

- (B) Find the distance y that the ramp extends in front of the wall.

Use the definition of cosine.

$$\cos A = \frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{AB}{AC}$$

Substitute \square° for A , y for AB , and \square for AC . $\cos \square^\circ = \frac{y}{\square}$

Multiply both sides by \square . $\square \cos \square^\circ = y$

Use a calculator to evaluate the expression.

$$y \approx \square$$

So, the ramp extends in front of the wall about \square feet.

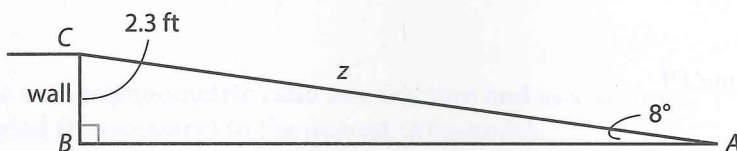
Reflect

10. Could you find the height of the wall using the cosine? Explain.

Your Turn

pg 701 SOH-CAH-TOA

11. Suppose a new regulation states that the maximum angle of a ramp for wheelchairs is 8° . At least how long must the new ramp be? Round to the nearest tenth of a foot.



$$\begin{aligned} \sin 8^\circ &= \frac{2.3}{z} \\ \frac{2.3}{\sin 8} &= \frac{z \sin 8}{\sin 8} \end{aligned}$$

$$z = \frac{2.3}{\sin 8} = 16.5$$

Explain 4 Finding Angle Measures using Sine and Cosine

In the triangle, $\sin A = \frac{5}{10} = \frac{1}{2}$. However, you already know that $\sin 30^\circ = \frac{1}{2}$. So you can conclude that $m\angle A = 30^\circ$, and write $\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$.

Extending this idea, the **inverse trigonometric ratios** for sine and cosine are defined as follows:

Given an acute angle, $\angle A$,

- if $\sin A = x$, then $\sin^{-1} x = m\angle A$, read as "inverse sine of x "
- if $\cos A = x$, then $\cos^{-1} x = m\angle A$, read as "inverse cosine of x "

You can use a calculator to evaluate inverse trigonometric expressions.

