

17.3

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1

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.



2

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.

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

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

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

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

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

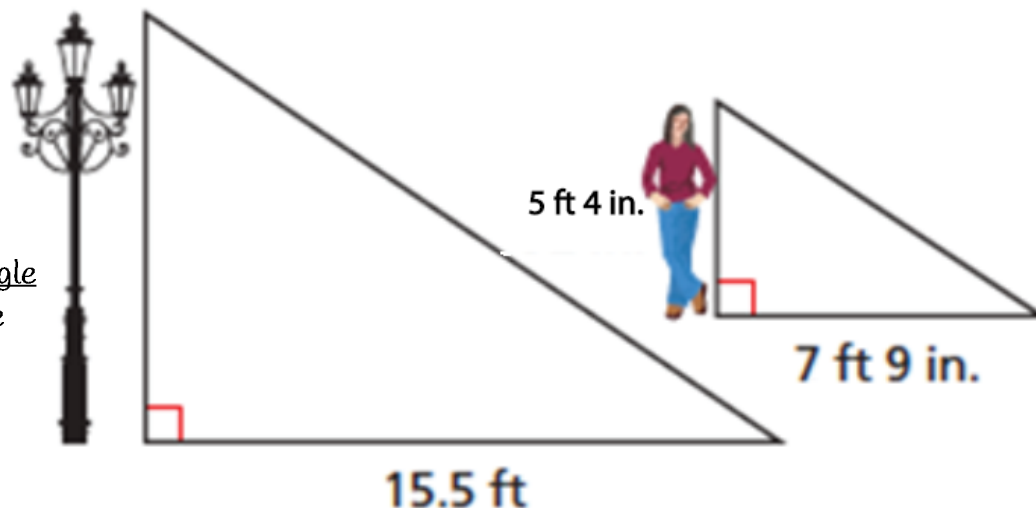
$$93h = 64(186)$$

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

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

convert the inches into feet.

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



3

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?

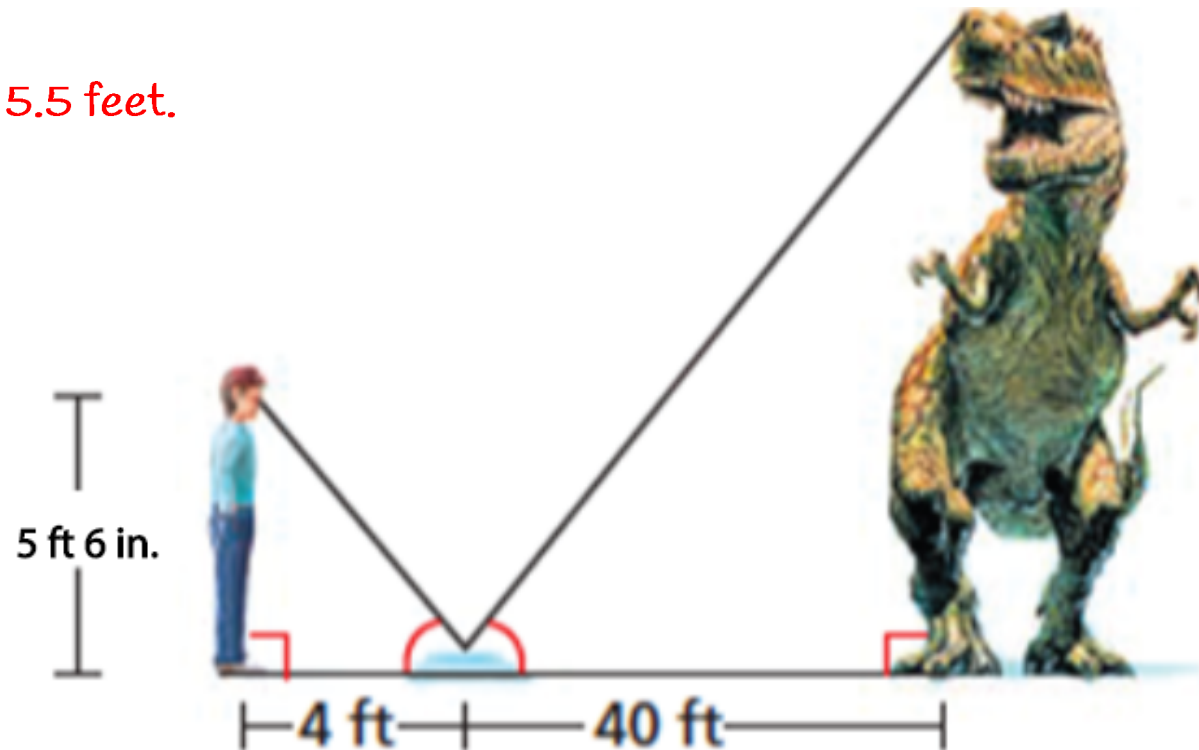
Write 5 feet 6 inches as 5.5 feet.

