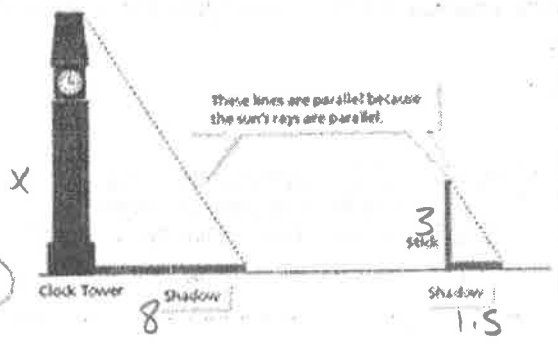
Key

Similar Triangles Application Problems

1. How tall is the building, given:

- length of the stick: 3 m
- length of the stick's shadow: 1.5 m
- length of the building's shadow: 8 m

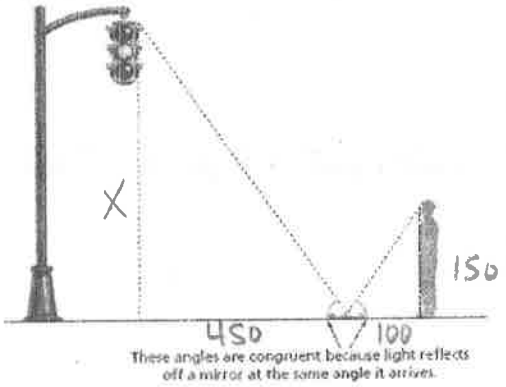
$\frac{8}{1.5} \times 3 = 16$ meters



2. How tall is the traffic light, given:

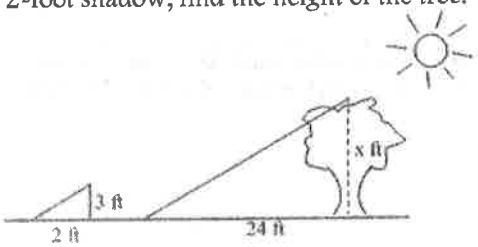
- height from the ground to Jim's eyes: 150 cm
- distance from the middle of the mirror to Jim's feet: 100 cm
- distance from the middle of the mirror to a point directly under the traffic signal: 450 cm

$\frac{450}{100} \times 150 = 675$ cm



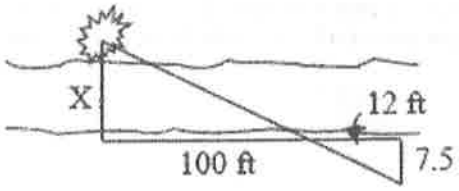
3. If a tree casts a 24-foot shadow at the same time that a yardstick casts a 2-foot shadow, find the height of the tree.

$\frac{24}{2} \times 3 = 36$ ft



4. A bush is sighted on the other side of a canyon. Find the width of the canyon.

$\frac{100}{12} \times 7.5 = 62.5$ ft

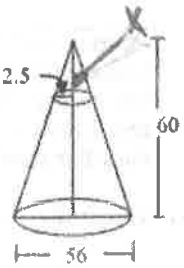


5. The cheerleaders at City High make their own megaphones by cutting off the small end of a cone made from heavy paper. If the small end of the megaphone is to have a radius of 2.5 cm, what should be the height of the cone that is cut off?

diameter of small cone
$2.5 \times 2 = 5$ cm

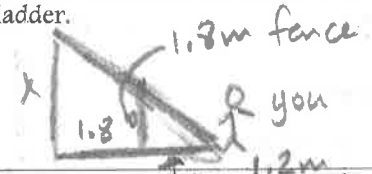
Shrink

$\frac{S}{B} = \frac{5}{56} \times 60 = 5.36$ cm



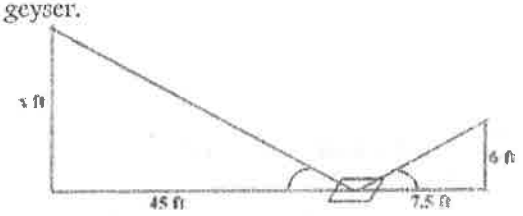
6. You are standing at the the foot of a ladder that is 1.2 m from a fence. The fence is 1.8 m high. The middle of the ladder touches the fence and the top of the ladder rests against a building that is 1.8 m behind the fence. Draw a diagram and determine the height on the building reached by the top of the ladder.

