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MAKING & USING A STUDY GUIDE

Study Guide Exam-4: Using Similar Triangles

Study Guide: helps you ① summarize,
② visualize, and analyze ③
concepts learned in class

* Warning: simply making a study guide
does not guarantee you an
A+ on the test.

1

The picture shows a person taking a pinhole photograph of himself. Light entering the opening reflects his image on the wall, forming similar triangles. What is the height of the image to the nearest inch?

First, we need to convert the feet into inches.

$$5 \text{ ft. } 4. \text{ in} = 64 \text{ in.}$$

$$4 \text{ ft. } 9 \text{ in} = 57 \text{ in.}$$

$$\frac{\text{Height of the Boy}}{\text{Height TV}} = \frac{\text{Distance to Boy}}{\text{Distance in TV}}$$

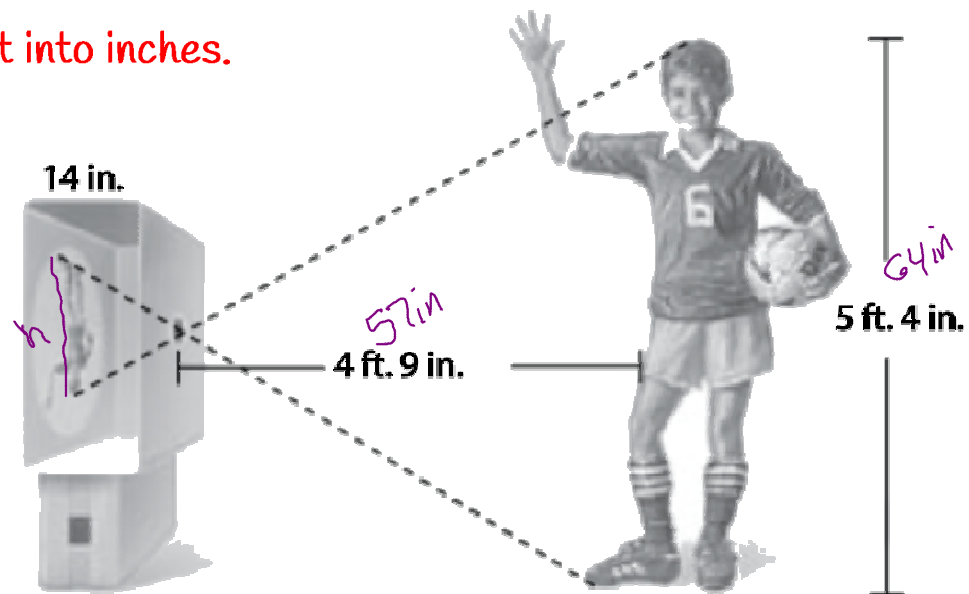
$$\frac{64}{h} = \frac{57}{14}$$

$$57h = 14(64)$$

$$h = \frac{896}{57}$$

$$h = 15.71$$

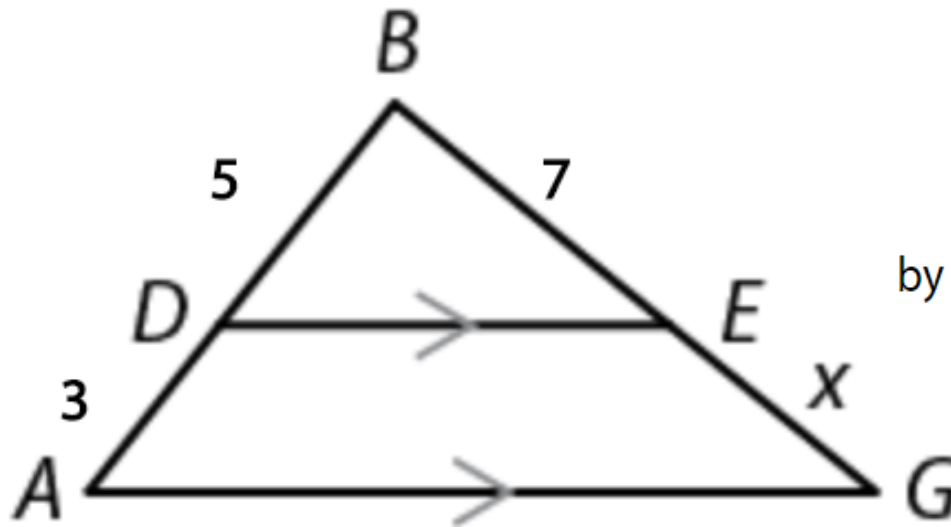
$$h \approx 16$$



The height of the image is about **16** inches tall.

