

1. Solve the proportion for x. Leave answer as fraction.

$$\frac{x}{4} = \frac{3}{11}$$

$$11x = 12$$

$$x = \frac{12}{11}$$

2. Solve the proportion for x. Leave answer as fraction.

~~$$\frac{x+1}{4} = \frac{x+3}{2}$$~~

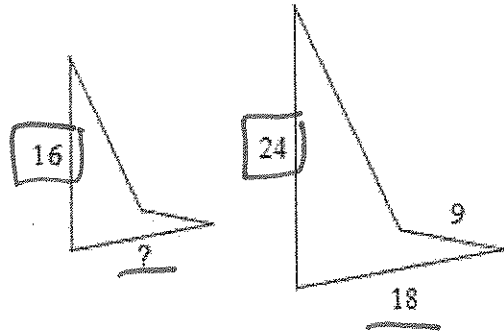
$$2(x+1) = 4(x+3)$$

$$2x+2 = 4x+12$$

$$-10 = 2x$$

$$x = -5$$

3. The two shapes below are similar. Find the missing side indicated by the "?".



$$\frac{16}{24} = \frac{?}{18}$$

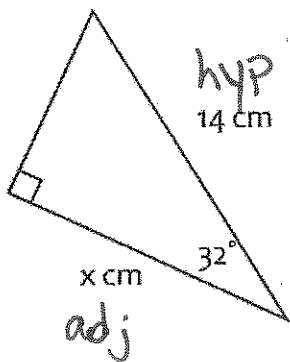
$$24? = 16(18)$$

$$24? = 288$$

$$? = 12$$

4. Find the side length x. Round to the nearest 0.1 cm.

(SHOW ALL OF YOUR WORK)



$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

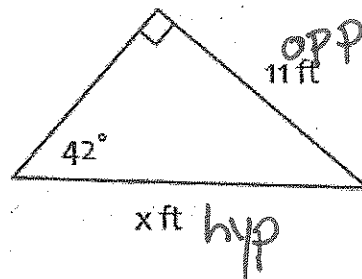
$$\cos 32 = \frac{x}{14}$$

$$x = 14 \cdot \cos 32$$

$$x \approx 11.9 \text{ cm}$$

5. Find the side length x. Round to the nearest 0.1 ft.

(SHOW ALL OF YOUR WORK)



$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

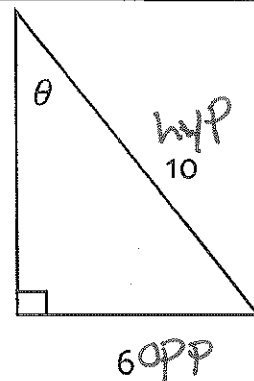
$$\frac{\sin 42}{1} = \frac{11}{x}$$

$$x \cdot \sin 42 = 11$$

$$x = \frac{11}{\sin 42} \approx 16.4 \text{ ft}$$

6. a) Find each of the three trigonometric ratios using angle θ .

$$\sin \theta = \frac{6}{10} = \frac{3}{5} \quad \cos \theta = \frac{8}{10} = \frac{4}{5} \quad \tan \theta = \frac{6}{8} = \frac{3}{4}$$

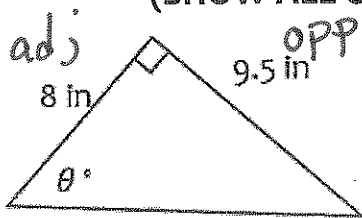


b) Find the measure of angle θ . Round to the nearest 0.1 degree.

$$\theta = \sin^{-1}\left(\frac{3}{5}\right) \approx 38.9^\circ$$

7. Find the angle θ . Round to the nearest 0.1 degree.

(SHOW ALL OF YOUR WORK)



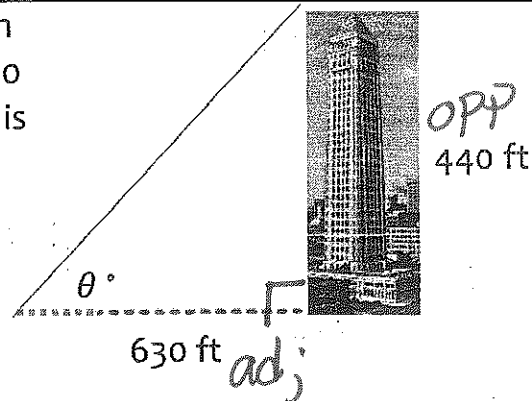
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan \theta = \frac{9.5}{8}$$

$$\theta = \tan^{-1}\left(\frac{9.5}{8}\right)$$

$$\theta \approx 49.9^\circ$$

8. Pascal is standing in front of the Foshay Tower in downtown Minneapolis. (The tower is about 440 feet and casts a shadow of 630 ft.) His shadow is in line with the shadow of the tower. Pascal's shadow is 8.6 feet. (Diagram is not drawn to scale).



(a) Find θ , the angle of elevation of the sun.

$$\tan \theta = \frac{440}{630} \quad \theta = \tan^{-1}\left(\frac{440}{630}\right)$$

$$\theta \approx 34.9^\circ$$

(b) Find the height of Pascal. Round to the nearest 0.01 ft.

