ometry
omework – Similar Triangles Applications

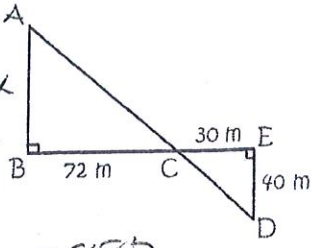
Name: _____

Date_____

Using Similar Triangles to Measure Distances

Over the centuries, similarity has been important to surveyors and mapmakers. Similarity can be used to measure distances that would not otherwise be measurable (inaccessible distances).

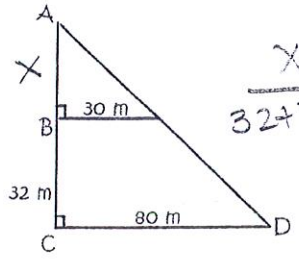
1. Suppose that a military engineer needs to know the distance across a river in order to build a temporary bridge. Using a point on the opposite side of the river as a reference point, the engineer sets up right triangles along the bank of the river. Use the diagram to find the distance across the river.



$\frac{X}{40} = \frac{72}{30}$ $30X = 2880$

$X = 96$ m

2. Another Method of Setting up Right Triangles to Measure the Distance Across the River



$\frac{X}{32+X} = \frac{30}{80}$

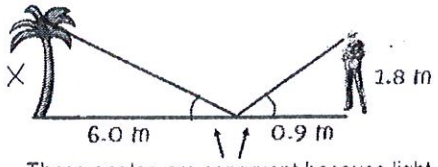
$80X = 30(32+X)$

$80X = 960 + 30X$

$50X = 960$

$X = 19.2$ m

3. Lamar Presley is planning to landscape his yard. First he needs to calculate the height of a palm tree in the backyard. He sights the top of the tree in a mirror that is 6.0 meters from the tree. It is on the ground and faces up. Lamar is 0.9 meters from the mirror and his eyes are 1.8 meters from the ground. How tall is the tree?

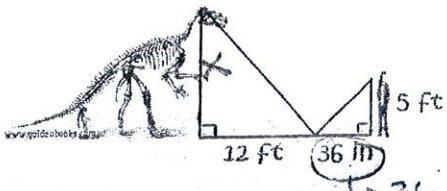


These angles are congruent because light reflects off a mirror at the same angle it arrives.

$\frac{1.8}{X} = \frac{.9}{6}$ $.9X = 10.8$

$X = 12$m

4. You use a mirror to estimate the height of the dinosaur skeleton. According to the laws of optics, the light reflects off a mirror at the same angle from which it strikes the mirror. How tall is the dinosaur?

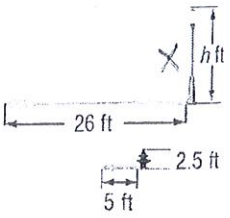


$\frac{5}{X} = \frac{3}{12}$ $60 = 3X$

$X = 20$ Ft.

$\frac{36}{12} = 3$ Ft.

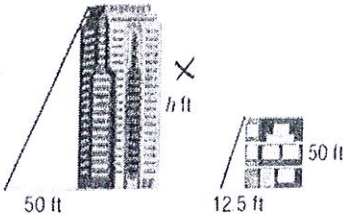
5. A fire hydrant 2.5 feet high casts a 5-foot shadow. How tall is a street light that casts a 26-foot shadow at the same time? Let h represent the height of the street light.



$\frac{2.5}{x} = \frac{5}{26}$ $5x = 65$

$x = 13$ ft.

6. What is the height of the building?

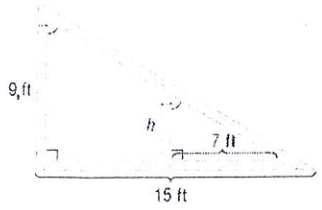


$\frac{x}{50} = \frac{50}{12.5}$

$12.5x = 2500$

$x = 200$ ft.

7. Find the height of the brace.

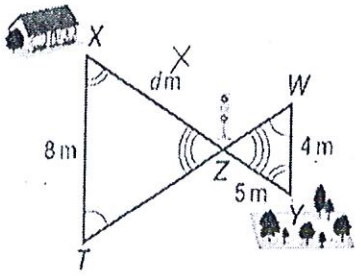


$\frac{h}{9} = \frac{7}{15}$

$63 = 15h$

$h = 4.2$ ft.

8. Find the distance from the park to the house.



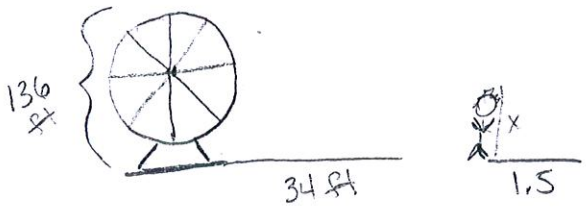
$\frac{4}{8} = \frac{5}{x}$

$4x = 40$

$x = 10$

Distance from park to house is $10 m + 5m = 15m$

9. The Giant Wheel at Cedar Point in Ohio is one of the tallest Ferris wheels in the country at 136 feet tall. If the Giant Wheel casts a 34-foot shadow, write and solve a proportion to find the height of a nearby man who casts a 1.5-foot shadow.



$\frac{x}{136} = \frac{1.5}{34}$

$34x = 204$

$x = 6$ ft.