2

Find the missing length. If needed, round to the nearest tenth.

The value of x is 4.2.It is given that $\overline{DE} \parallel \overline{AG}$,

$$\text{so } \frac{DB}{AD} = \frac{EB}{GE}$$

by the Triangle Proportionality Theorem.

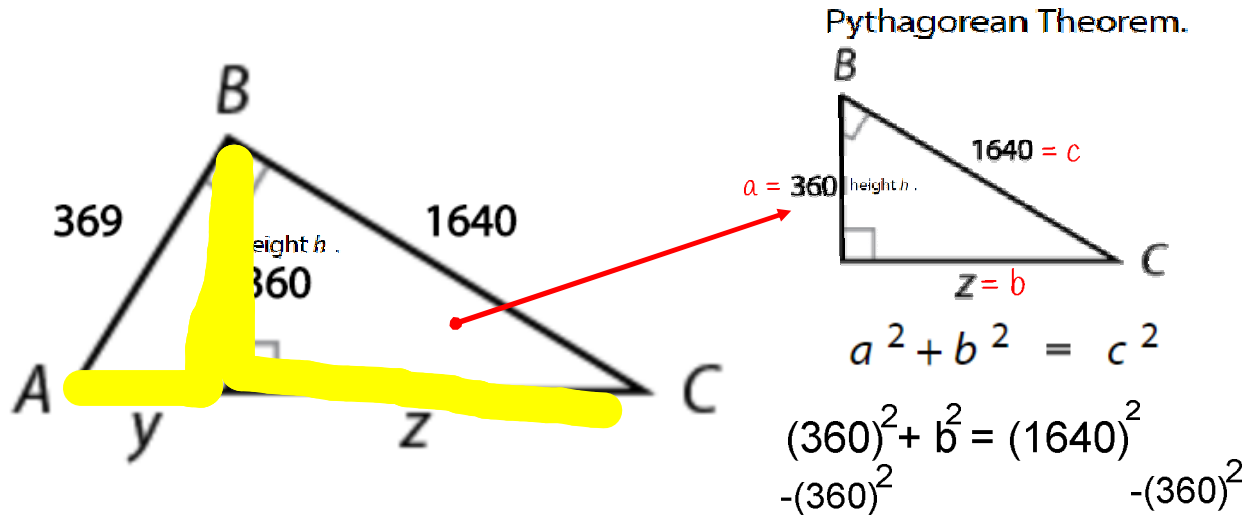
$$\frac{5}{3} = \frac{7}{x}$$

$$5x = 21$$

$$x = \frac{21}{5}$$

$$4.2 = x$$

- 3 Find the missing lengths.
If needed, round the answers to the nearest tenth.



The value of y is .

The value of z is .

$$\frac{y}{h} = \frac{h}{z}$$

$$\frac{y}{360} = \frac{360}{1600}$$

$$360^2 = 1600y$$

$$\frac{360^2}{1600} = y$$

$$y = 81$$

4

On the map, 1st Street and 2nd Street are parallel. What is the distance from City Hall to 2nd Street along Cedar Road? Enter your answer as a decimal rounded to the nearest tenth.

$$\frac{2.1}{x} = \frac{2.8}{2.4}$$

$$2.8x = (2.1) \cdot 2.4$$

$$x = \frac{5.04}{2.8}$$

$$x = 1.8$$



To find the distance from City Hall to 2nd Street along Cedar Road, add the distance from City Hall to 1st Street and the distance between 1st and 2nd Street.

$$1.8 + 2.4 = 4.2 \text{ miles.}$$

The distance is miles.

5

On the map, 5th Avenue, 6th Avenue, and 7th Avenue are parallel. What is the length of Main Street between 5th Avenue and 6th Avenue? Enter your answer as a decimal rounded to the nearest hundredth.

