}$? Explain your answer in two ways:

a. Use your calculator to help give a numerical argument.

b. Use a grid and lengths of line segments to give a geometric argument.

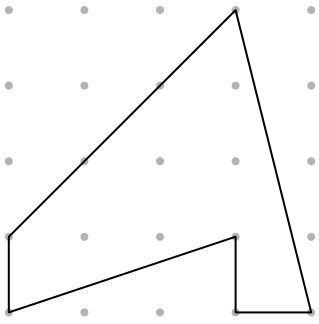
Additional Practice *(continued)*

For Exercises 8–10, find the perimeter of each figure. Express the perimeter in two ways: as the sum of a whole number and square roots, and as a single value after using decimal approximations to the nearest tenth for the square roots. An example is done for you.



The perimeter of this figure is
$2 + \sqrt{10} + \sqrt{17} + \sqrt{5} \approx$
$2 + 3.2 + 4.1 + 2.2 =$
11.5 units

8.



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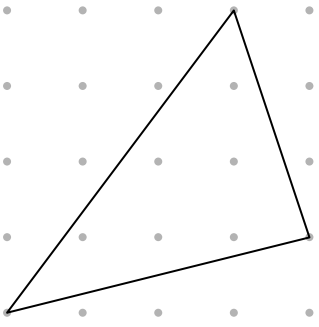
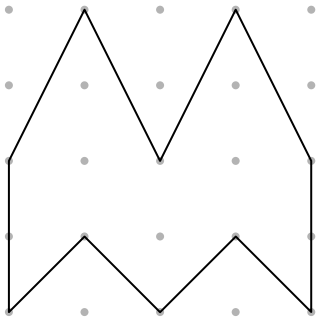


10.



Additional Practice *(continued)*

11. For each number sentence below, decide if it is true (T) or false (F):

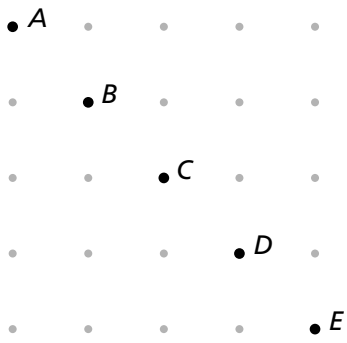
a. $7 = \sqrt{49}$

b. $7 = -\sqrt{49}$

c. $-7 = \sqrt{49}$

d. $-7 = -\sqrt{49}$

12. Points A, B, C, D, and E are shown on the grid below:



Using these 5 points only, list all line segments which have the following lengths:

$\sqrt{2}$

$2\sqrt{2}$

$3\sqrt{2}$

$4\sqrt{2}$

$5\sqrt{2}$

13. List all the whole numbers that could be substituted for x so that the expression is true.

a. $4 < \sqrt{x} < 5$

b. $8 < \sqrt{x} < 9$

c. $0 < \sqrt{x} < 1$

Name _____ Date _____ Class _____

Skill: Exponents and Square Roots

Investigation 2

Looking for Pythagoras

Find the value of each square root.

1. $\sqrt{64}$ **2.** $\sqrt{81}$ **3.** $\sqrt{100}$ **4.** $\sqrt{144}$

Find the length of the side of a square with the given area.

5. 121 ft^2 **6.** 4 mi^2

7. 225 $in.^2$ **8.** 196 yd^2

Find two consecutive whole numbers that each number is between.

9. $\sqrt{80}$ **10.** $\sqrt{56}$

11. $\sqrt{130}$ **12.** $\sqrt{150}$

13. $\sqrt{70}$ **14.** $\sqrt{190}$

15. $\sqrt{204}$ **16.** $\sqrt{159}$

Estimate each square root to one decimal place.