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

$$4h = 5.5(40)$$

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

$$h = 55$$



The dinosaur is 55 feet tall.

4

Mayce is 5.4 feet tall. To find the height of a tree, he measures his 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.

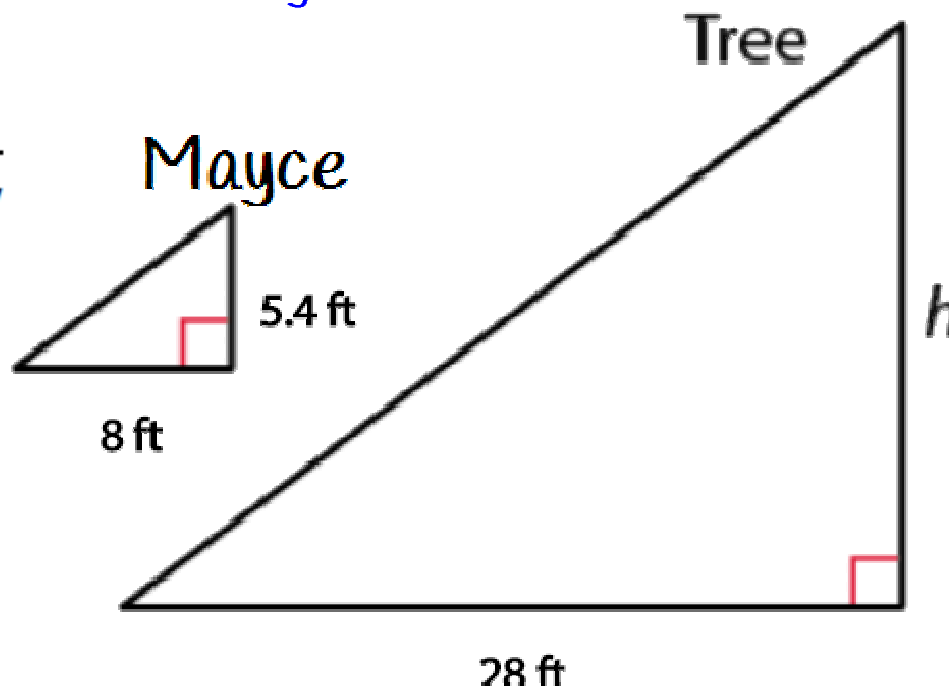
$$\frac{\text{tree's height}}{\text{Mayce's height}} = \frac{\text{tree's shadow}}{\text{Mayce's shadow}}$$

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

$$8h = 5.4(28)$$

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

$$h = 18.9$$



The tree is 18.9 feet tall.

5

In order to find the height of a cliff, you stand at the bottom of the cliff, walk 60 feet from the base, and place a mirror on the ground. Then you face the cliff and step back 5 feet so that you can see the top of the cliff in the mirror. Assuming your eyes are 5.6 feet above the ground, explain how to use this information to find the height of the cliff. (The angles marked congruent are congruent because of the nature of the reflection of light in a mirror.) Round to the nearest foot.