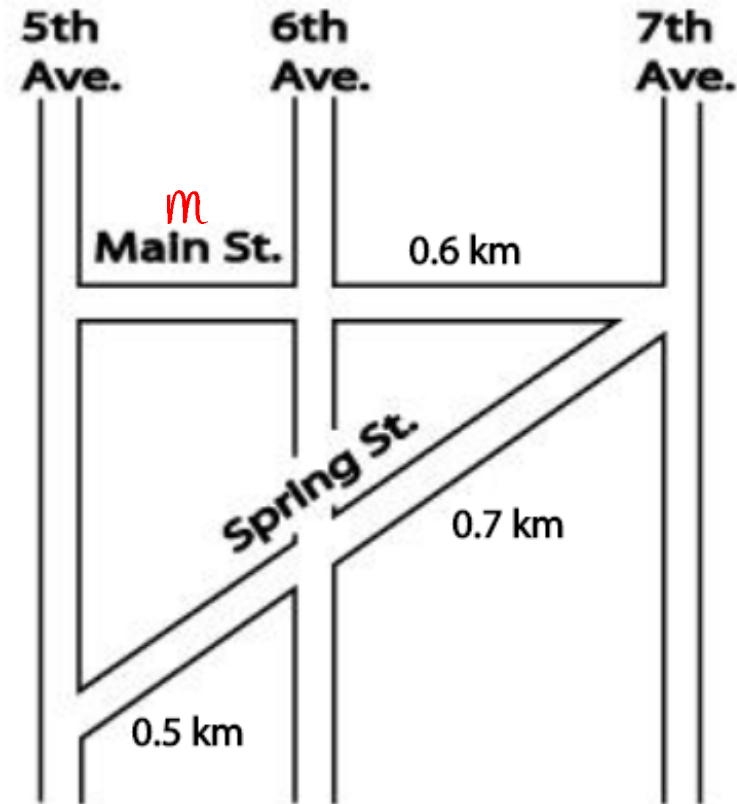
$$\frac{m}{0.5} = \frac{0.6}{0.7}$$

$$0.7m = (0.5) 0.6$$

$$m = \frac{0.3}{0.7}$$

$$m = 0.4285$$

$$m = 0.43$$



The length of Main Street between 5th Avenue and 6th Avenue is kilometer.

6

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

5.5 and 18


The geometric mean is $3\sqrt{11}$.

$$\frac{5.5}{x} = \frac{x}{18}$$

$$x^2 = 5.5(18)$$

$$x = \sqrt{99}$$

$$x = 3\sqrt{11}$$

$$\sqrt{11 \cdot 9}$$


7

Andy wants to find the distance d across a river. He located points as shown in the figure, then use similar triangles to find that $d = 225$ feet. How can you tell without calculating that he must be wrong? Tell what you think he did wrong and correct his error. Round your answer to the nearest tenth if necessary.

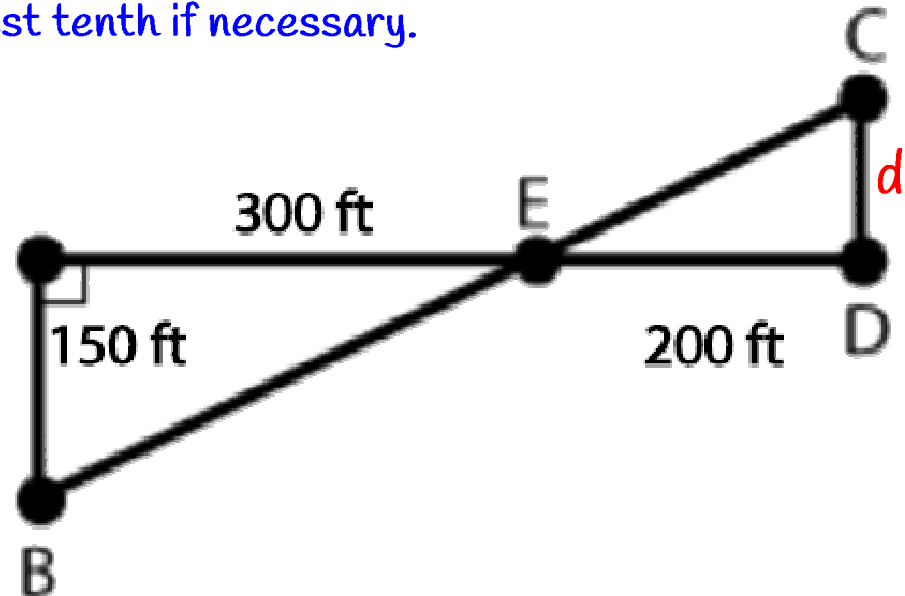
The correct proportion is:

$$\frac{d}{150} = \frac{200}{300}$$

$$300d = 150(200)$$

$$d = \frac{30000}{300}$$

$$d = 100$$



Andy must have used the wrong .