17. $\sqrt{18}$ **18.** $\sqrt{24}$

19. $\sqrt{50}$ **20.** $\sqrt{8}$

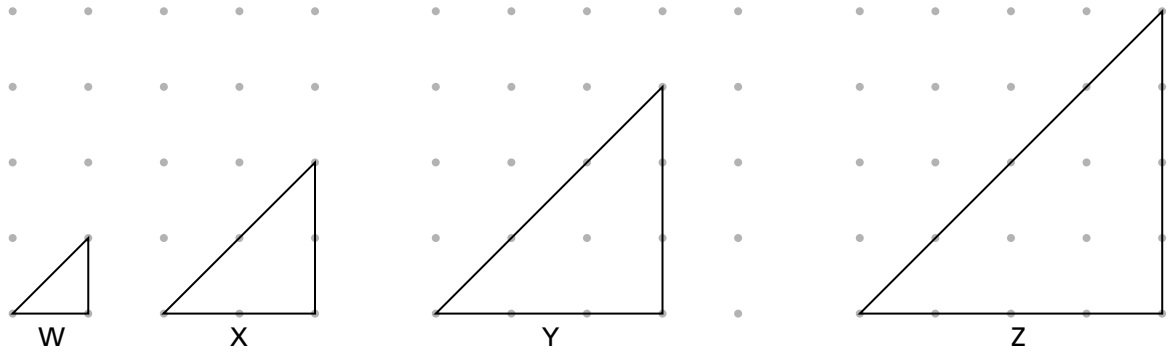
Name _____ Date _____ Class _____

Additional Practice

Investigation 3

Looking for Pythagoras

1. a. Find the length of the hypotenuse of each triangle.



b. How are the hypotenuse lengths in figures X, Y, and Z related to the hypotenuse length in figure W?

2. Draw a right triangle with a hypotenuse length of $\sqrt{5}$.

3. Draw a right triangle with a hypotenuse length of $2\sqrt{5}$.

4. Draw a right triangle with a hypotenuse length of $3\sqrt{5}$.

Additional Practice *(continued)*

5. Give the coordinates of two points on a coordinate grid that are $\sqrt{10}$ apart.

6. Give the coordinates of two points that are $\sqrt{13}$ apart.

7. Give the coordinates of two points that are $\sqrt{32}$ apart.

8. Give the coordinates of two points that are $7\sqrt{2}$ apart.

9. Give the coordinates of a point on a coordinate grid that is a distance of $\sqrt{5}$ from point $(1, 3)$.

10. Give the coordinates of a point that is a distance of $\sqrt{17}$ from point $(0, -5)$.

11. Give the coordinates of a point that is a distance of $2\sqrt{5}$ from point $(-10, -2)$.

12. Give the coordinates of a point that is a distance of $3\sqrt{5}$ from point $(8, -2)$.

13. What is the length of the line segment that connects points $(0, 0)$ and $(4, 2)$?

14. What is the length of the line segment that connects points $(0, 0)$ and $(2, 4)$?

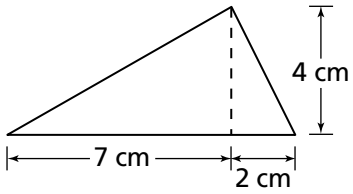
15. What is the length of the line segment that connects points $(-2, 0)$ and $(0, 2)$?

16. What is the length of the line segment that connects points $(0, -3)$ and $(3, 3)$?

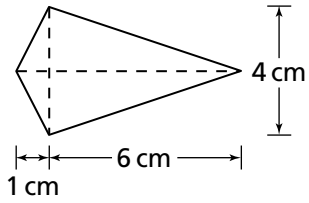
Additional Practice *(continued)*

For Exercises 17–19, find the perimeter of the figure to the nearest tenth of a centimeter.

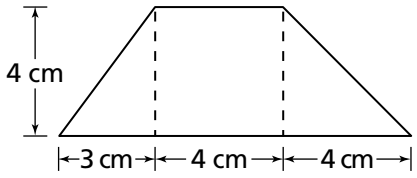
17.



18.



19.



For Exercises 20–23, use the map in Additional Practice, Investigation 1 to find the distance by helicopter between the two landmarks. Explain how you found the distance.

20. the greenhouse and the police station

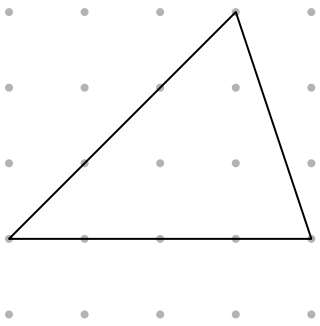
21. the police station and the art museum

22. the greenhouse and City Hall

23. City Hall and the animal shelter

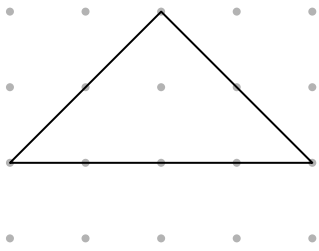
Additional Practice *(continued)*

For Exercises 24–26, find the perimeter of the right triangle. Express the perimeter as the sum of a whole number and square roots and as a single value using decimal approximations to the nearest tenth for the square roots. An example is done for you.

