# Indirect Measurement Worksheet

Name: _____*KEY*_____ Date: ___/___/___

Rita designs and test model rockets. She made a device that allows her to measure the angle of the rocket's elevation at the peak of its path.

During one test, she used the device at a point of 60 feet from the launch pad. When the rocket reached the peak of its path, the measurements on Rita's device were as shown in the diagram below.

Straw

10 in.

51°

8 in. ←Thread

Weight

Launch
Pad

60 ft

(not drawn to scale)
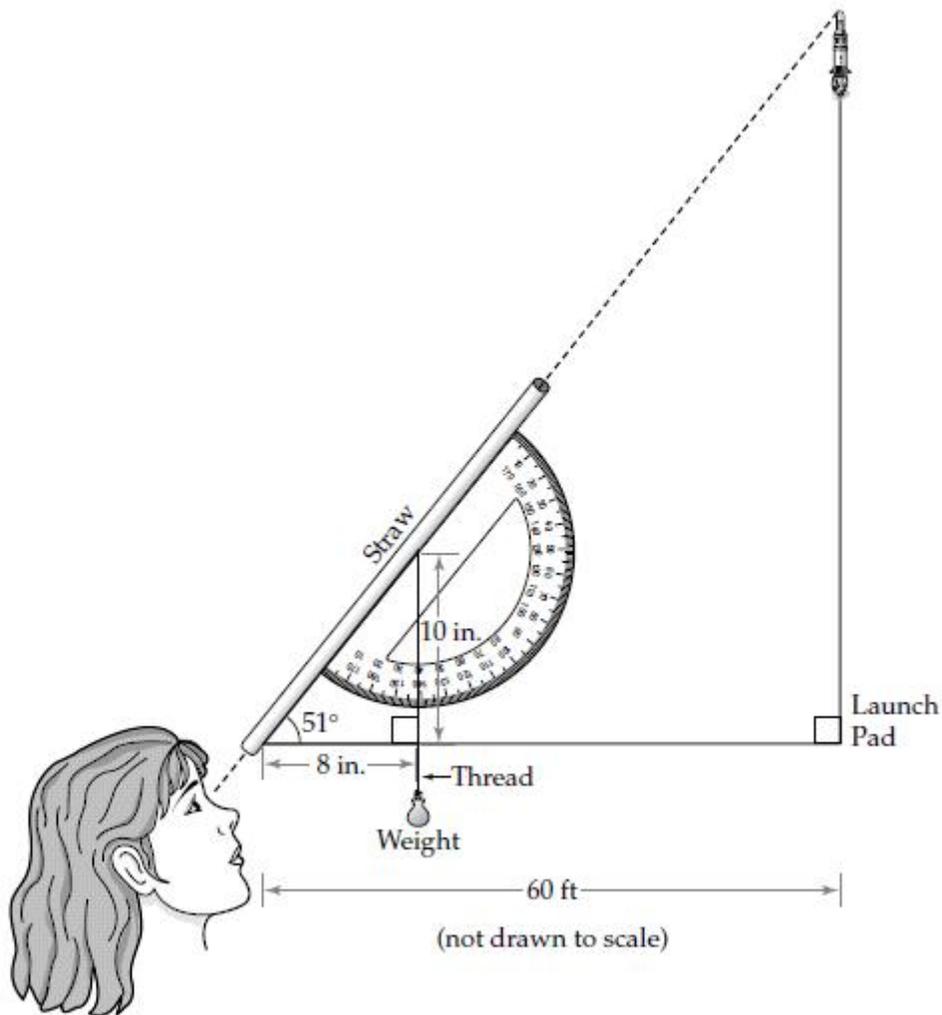
Based on Rita's measurements, what was the approximate height, in feet, that the rocket reached at the peak of its path?

$$\frac{8}{60} = \frac{10}{h} \implies 8h = 600 \implies h = \frac{600}{8} = \boxed{75 \text{ ft}}$$