The distance d is actually feet.

8

A student wanted to find the height h of a statue of a pineapple in Nambour, Australia. She measured the pineapple's shadow and her own shadow. The student's height is 5 feet 6 inches. What is the height of the pineapple? Round to the nearest tenth if necessary.

We need the same units, so convert the feet into inches.

$$5 \text{ ft } 6 \text{ in} = 66 \text{ in.},$$

$$2 \text{ ft} = 24 \text{ in.},$$

$$8 \text{ ft } 9 \text{ in.} = 105 \text{ in.}$$

$$\frac{AC}{DF} = \frac{BC}{EF}$$

$$\frac{66}{h} = \frac{24}{105}$$

$$24h = 66(105)$$

$$h = \frac{6930}{24}$$

$$h = 288.8$$

The pineapple is 288.8 inches tall.



9

Jenny is 5 feet 4 inches tall. To find the height h of a light pole, she measured her shadow and the pole's shadow. What is the height of the pole? Give the height as a mixed number (a whole number and a fraction).

We need the same units, so convert the feet into inches.

$$5 \text{ ft. } 4. \text{ in} = 64 \text{ in.}$$

$$7 \text{ ft. } 9 \text{ in} = 93 \text{ in.}$$

$$15.5 \text{ ft (12)} = 186 \text{ in.}$$

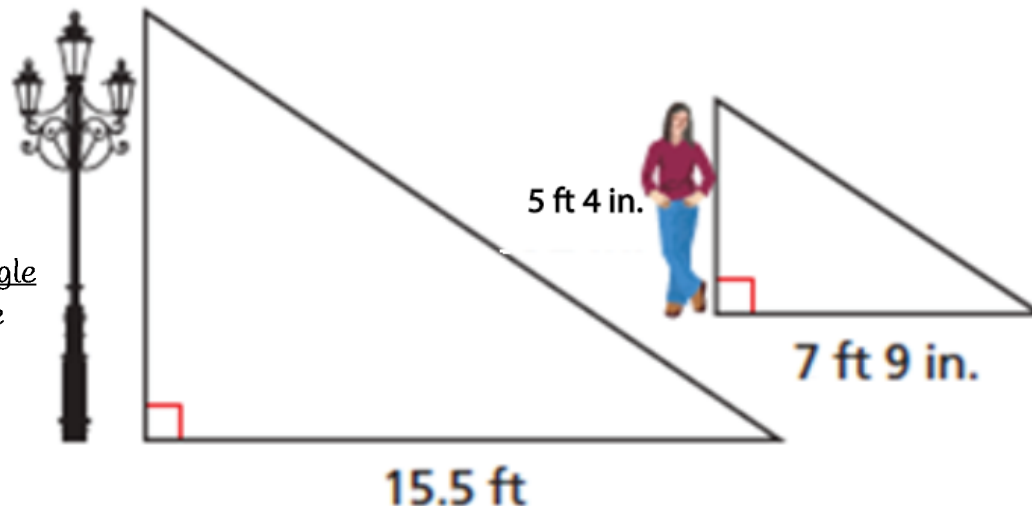
$$\frac{\text{Height Small Triangle}}{\text{Height Big Triangle}} = \frac{\text{Shadow Small Triangle}}{\text{Shadow Big Triangle}}$$

$$\frac{64}{h} = \frac{93}{186}$$

$$93h = 64(186)$$

$$h = \frac{64(186)}{93}$$

$$h = 128 \text{ in.}$$



convert the inches into feet.

$$\frac{128}{12} = 10\frac{8}{12} = 10\frac{2}{3}$$

10

To find the height h of a dinosaur in a museum, Amir placed a mirror on the ground 40 feet from its base. Then he stepped back 4 feet so that he could see the top of the dinosaur in the mirror. Amir's eyes were approximately 5 feet 6 inches above the ground. What is the height of the dinosaur?