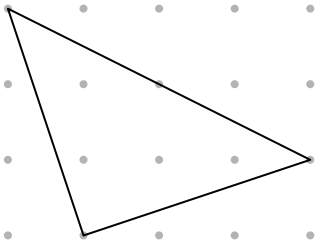


The perimeter of this figure is
$4 + \sqrt{10} + \sqrt{18} \approx 2 + 3.2 + 4. = 9.4$ units

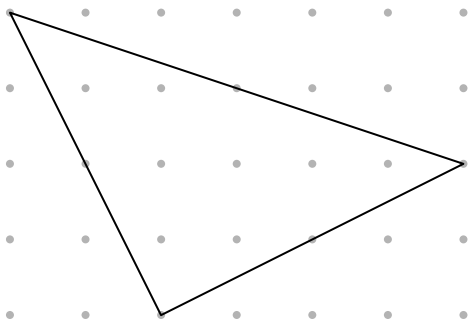
24.



25.



26.



Name _____ Date _____ Class _____

Skill: Using the Pythagorean Theorem

Investigation 3

Looking for Pythagoras

Can you form a right triangle with the three lengths given? Show your work.

1. $20, 21, 29$

2. $7, 11, 12$

3. $10, 2\sqrt{11}, 12$

4. $28, 45, 53$

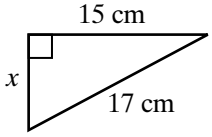
5. $9, \sqrt{10}, 10$

6. $10, 15, 20$

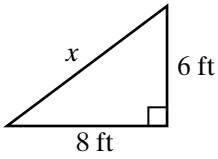
Skill: Using the Pythagorean Theorem *(continued)*

Use the Pythagorean theorem to find the missing side of each right triangle.

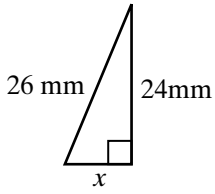
7.



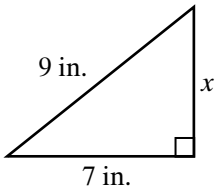
8.



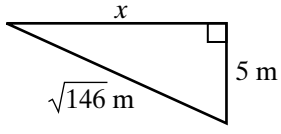
9.



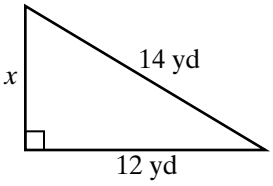
10.



11.



12.



Name _____ Date _____ Class _____

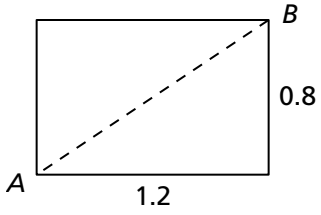
Additional Practice

Investigation 4

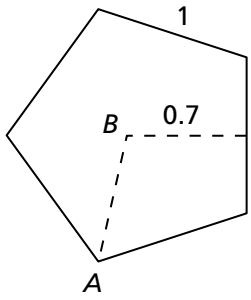
Looking for Pythagoras

Find the length of AB to the nearest hundredth centimeter. All measurements are in centimeters, but figures may be drawn to different scales. Explain your reasoning.

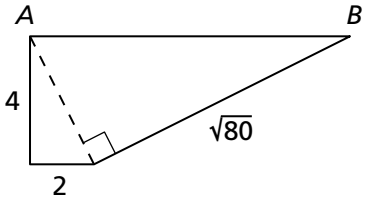
1.



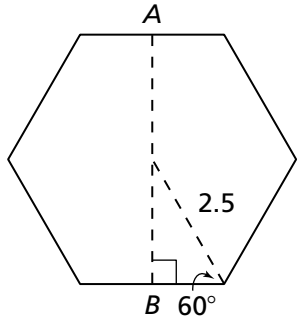
2. This is a regular pentagon.



3.



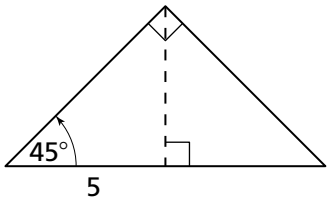
4. This is a regular hexagon.



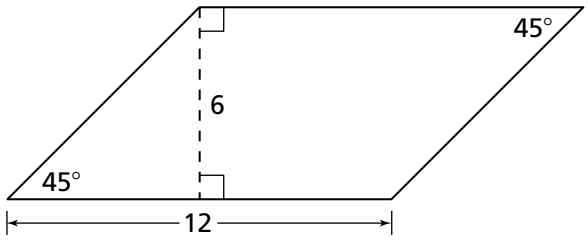
Additional Practice *(continued)*

For Exercises 5–8, find the perimeter of the figure to the nearest tenth centimeter. All measurements are in centimeters, but figures may not be to scale.