Crista works for a company that cuts down diseased palm trees before they fall and cause damage. She must determine the height of the palm tree.
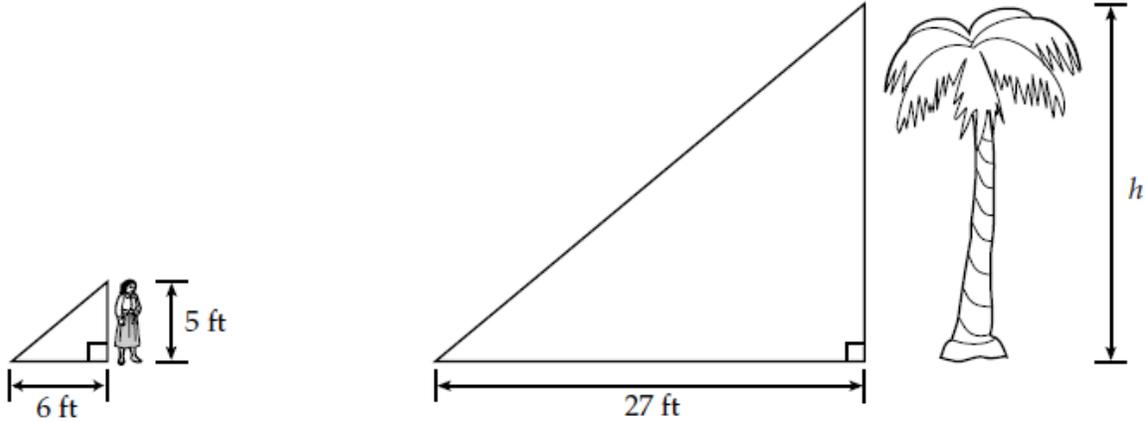
Crista is 5 feet tall and has measured her shadow to be 6 feet long. At the same time, she measured the tree's shadow to be 27 feet long. What is the height (h) of the palm tree?
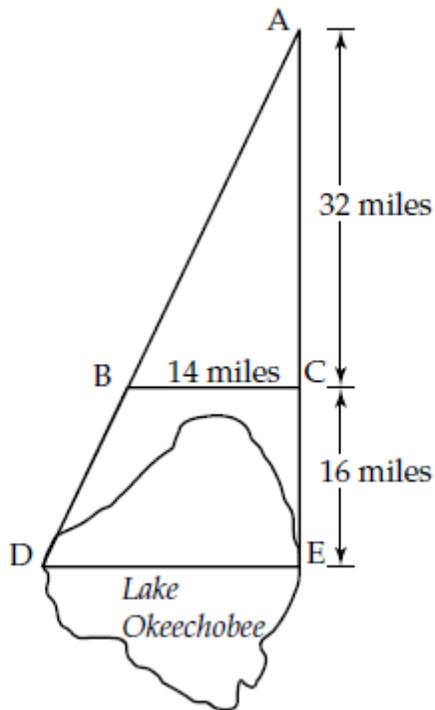

$$\frac{6}{27} = \frac{5}{h} \quad \Rightarrow \quad 6h = (27)(5)$$

$$\Rightarrow \quad 6h = 135$$

$$\Rightarrow \quad \boxed{h = 22.5 \text{ ft}}$$

LAKE OKEECHOBEE

$$\overline{BC} \parallel \overline{DE}$$

A surveyor used the above map to find the distance across Lake Okeechobee.

A. Write a proportion used to find the distance across Lake Okeechobee.

$$\frac{x}{14} = \frac{16+32}{16}$$

B. Find the distance across Lake Okeechobee.

$\Rightarrow 16x = (14)(48)$

$\Rightarrow 16x = 672$

$\Rightarrow \boxed{x = 42 \text{ miles}}$

C. Explain why triangle ABC is similar to triangle ADE.

- $\angle E = \angle C = 90°$

- $\angle D = \angle B$ since $\overline{BC} \parallel \overline{DE}$

- $\angle A = \angle A$

} corresponding all ∧ angles are equal

As shown in the drawing, Raymond used similar triangles to find the height of a pole. When he stood 6.5 feet from a small puddle, he could see the reflection of the top of the pole in the puddle. The puddle was 26 feet from the pole, and Raymond's eye level was 5.5 feet about the ground.
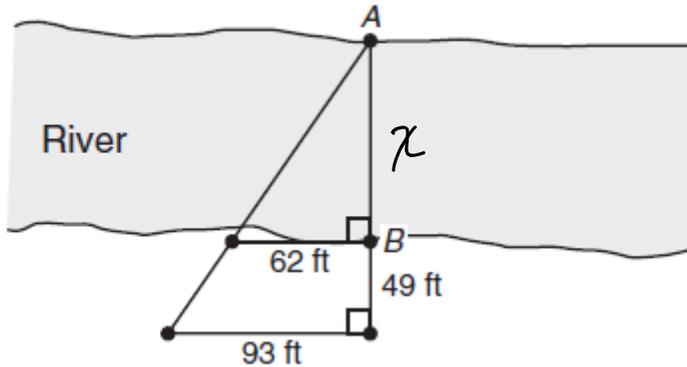

