

Section 8.3 The Cosine Ratio, Build Your Skills, p506–508
Student Resource p351–353

Build Your Skills

1. a)

$$\cos A = \frac{x}{h}$$

$$\cos 65^\circ = \frac{x}{6.2}$$

$$x = 6.2 \cos 65^\circ$$

$$x \approx 2.6 \text{ m}$$

The wire must be attached 2.6 m from the base of the pole.

b)

$$\cos A = \frac{x}{h}$$

$$\cos 47^\circ = \frac{4.1}{x}$$

$$x \cos 47^\circ = 4.1$$

$$x = \frac{4.1}{\cos 47^\circ}$$

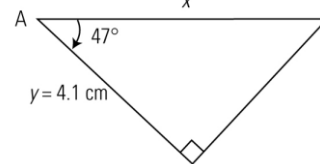
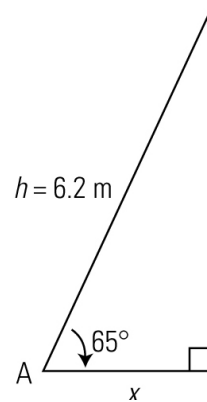
$$x \approx 6.0 \text{ cm}$$

The width is 6 cm.

Multiply both sides by 6.2.

Multiply both sides by x .

Multiply both sides by $\cos 47^\circ$.



2. $\cos A = \frac{g}{t}$

$$\cos 30^\circ = \frac{72}{t}$$

$$t \cos 30^\circ = 72$$

$$t = \frac{72}{\cos 30^\circ}$$

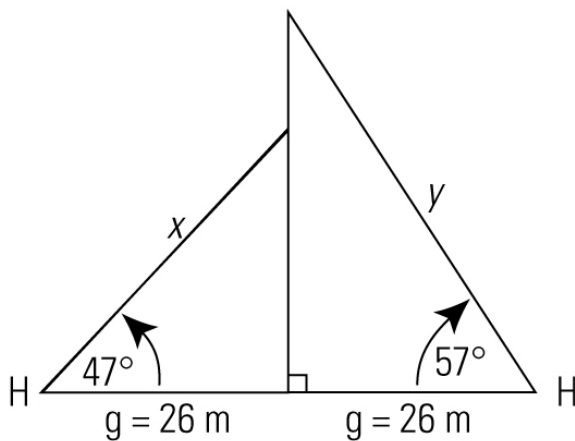
$$t \approx 83.1 \text{ m}$$

The travel pipe must be 83.1 m long.

Multiply both sides by t .

Divide both sides by $\cos 30^\circ$.

3. Sketch the triangles formed by the ground, the totem pole, and the ropes.



$$\cos H = \frac{g}{x}$$

$$\cos 47^\circ = \frac{26}{x}$$

$$x \cos 47^\circ = 26$$

$$x = \frac{26}{\cos 47^\circ}$$

$$x \approx 38.1 \text{ m}$$

$$\cos H = \frac{g}{y}$$

$$\cos 57^\circ = \frac{26}{y}$$

$$y \cos 57^\circ = 26$$

$$y = \frac{26}{\cos 57^\circ}$$

$$y \approx 47.7 \text{ m}$$

The ropes are 38.1 m and 47.7 m long.

You can find out more about totem poles in the “Explore all Films” section of the National Film Board of Canada website (<http://www.nfb.ca/>). Search for the keyword “totem poles.”

Multiply both sides by x .

Multiply both sides by $\cos 47^\circ$.

Multiply both sides by y .