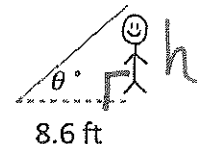
$$\frac{8.6}{630} = \frac{h}{440} \quad 630h = 8.6(440)$$

$$630h = 3784$$

$$h \approx 6.01 \text{ ft}$$

OR

$$\tan 34.9 = \frac{h}{8.6}$$



$$h = 8.6 \tan 34.9 \approx 6.08 \text{ ft}$$

1. Solve the proportion for x. Leave answer as fraction.

$$\frac{x}{4} = \frac{3}{7}$$

$$7x = 12$$

$$x = \frac{12}{7}$$

2. Solve the proportion for x. Leave answer as fraction.

~~$$\frac{x+2}{3} = \frac{x+3}{6}$$~~

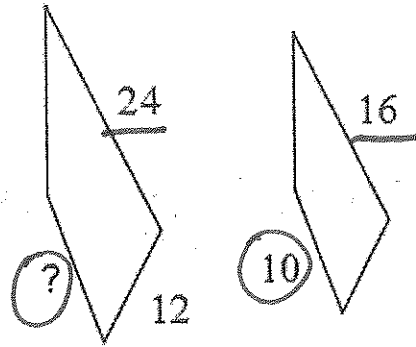
$$3(x+3) = 6(x+2)$$

$$3x + 9 = 6x + 12$$

$$-3 = 3x$$

$$x = \frac{-3}{3} = -1$$

3. The two shapes below are similar. Find the missing side indicated by the "?".



$$\frac{16}{24} = \frac{10}{?}$$

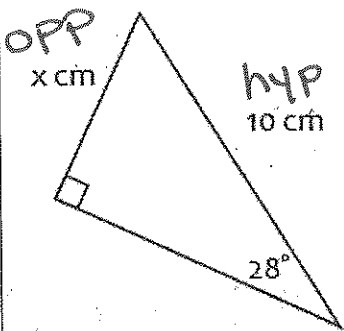
$$16? = 24(10)$$

$$16? = 240$$

$$? = \frac{240}{16} = \boxed{15}$$

4. Find the side length x. Round to the nearest 0.1 cm.

(SHOW ALL OF YOUR WORK)



$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

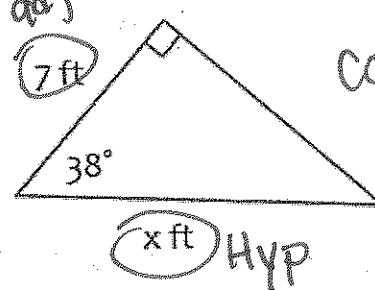
$$\frac{\sin 28}{1} = \frac{x}{10}$$

$$x = 10 \cdot \sin 28$$

$$x \approx \boxed{4.7 \text{ cm}}$$

5. Find the side length x. Round to the nearest 0.1 ft.

(SHOW ALL OF YOUR WORK)



$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\frac{\cos 38}{1} = \frac{7}{x}$$

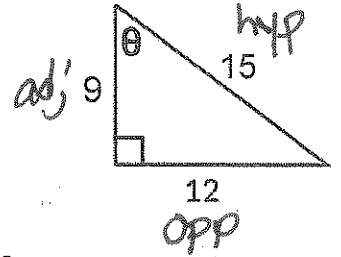
$$x \cdot \cos 38 = 7$$

$$x = \frac{7}{\cos 38}$$

$$x \approx \boxed{8.9 \text{ ft}}$$

6. a) Find each of the three trigonometric ratios using angle θ .

$$\sin \theta = \frac{12}{15} = \frac{4}{5} \quad \cos \theta = \frac{9}{15} = \frac{3}{5} \quad \tan \theta = \frac{12}{9} = \frac{4}{3}$$

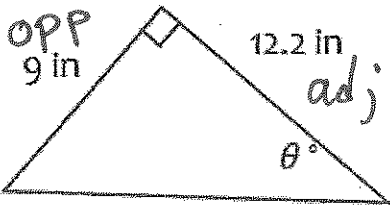


b) Find the measure of angle θ . Round to the nearest 0.1 degree.

$$\theta = \sin^{-1}\left(\frac{4}{5}\right) \quad \theta \approx 53.1^\circ$$

7. Find the angle θ . Round to the nearest 0.1 degree.

(SHOW ALL OF YOUR WORK)



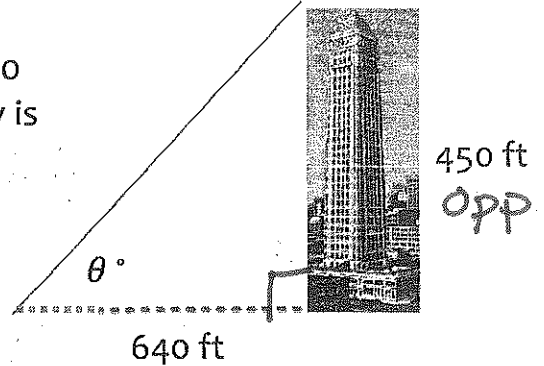
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan \theta = \frac{9}{12.2}$$

$$\theta = \tan^{-1}\left(\frac{9}{12.2}\right)$$

$$\theta \approx 36.4^\circ$$

8. Beta is standing in front of the Foshay Tower in downtown Minneapolis. (The tower is about 450 feet and casts a shadow of 640 ft.) Her shadow is 7.5 feet. (Diagram is not drawn to scale).



(a) Find θ , the angle of elevation of the sun.

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \quad \tan \theta = \frac{450}{640}$$

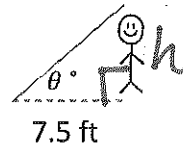
$$\theta = \tan^{-1}\left(\frac{450}{640}\right) \approx 35.1^\circ$$

(b) Find the height of Beta. Round to the nearest 0.01 ft.

$$\frac{7.5}{640} = \frac{x}{450} \quad 640x = 7.5(450)$$

$$\frac{640x}{640} = \frac{3375}{640}$$

$$x \approx 5.27 \text{ ft}$$



$$\tan 35.1 = \frac{h}{7.5}$$

$$h = 7.5 \tan 35.1 \approx 5.27 \text{ ft}$$