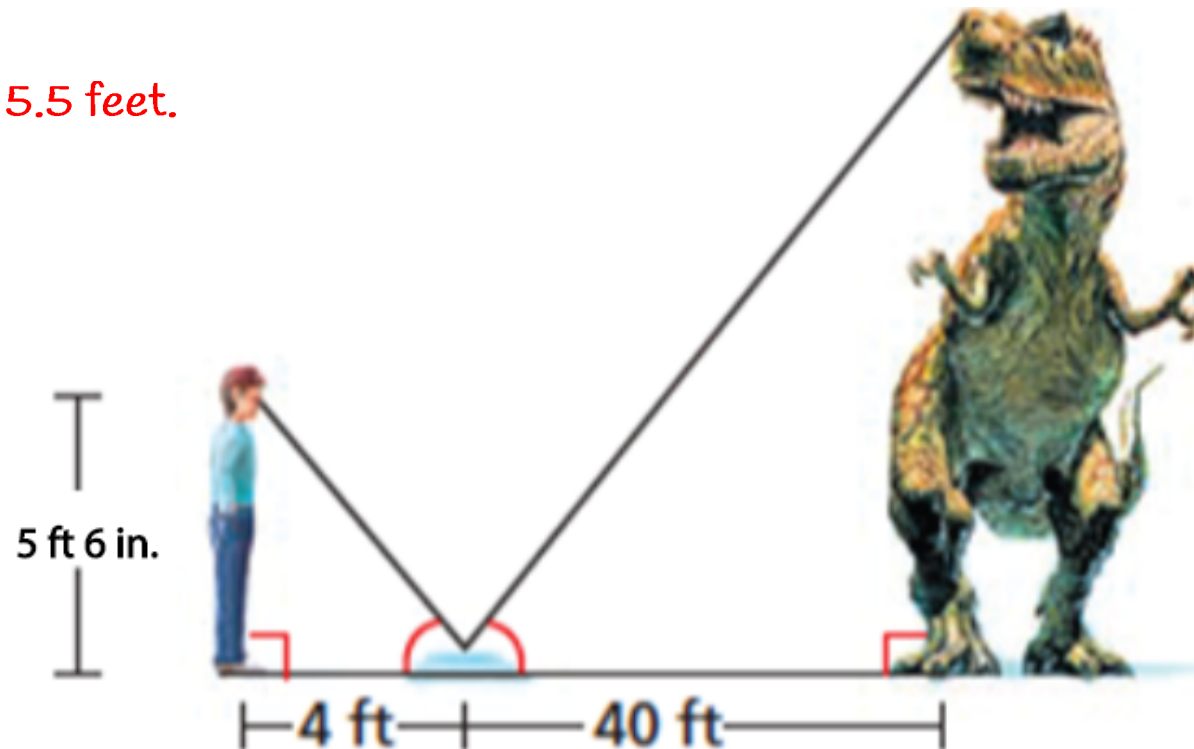
Write 5 feet 6 inches as 5.5 feet.

$$\frac{h}{5.5} = \frac{40}{4}$$

$$4h = 5.5(40)$$

$$h = \frac{220}{4}$$

$$h = 55$$



The dinosaur is 55 feet tall.

11

Mayce is 5.4 feet tall. To find the height of a tree, she measures her shadow and the tree's shadow. The measurements of the two shadows are shown. Find the height h of the tree. Round to the nearest tenth if necessary.

