Geometry Section 12.3: Using Proportional Relationships
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1. Finding distances using similar triangles is called **indirect measurement**.

Use similar triangles $\triangle ABC$ and $\triangle XYZ$ to find the missing height $h$.

2. $\frac{24}{4} = \frac{h}{60}$

3. $\frac{h}{5.5} = \frac{156}{16.5}$
   $h = 52 \text{ ft}$

4. $\frac{h}{108.5} = \frac{14}{3.8}$
   $h = 31 \text{ ft}$

5. $\frac{h}{3.8} = \frac{36}{15.2}$
   $h = 52 \text{ ft}$

6. $\frac{d}{80} = \frac{48}{60}$
   $d = 64 \text{ m}$

7. $\frac{d}{180} = \frac{78}{45}$
   $d = 31.2$

8. $\frac{d}{140.4} = \frac{27}{18}$
   $d = 210.6 \text{ m}$

9. $\frac{d}{64.8} = \frac{211.2}{388.8}$
   $d = 35.2 \text{ m}$
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?

$$\frac{5.5}{h} = \frac{4}{40} \quad h = 55 \text{ ft}$$

11. Jenny is 5 feet 2 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?

$$\frac{h}{5.167} = \frac{15.5}{7.75} \quad 10.3 \text{ ft}$$

12. 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 4 inches. What is the height of the pineapple?

$$5'4" = 64" \quad \frac{h}{64} = \frac{105}{24} \quad h = 280 \text{ in}$$

$$8'9" = 105" \quad 23'4"$$

13. To find the height $h$ of a flagpole, Casey measured her own shadow and the flagpole's shadow. Given that Casey's height is 5 feet 4 inches, what is the height of the flagpole?

$$\frac{64}{h} = \frac{36}{171} \quad h = 304 \text{ in} \quad 25'4"$$

19. To find the height of a tree, Adrian measures the tree's shadow and then his shadow. Which proportion could Adrian use to find the height of the tree? Select all that apply.

A. $\frac{AC}{DE} = \frac{BC}{EF}$

B. $\frac{DE}{AC} = \frac{EF}{BC}$

C. $\frac{AB}{DF} = \frac{BC}{EF}$

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

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