$\frac{1.8+1.2}{1.2} = \frac{3}{1.2} \times 1.8 = 4.5m$



7. Ramon places a mirror on the ground 45 ft from the base of a geyser. He walks backward until he can see the top of the geyser in the middle of the mirror. At that point, Ramon's eyes are 6 ft above the ground and he is 7.5 ft from the mirror. Use similar triangles to find the height of the geyser.

$\frac{45}{7.5} \times 6 = 36$ ft

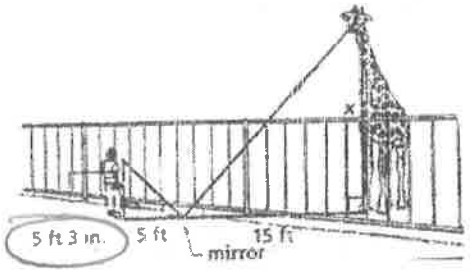


8. Find the height of the giraffe in the diagram below.

Inches to ft

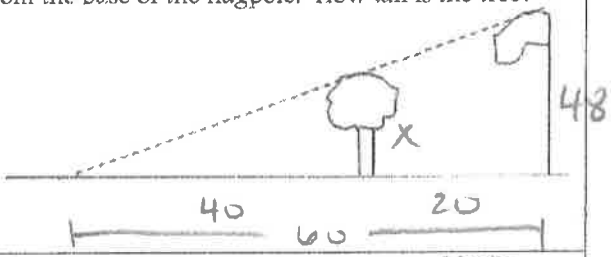
$\frac{3}{12} = .25$

$\frac{15}{5} \times 5.25 = 15.75$ ft or 15' 9" = 189 in



9. On level ground, the base of a tree is 20 ft from the bottom of a 48-ft flagpole. The tree is shorter than the pole. At a certain time, their shadows end at the same point 60 ft from the base of the flagpole. How tall is the tree?

$\frac{40}{60} \times 48 = 32$ ft



10. A tourist on the observation deck of a building looks east, facing another building 320 ft high and two blocks from the first building. Her view is 400 ft above street level. Her car is parked five blocks east of the second building. If no other buildings intervene, can she see her car?

* x+2 is the line of sight to ground.

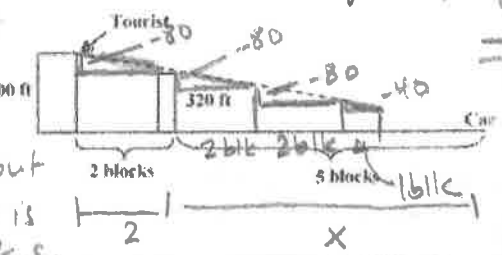
$\frac{B}{5} = \frac{400}{320} = \frac{x+2}{x}$

$400x = 320x + 640$

$-320x \quad -320x$

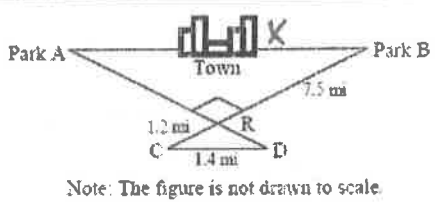
$80x = 640 \quad x = 8$

So, no the tourist cannot see the car, it is only 7 blks away, but the line of sight is out to 10 blocks.



400 − 280 = 120 ft above ground at the car (line of sight)

11. Mason Construction wants to connect two parks on opposite sides of town with a road. Surveyors have laid out a map as shown. The road can be built through the town or around town through point R. The roads intersect at a right angle at point R. The line joining Park A to Park B is parallel to the line joining C and D.



Note: The figure is not drawn to scale.

a. What is the distance between the parks through town?

$\frac{x}{1.4} = \frac{7.5}{1.2}$

$1.2x = 10.5$

$x = 8.75$ miles

b. What is the distance from Park A to Park B through point R?

R is a RT $\triangle$ $a^2 + 7.5^2 = 8.75^2$ $a = \sqrt{(8.75)^2 - (7.5)^2} = 4.5$

$4.5 + 7.5 = 12$ miles