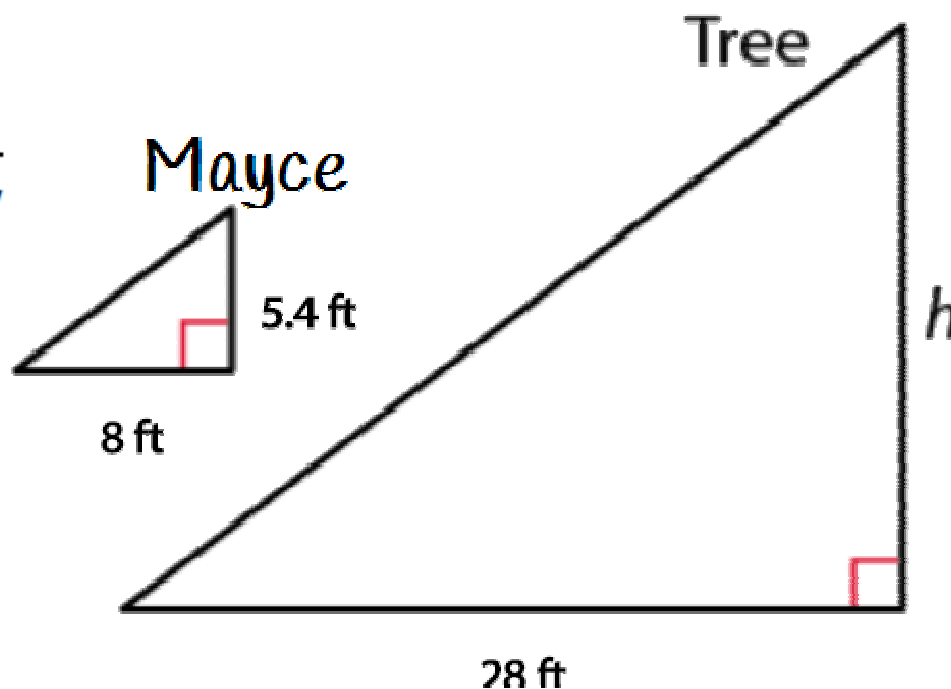
$$\frac{\text{tree's height}}{\text{Mayce's height}} = \frac{\text{tree's shadow}}{\text{Mayce's shadow}}$$

$$\frac{h}{5.4} = \frac{28}{8}$$

$$8h = 5.4(28)$$

$$h = \frac{151.2}{8}$$

$$h = 18.9$$



The tree is 18.9 feet tall.

12

To find the distance d across a stream, Levi located points as shown in the figure. Use the given information to find d . Round your answer to the nearest tenth if necessary.

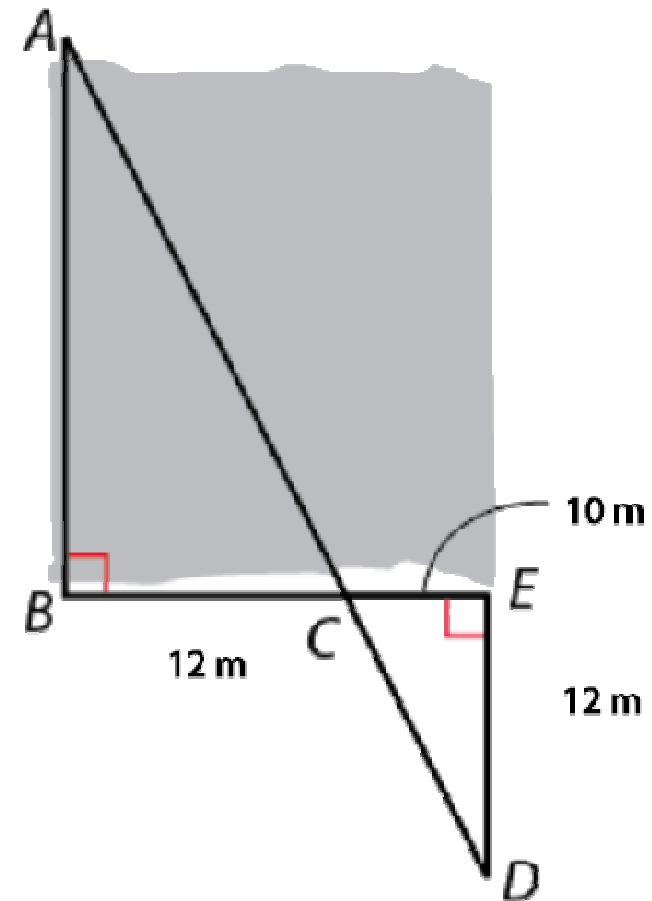
$$\frac{AB}{DE} = \frac{BC}{EC}$$

$$\frac{d}{12} = \frac{12}{10}$$

$$10d = 12(12)$$

$$d = \frac{144}{10}$$

$$d = 14.4$$



The distance d is 14.4 meters.

