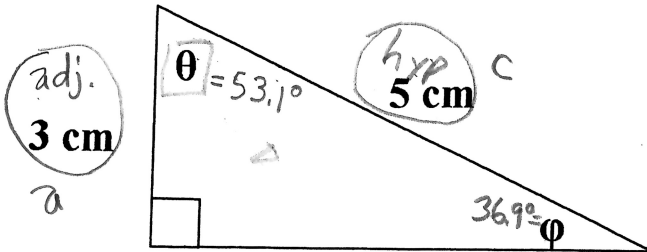


## Trigonometry Practice

1. Determine all angles and side lengths in the following right triangle:

SOH  
CAH  
TOA



①  $\cos \theta = \frac{\text{adj}}{\text{hyp}}$

$$\cos \theta = \frac{3}{5}$$

$$\theta = \cos^{-1}\left(\frac{3}{5}\right)$$

$$\theta \approx 53.1^\circ$$

②  $\phi = 180^\circ - 90^\circ - 53.1^\circ$

$$\phi \approx 36.9^\circ$$

③  $a^2 + b^2 = c^2$   
 $3^2 + x^2 = 5^2$

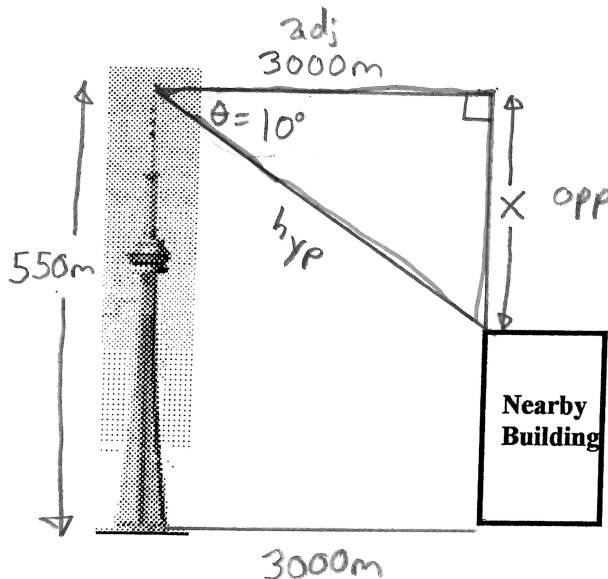
$$9 + x^2 = 25$$

$$x^2 = 25 - 9$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = 4 \text{ cm}$$

2. A tourist standing at the top of the CN Tower sees the top of a nearby building at an angle of depression of  $10^\circ$ . The CN Tower is 550 m tall. If the building is known to be 3 km away, how tall is this building? (TOA)



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

$$\frac{\tan(10^\circ)}{1} = \frac{x}{3000}$$

$$x = 3000 \tan(10^\circ)$$

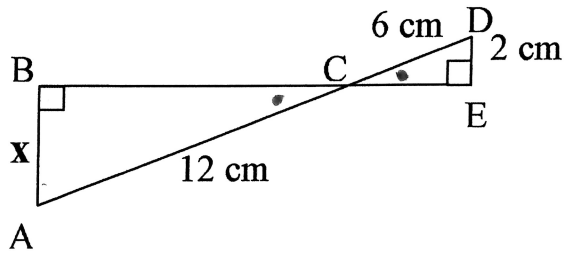
$$x \approx 529 \text{ m}$$

$$\text{height} = 550 - x$$

$$= 550 - 529$$

$$\approx 31 \text{ m}$$

3. Determine the length of x using two methods.



a) Solve for x using similar triangles.

Since  $\angle ABC = \angle DEC (90^\circ)$   
 $\angle BCA = \angle ECD$  (OAT)  
 then  $\triangle ABC \sim \triangle DEC$  (AA~)

Since  $\triangle ABC \sim \triangle DEC$   
 then  $AB:BC:CA = DE:EC:CD$   
 $x:BC:12 = 2:EC:6$

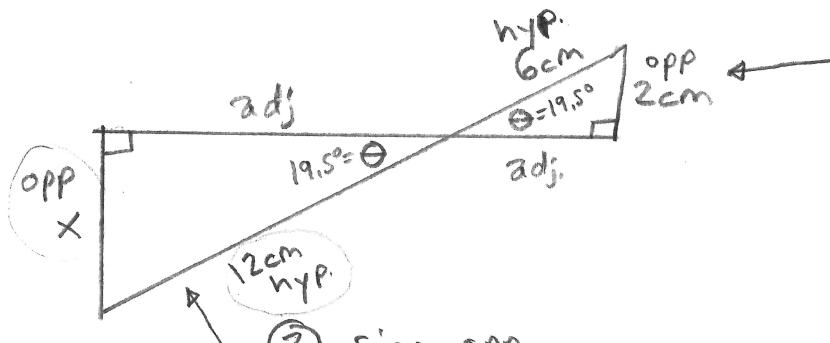
$$\frac{x}{2} = \frac{BC}{EC} = \frac{12}{6}$$

$$\frac{x}{2} = \frac{12}{6}$$

$$\frac{6x}{6} = \frac{24}{6}$$

$$x = 4 \text{ cm}$$

b) Solve for x using trigonometry.