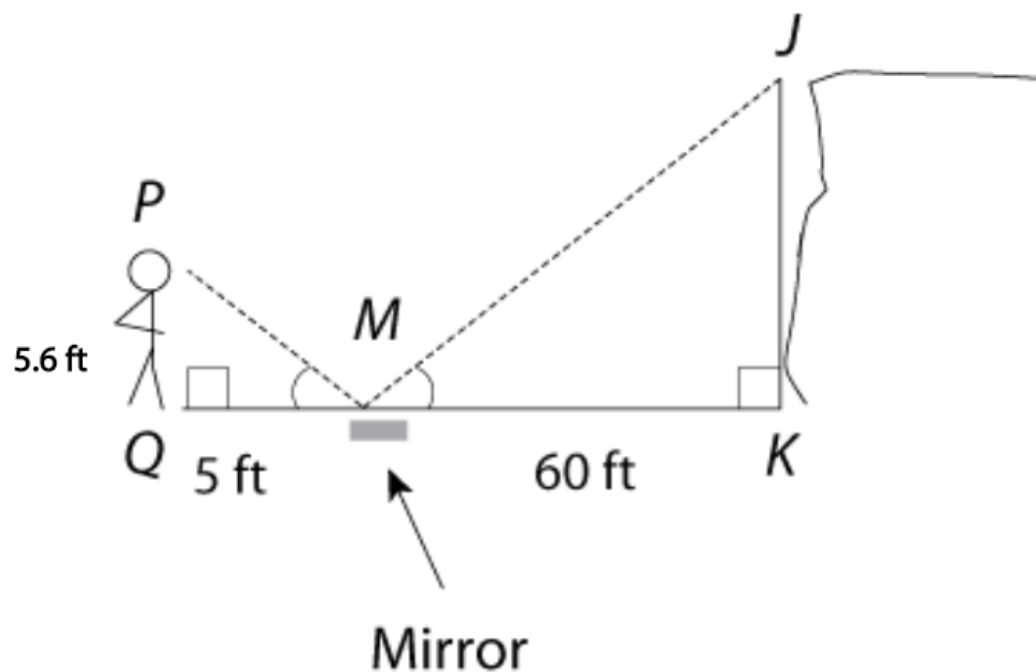
$$\frac{JK}{PQ} = \frac{MK}{MQ}$$

$$\frac{JK}{5.6} = \frac{60}{5}$$

$$5JK = 5.6(60)$$

$$JK = \frac{336}{5}$$

$$JK \approx 67$$



The cliff is about 67 feet tall.

6

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.

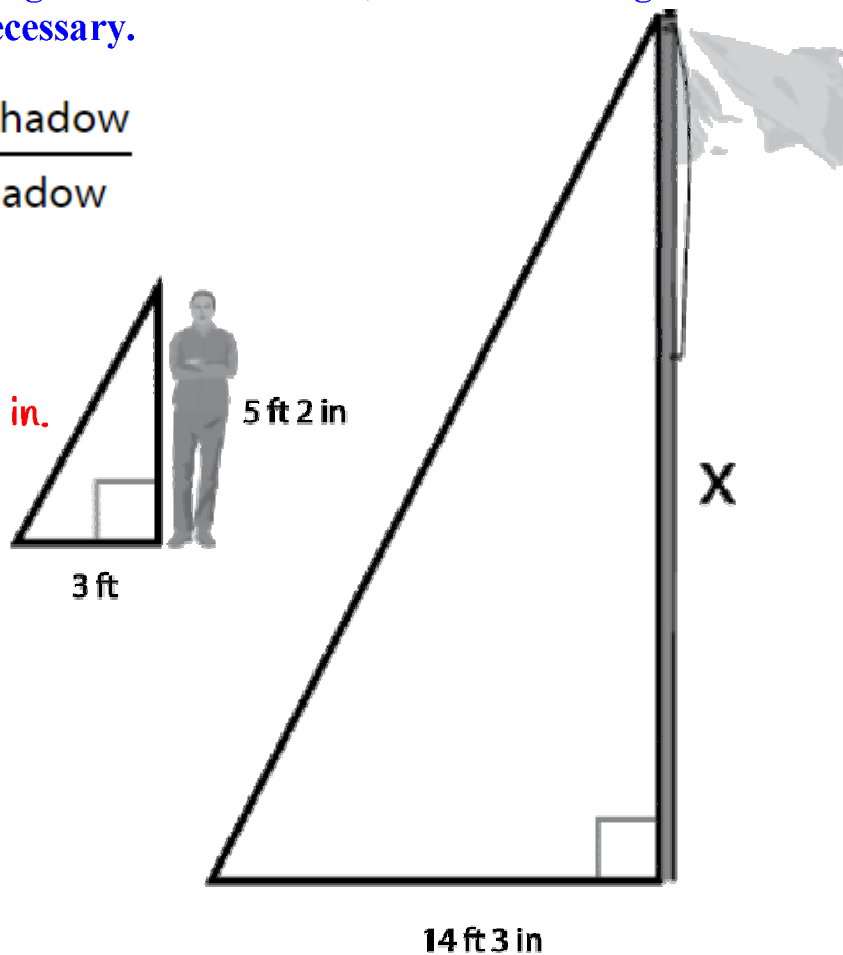
Flagpole's shadow: 14 ft 3 inches = 171 in.