- 13 Use similar triangles $\triangle ABC$ and $\triangle XYZ$ to find the missing height h . Round to the nearest tenth if necessary.

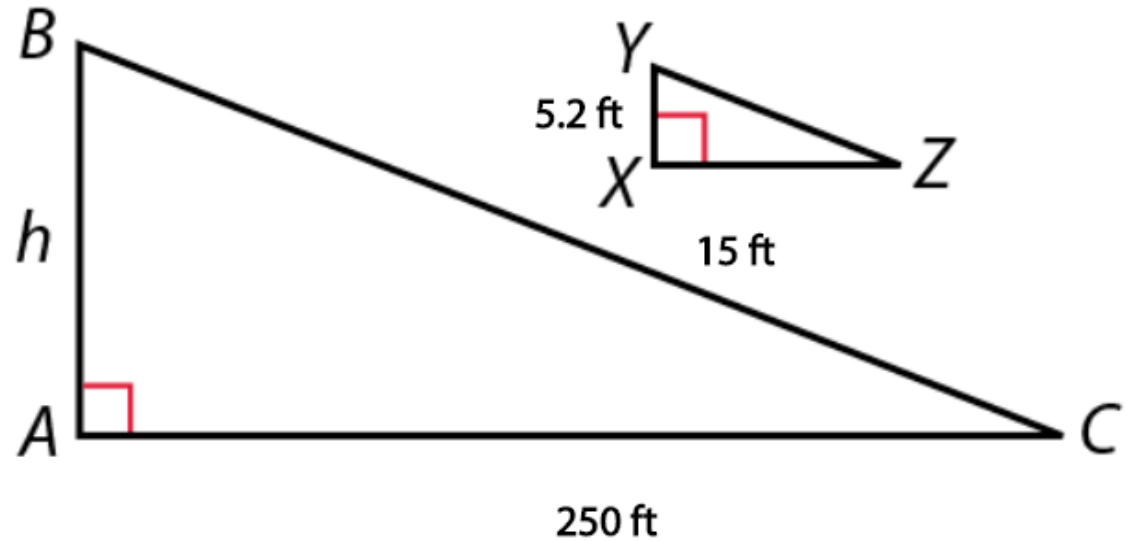
$$\frac{AB}{XY} = \frac{AC}{XZ}$$

$$\frac{h}{5.2} = \frac{250}{15}$$

$$15h = 5.2(250)$$

$$h = \frac{1300}{15}$$

$$h = 86.7 \text{ feet}$$



14

Use similar triangles $\triangle ABC$ and $\triangle XYZ$ to find the missing height h .
Round to the nearest tenth if necessary.

