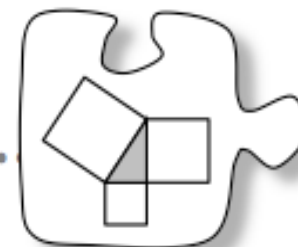# 9.2.5 How can I find missing parts?

Applications of the Pythagorean Theorem

Common Core Standard: 8.G.7, 8.G.8

Guiding Questions

Think about these questions throughout this chapter:

How are they related?

Can I make a triangle?

What if it is a right triangle?

What do I know about this triangle?

Is the triangle a right triangle?

Who is Pythagoras?

CPM Materials modified by Mr. Deyo

Title: IM8 - Ch. 9.2.5 How Can I Find The Missing Parts?   **Date:**

Learning Target

By the end of the period, I will apply the Pythagorean Theorem to problems in a variety of two-dimensional, real-world contexts.

I will demonstrate this by completing Four-Square notes and by solving problems in a pair/group activity.

Home Work: Sec. 9.2.5

Desc.   Date Due

Review & Preview

   4 Problems   9-129, 9-130, 9-131, 9-133

COLLABORATIVE LEARNING EXPECTATIONS

Working with other students allows you to:
- Develop new ways of thinking about mathematics,
- Learn to communicate about math, and
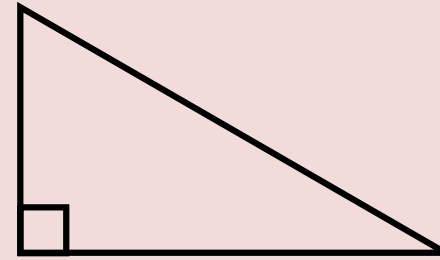- Understand ideas better by having to explain your thinking to others.

The following expectations will help you get the most out of working together.

T   Together, work to answer questions.

E   Explain and give reasons.

A   Ask questions and share ideas.

M   Members of your team are your first resource.

S   Smarter together than apart.

Vocabulary

1) **right triangle**

2) **leg(s)**
   **(a & b)**

3) **hypotenuse**
   (c)

4) **Pythagorean Theorem**
   $$a^2 + b^2 = c^2$$

Sketch

DAY 2
1. Review word
   ◆ Friendly Definition
   ◆ Physical Representation

2. Draw a sketch

Friendly Definition

DAY 1
1. Use Visuals

2. Introduce the word
   ◆ Friendly Definition
   ◆ Physical Representation

3. Use Cognates

4. Write friendly definition

5. Physical Representation

Word List
1.
2.
3.
4.

Wordwork

DAY 3 and/or DAY 4
1. Review the word
   ◆ Friendly Definition
   ◆ Physical Representation

2. Show how the word works
   ◆ Synonyms/antonym
   ◆ Word Problems
   ◆ Related words/phrases
   ◆ Example/non-example

Sentence

DAY 5
1. Review the word
   ◆ Friendly definition
   ◆ Physical Representation

3. Write a sentence
   ✓ at least 2 rich words (1 action)
   ✓ correct spelling
   ✓ correct punctuation
   ✓ correct subject/predicate agreement
   ✓ clear and clean writing

Vocabulary Acquisition

9.2.5 How Can I Find Missing Parts?   In this section, you have studied different properties of triangles. You have used the Pythagorean Theorem to describe the special relationship between the sides of a right triangle. In this lesson, you will use these ideas to solve a variety of different problems.

9-122   Ann is measuring some fabric pieces for a quilt. Use the Pythagorean Theorem and your calculator to help her find each of the missing lengths below. Decide whether each answer is rational or irrational. If it is rational, explain whether the decimal repeats or terminates.

a)

32 in.

24 in.

b)

10 m

20 m

c)