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

$$36x = 62(171)$$

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

$$x = 294.5$$



The flagpole is 294.5 inches tall

7

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.

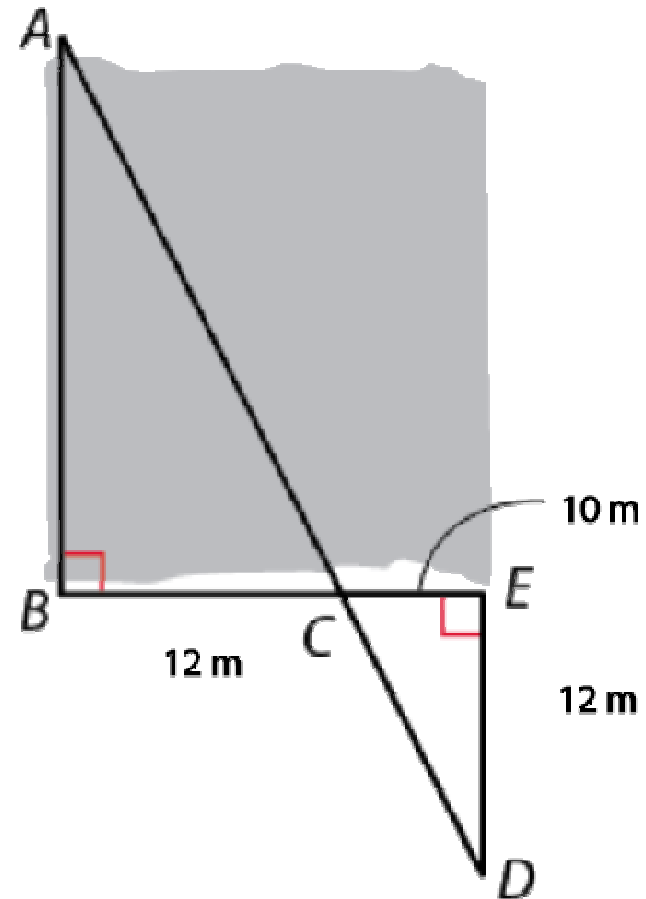
$$\frac{AB}{DE} = \frac{BC}{EC}$$

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

$$10d = 12(12)$$

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

$$d = 14.4$$



The distance d is 14.4 meters.