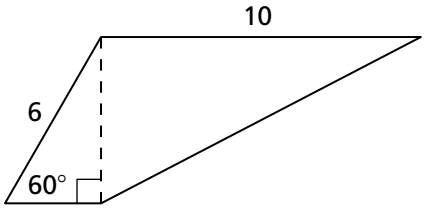
5.



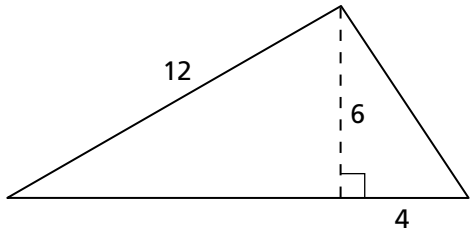
6.



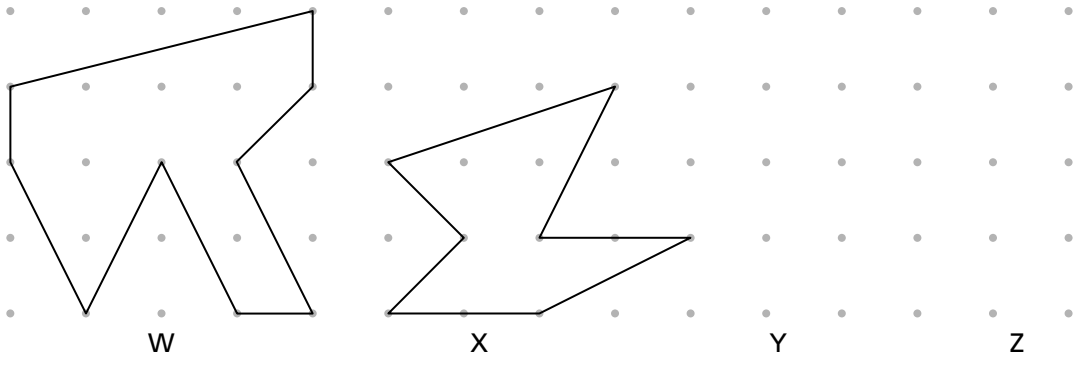
7.



8.



9. a. Find the areas of figures W and X. Describe the method you use.



b. On the above grid, draw two different figures Y and Z, each with an area of $7\frac{1}{2}$ square units.

Additional Practice *(continued)*

Sketch the triangle described, and label the three side lengths.

10. Two of the sides in this isosceles right triangle measure $\sqrt{18}$ and 3.

11. Two of the sides in this isosceles right triangle measure $\sqrt{52}$ and $\sqrt{26}$.

For Exercises 12–17, a pair of lengths is given. What third length could be used with the other two lengths to make a right triangle?

Try to solve each problem two ways:

(1) let the missing value be the length of one of the legs of the triangle and

(2) let the missing value be the length of the hypotenuse of the triangle.

Sketch each triangle you find, and label the side lengths.

12. 9, 15, and ☐

13. $\sqrt{45}$, 3, and ☐

14. $\sqrt{50}$, 5, and ☐

15. $\sqrt{18}$, 3, and ☐

16. 8, $\sqrt{18}$, and ☐

17. $\sqrt{52}$, $\sqrt{26}$, and ☐

Name _____ Date _____ Class _____

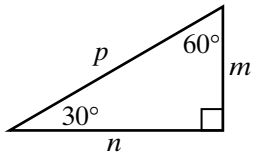
Skill: Special Right Triangles

Investigation 4

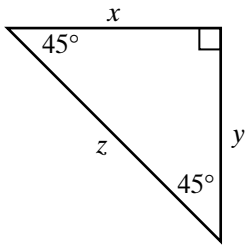
Looking for Pythagoras

The length of one side of the triangle is given in each row of the table. Find the missing lengths for that triangle.

	m	*n*	*p*
1.	14		
2.			36
3.		$9\sqrt{3}$	
4.	5		



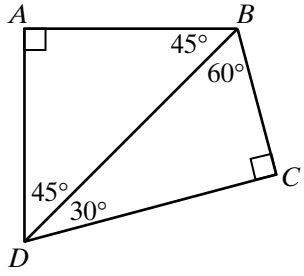
	x	*y*	*z*
5.	11		
6.		8.7	
7.			$7\sqrt{2}$
8.	17		



In the figure, $BD = 6\sqrt{2}$. Find each value.

9. AB

10. AD



11. BC

12. CD