7.6 cm

9.5 cm
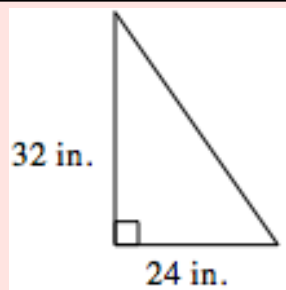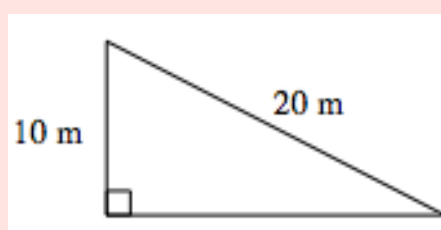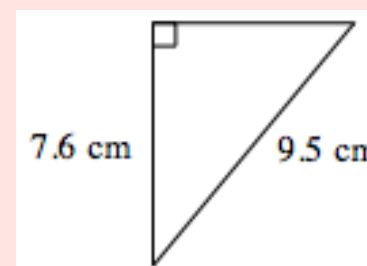
9-123. Coach Kelly's third-period P.E. class is playing baseball. The distance between each base on the baseball diamond is 90 feet. Lisa, at third base, throws the ball to Dano, at first base.
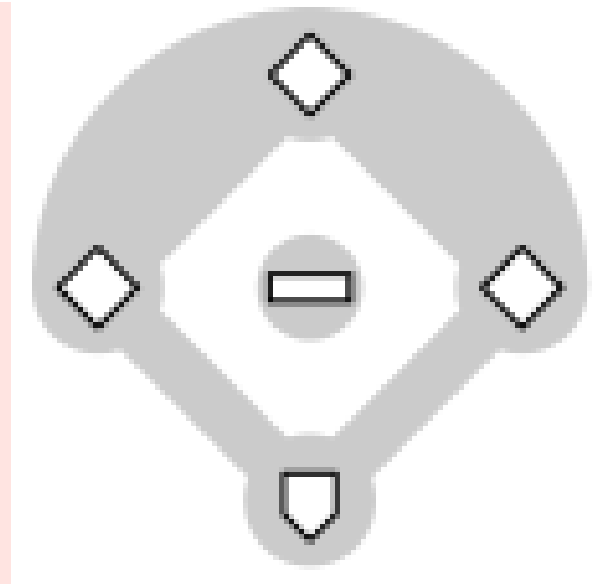
How far did she throw the ball? State whether your answer is rational or irrational.

9-124. As the city planner of Right City, you are responsible to report information to help the Board of Supervisors make decisions about the budgets for the fire and police departments. The board has asked for a report with answers to the following questions. Each grid unit in the figure at right represents 1 mile.

a) For fire safety, bushes will be cleared along the perimeter of the city. **What is the length of the perimeter?** Include all of your calculations in your report.
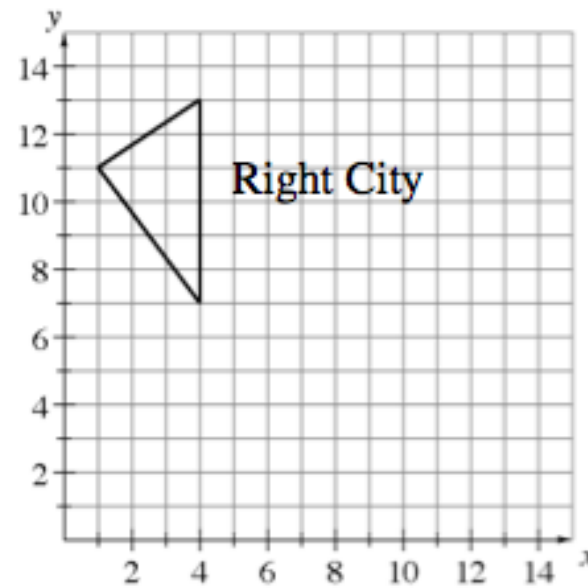
b) Some people say that Right City got its name from its shape. Is the shape of the city a right triangle? Show how you can tell.

9-125. Clem and Clyde have a farm with three different crops: a square field of corn, a rectangular field of artichokes, and a right-triangle grove of walnut trees (as shown at right). A fence totally surrounds the farm. **Find the total area of Clem and Clyde's land in square miles and tell them how much fencing they need to enclose the outside of their farm.**

1 mi

1.2 mi

1.2 mi   1.6 mi
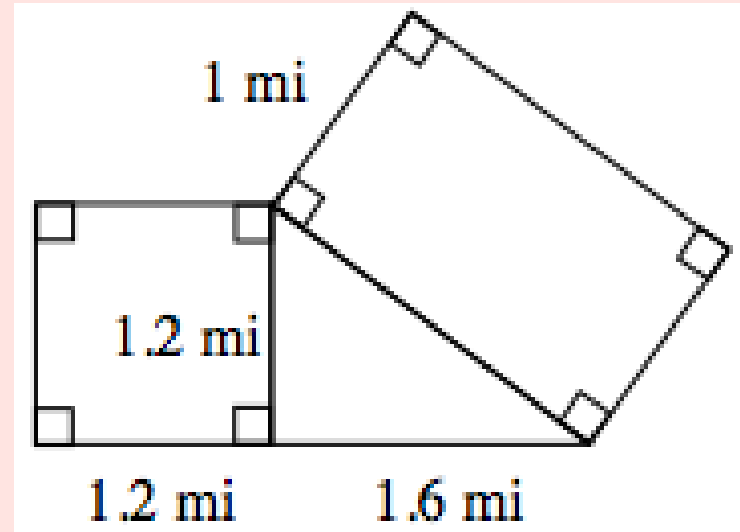
They need _____ of fencing to enclose the outside of their farm.

9-126   Scott and Mark are rock climbing. Scott is at the top of a 75-foot cliff, when he throws a 96-foot rope down to Mark, who is on the ground below. If the rope is stretched tightly from Mark's feet to Scott's feet, **how far from the base of the cliff (directly below Scott) is Mark standing?**

Draw a diagram and label it.	Then find the **missing length**. Is the length irrational?