Pole   26 ft   6.5 ft

Puddle   5.5 ft
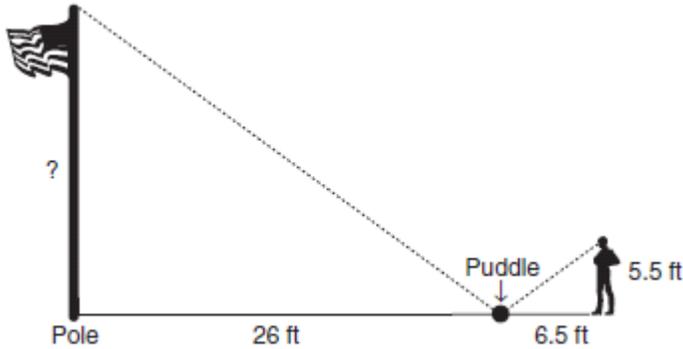
What is the height of the pole in feet?

$$\frac{5.5}{6.5} = \frac{x}{26}$$

$$\Rightarrow 6.5x = 143$$

$$\Rightarrow \boxed{x = 22 \text{ ft}}$$

An engineer wanted to approximate the width of a river. She placed markers at Point *A* and Point *B* to represent the average width of the river. She also placed 3 other markers along the riverbank and measured the distances shown in the diagram below.

A

River

x

62 ft

B

49 ft

93 ft

Based on this diagram, what was the width of the river, in feet, from point *A* to point *B*?
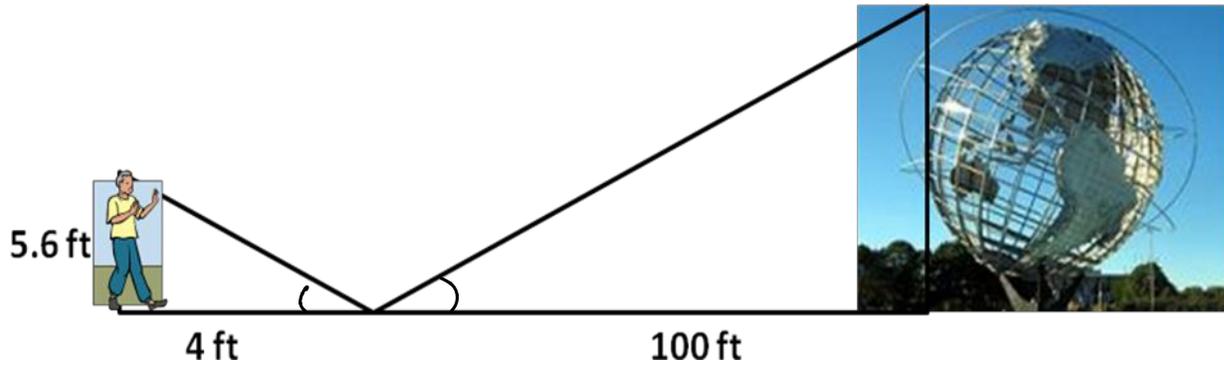
$$\frac{62}{93} = \frac{x}{x+49}$$

$$62(x+49) = 93x$$

$$62x + 3038 = 93x$$

$$3038 = 31x$$

$$\boxed{98 \text{ ft} = x}$$

To estimate the height of the Unisphere, the World's largest globe, you can place a mirror on the ground and stand where you can see the top of the Unisphere in the mirror, as shown in the diagram. What is the height of the Unishpere?

5.6 ft

4 ft   100 ft

$$\frac{5.6}{4} = \frac{x}{100}$$

$$\Rightarrow 4x = 560$$

$$\Rightarrow \boxed{x = 140 \text{ ft}}$$