Divide both sides by $\cos 57^\circ$.

$$4. \cos S = \frac{g}{x}$$

$$\cos 23^\circ = \frac{200}{x}$$

$$x \cos 23^\circ = 200$$

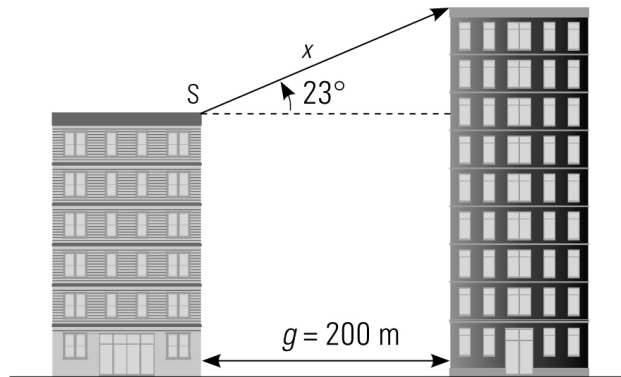
Multiply both sides by x .

$$x = \frac{200}{\cos 23^\circ}$$

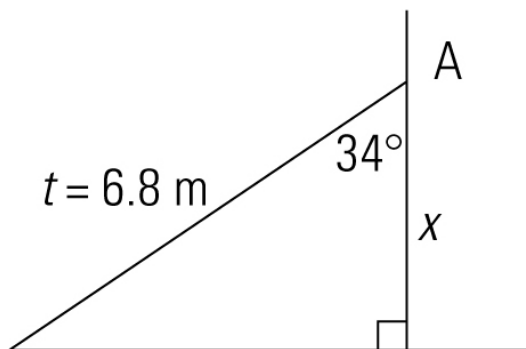
Divide both sides by $\cos 23^\circ$.

$$x \approx 217.3 \text{ m}$$

The surveyor is 217.3 m from the top of the second building.



5.



$$\cos A = \frac{x}{t}$$

$$\cos 34^\circ = \frac{x}{6.8}$$

$$x = 6.8 \cos 34^\circ$$

$$x \approx 5.6$$

The timber reaches 5.6 ft up the pole.

Multiply both sides by 6.8.

$$6. l^2 + h^2 = c^2$$

$$1^2 + h^2 = 3^2$$

$$1 + h^2 = 9$$

$$h^2 = 8$$

$$h = \sqrt{8}$$

$$h \approx 2.8$$

The length of the tapered section of the kayak is approximately 2.8 ft.

Extend Your Thinking

7. If the opposite and the adjacent sides of a triangle are equal, the triangle must be isosceles and so the angles must be 45° . In this case, $\sin x = \cos x$.

8.

$$\cos M = \frac{d}{l}$$

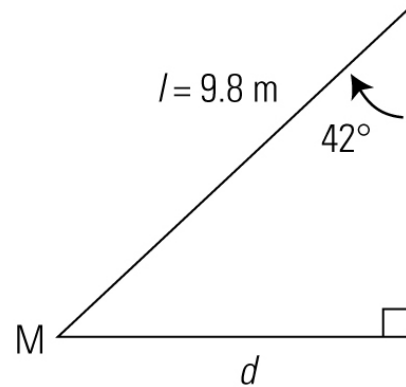
$$\cos 48^\circ = \frac{d}{9.8}$$

$$d = 9.8 \cos 48^\circ$$

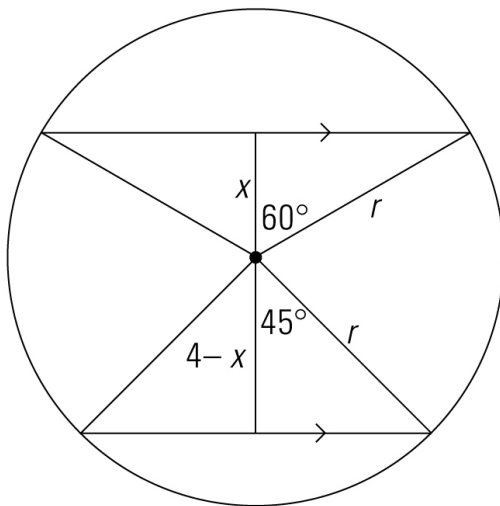
Multiply both sides by 9.8.

$$d \approx 6.6$$

The mount is about 6.6 m from the pole.



9.



If the distance between the two parallel lines is 4 cm, let the distance from the centre to one chord be x .

The other will be 4 minus x .

Label the radius r .