8

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

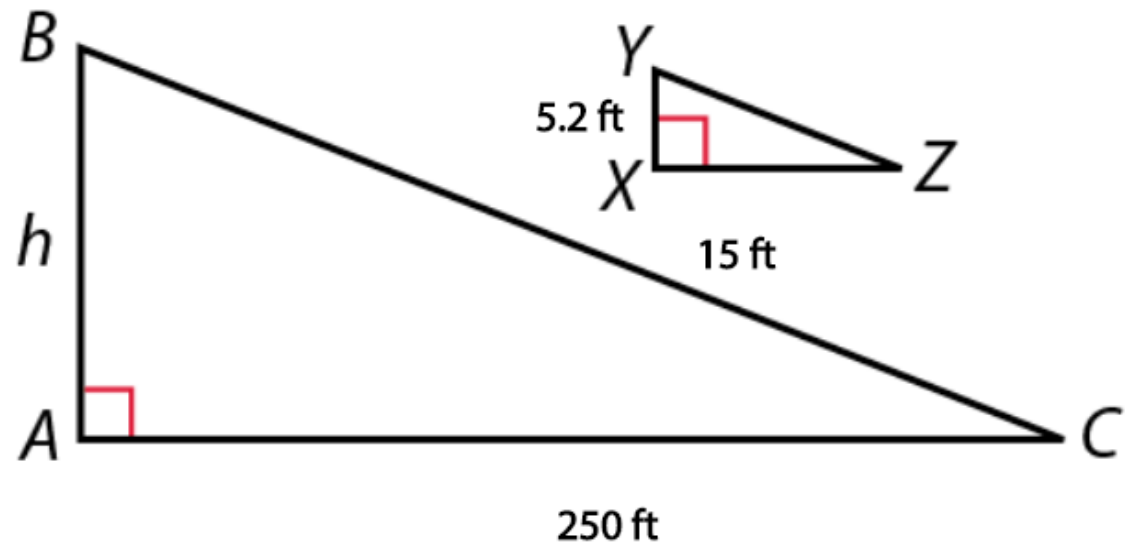
$$\frac{AB}{XY} = \frac{AC}{XZ}$$

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

$$15h = 5.2(250)$$

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

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



9

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

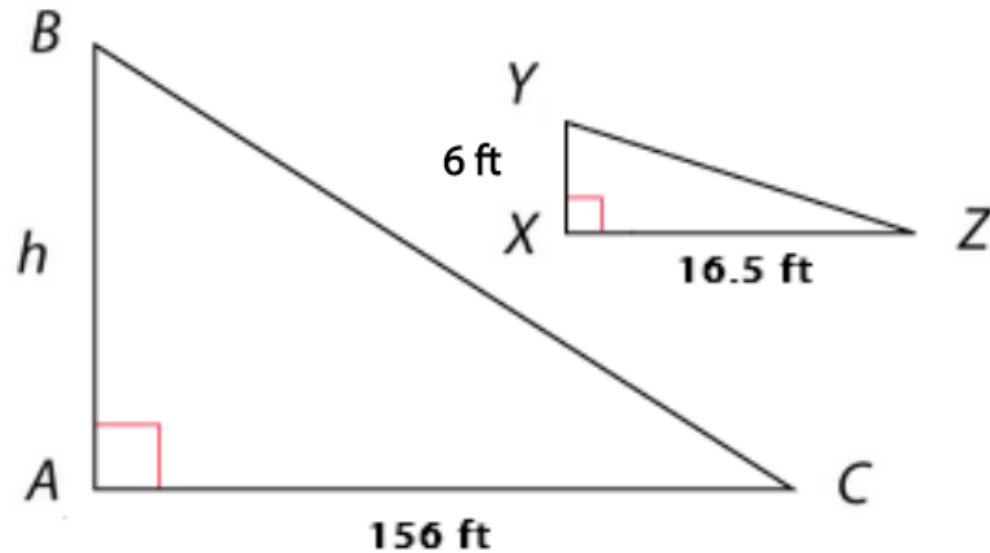
$$\frac{AB}{XY} = \frac{AC}{XZ}$$

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

$$16.5h = 6(156)$$

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

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



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

$$\frac{CB}{ZY} = \frac{AC}{XZ}$$

$$\frac{h}{3.8} = \frac{108.5}{14}$$

$$14h = 3.8(108.5)$$

$$h = \frac{412.3}{14}$$

$$h = 29.5 \text{ feet}$$