$$\textcircled{2} \sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\frac{\sin(19.5^\circ)}{1} = \frac{x}{12}$$

$$x = 12 \sin(19.5^\circ)$$

$$x \hat{=} 4 \text{ cm}$$

SOH  
 $\textcircled{1} \sin \theta = \frac{\text{opp.}}{\text{hyp.}}$

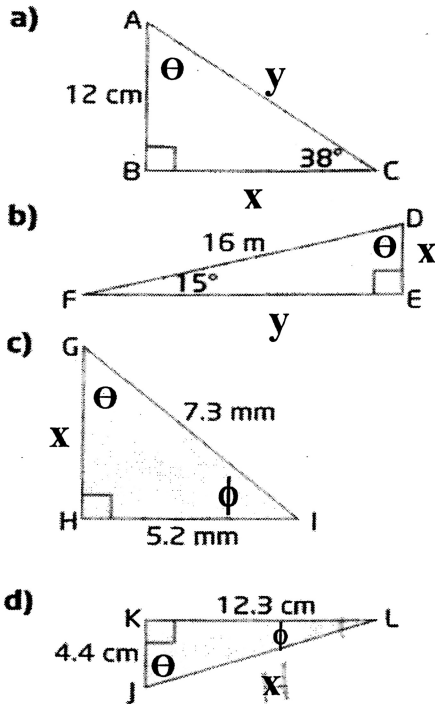
$$\sin \theta = \frac{2}{6}$$

$$\theta = \sin^{-1}\left(\frac{2}{6}\right)$$

$$\theta \hat{=} 19.5^\circ$$

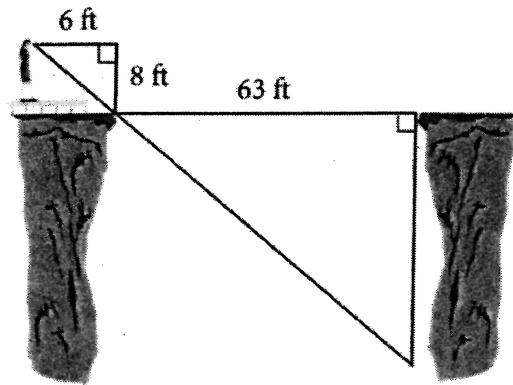
# Solving Triangles – Homework

1. Solve each triangle.



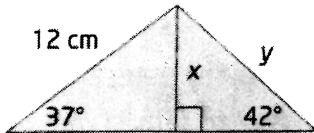
5. The distance across a gorge is 63 ft.

Susan stands at the front of the elevated observation deck, 6 ft back from the edge of the gorge. Her eye level is 8 ft from the ground. She can just see the bottom of the cliff on the other side. How deep is the gorge, to the nearest foot?

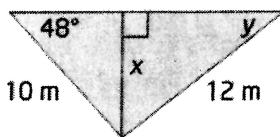


2 Two buildings are 15 m apart. From the top of the shorter building, the angle of elevation to the top of the taller building is  $48^\circ$ , and the angle of depression to the bottom of the taller building is  $34^\circ$ . Find the heights of the two buildings to the nearest tenth of a metre.

3. Find the length of  $x$ , then the length of  $y$ , to the nearest tenth of a centimetre.



4. Find the length of  $x$ , to the nearest tenth of a metre, then the measure of  $y$ , to the nearest degree.



## Answers

- 1a)  $x = 15.4$  cm,  $y = 19.5$  cm,  $\theta = 52^\circ$   
 b)  $x = 4.1$  m,  $y = 15.5$  m,  $\theta = 75^\circ$   
 c)  $x = 5.1$  mm,  $\theta = 44.6^\circ$ ,  $\phi = 45.4^\circ$   
 d)  $x = 13.1$  mm,  $\theta = 70.3^\circ$ ,  $\phi = 19.7^\circ$
2. short = 10.1 m, tall = 26.8 m  
 3.  $x = 7.2$  cm,  $y = 10.8$  cm  
 4.  $x = 7.4$  m,  $y = 38.3^\circ$   
 5. 84 feet