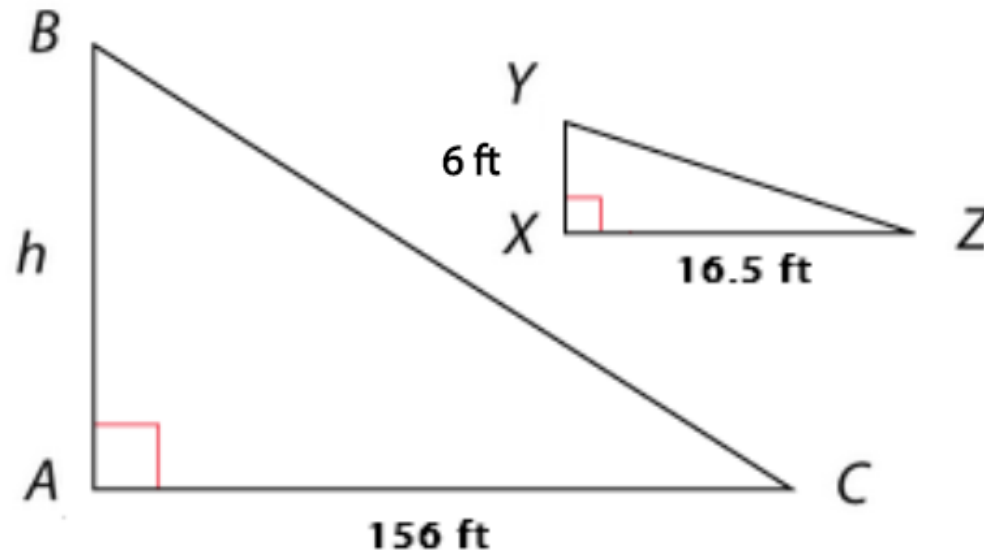
$$\frac{AB}{XY} = \frac{AC}{XZ}$$

$$\frac{h}{6} = \frac{156}{16.5}$$

$$16.5h = 6(156)$$

$$h = \frac{936}{16.5}$$

$$h = 56.7 \text{ feet}$$



15

To find the height x of a flagpole, Casey measured her own shadow and the flagpole's shadow. Given that Casey's height is 5 feet 2 inches, what is the height of the flagpole? Round to the nearest tenth if necessary.

$$\frac{\text{flagpole's height}}{\text{Casey's height}} = \frac{\text{flagpole's shadow}}{\text{Casey's shadow}}$$

First convert all units to inches.

Casey's height: 5 ft 2 inches = 62 in.

Casey's shadow: 3 ft = 36 in.

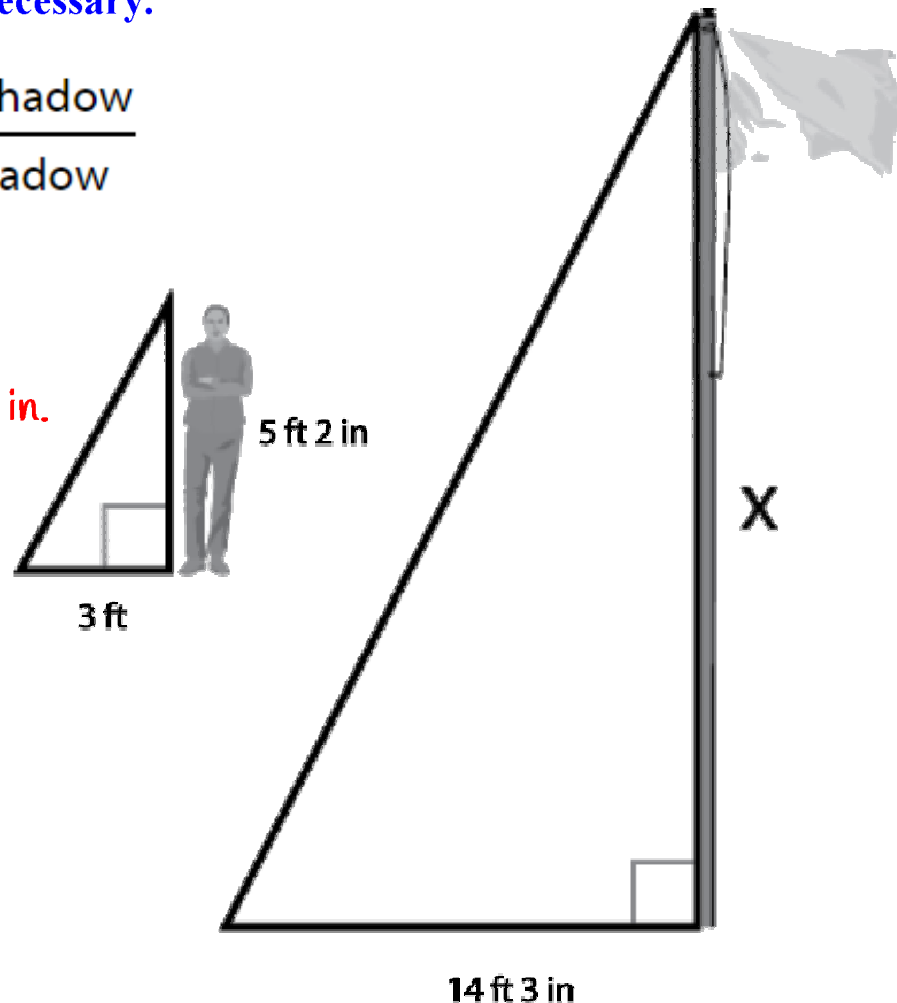
Flagpole's shadow: 14 ft 3 inches = 171 in.

$$\frac{x}{62} = \frac{171}{36}$$

$$36x = 62(171)$$

$$x = \frac{10602}{36}$$

$$x = 294.5$$



The flagpole is 294.5 inches tall