9-127. Nicole has three long logs. She wants to place them in a triangle around a campfire to allow people to sit around the fire. **The logs have lengths 19, 11, and 21 feet.**

a) Can she form a triangle with these lengths? If so, what type of triangle (acute, obtuse, or right) will the logs form? Justify your answers.

b) Nicole realized she wrote the numbers down incorrectly. Her logs are actually **9, 11, and 21** feet. **Will she still be able to surround her campfire with a triangular seating area?** If so, will the shape be a right triangle? Justify.

9-128. LEARNING LOG   "Pythagorean Theorem"   DATE _____

The Pythagorean Theorem describes the special relationship that exists between the side lengths of a right triangle. In your Learning Log, describe how the Pythagorean Theorem can be used to find a missing side length on a right triangle. Make up examples in which either the hypotenuse length is missing or a leg length is missing. Be sure to include pictures and describe how you would find each missing length.

9-129. On a coordinate grid, draw a triangle with vertices at (2, 6), (2, 2), and (5, 6).

Review & Preview

a) Find the lengths of each side of the triangle.
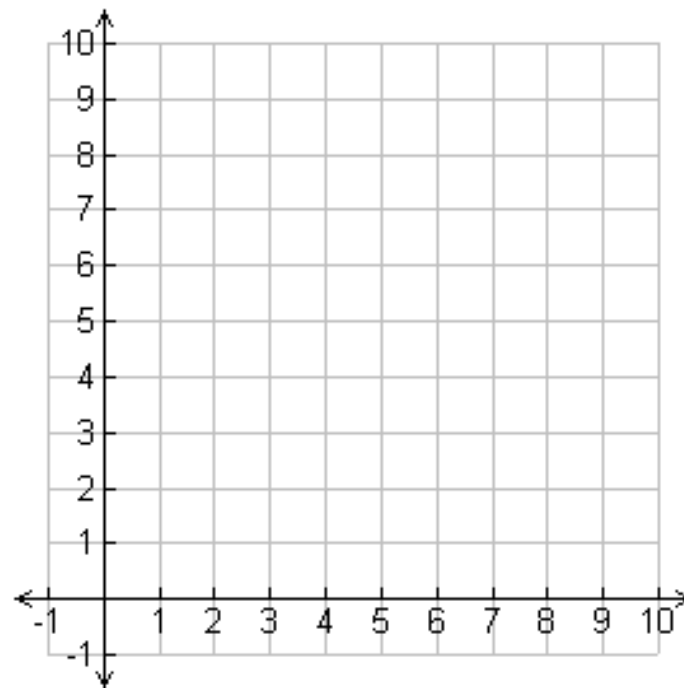
What is the perimeter?

b) What type of triangle is formed by these points? Justify your answer.

9-130. Ann lives on the shoreline of a large lake. A market is located 24 km south and 32 km west of her home on the other side of the lake. If she takes a boat across the lake directly toward the market, how far is her home from the market?

Review & Preview

9-131. Change each number below from a decimal to an equivalent fraction. For help with the repeating decimals, review the Math Notes box from Lesson 9.2.4.

Review & Preview

a)

$$0.7 = \underline{\qquad}$$

b)

$$0.\overline{7} = \underline{\qquad}$$

c)

$$0.15 = \underline{\qquad}$$

d)

$$0.\overline{15} = \underline{\qquad}$$

9-132a,b. Simplify each of the following expressions.

a)

$$3\frac{1}{5} \cdot \frac{7}{4}$$

b)

$$5^3 \cdot \left(-\frac{4}{5}\right)$$

9-132c,d. Simplify each of the following expressions.

c)

$$2^4 \cdot \frac{5}{8}$$

d)

$$-\frac{1}{2} \cdot 3^2$$

9-132e,f. Simplify each of the following expressions.

e) $$-\frac{5}{6}+\left(\frac{1}{2}\right)^2$$

f) $$\left(-\frac{4}{5}\right)^2-\frac{3}{50}$$

9-132g,h. Simplify each of the following expressions.

g) $\left(\dfrac{3}{10}\right)^2 - \left(-\dfrac{2}{5}\right)^2$

h) $8^2\left(-\dfrac{7}{8}\right) - \dfrac{1}{2}$

9-133. Simplify each numerical expression.

a) $(3x)^4 x^3$

b) $\dfrac{2^4 \cdot 3}{2^3 \cdot 3^2}$

c) $4^{-3} \cdot 4^2$

d*) $|5 - 6| - |6 + 1|$

9-134. Identify the type of growth in each table below as linear or non-linear.

Review & Preview

a)

x	-2	-1	0	1	2	3
y	-8	-1	0	1	8	27

linear

non-linear

b)

x	-2	-1	0	1	2	3
y	4	6	8	10	12	14

linear

non-linear

c)

x	-2	-1	0	1	2	3
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

linear

non-linear