

Section 9.1 Trigonometric **FUN**ctions

$$\sin\theta = \text{opposite/hyp.} = \frac{O}{H}$$

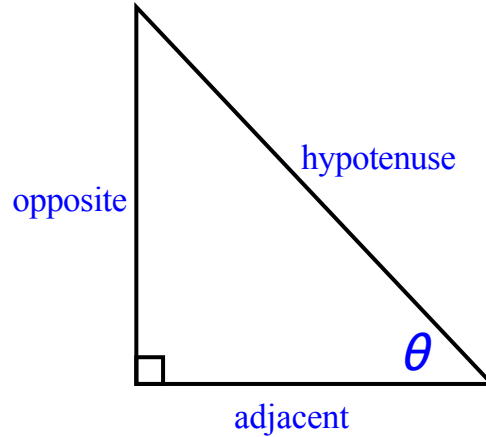
$$\cos\theta = \text{adjacent/hyp.} = \frac{A}{H}$$

$$\tan\theta = \text{opposite/adj.} = \frac{O}{A}$$

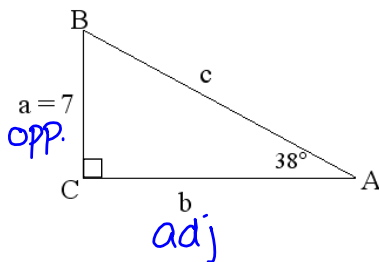
$$\csc\theta = \text{hyp/opposite} = \frac{H}{O}$$

$$\sec\theta = \text{hyp/adjacent} = \frac{H}{A}$$

$$\cot\theta = \text{adj/opposite} = \frac{A}{O}$$

**Example 1**

Find b.



$$\tan\theta = \frac{O}{A}$$

$$\tan 38^\circ = \frac{7}{b}$$

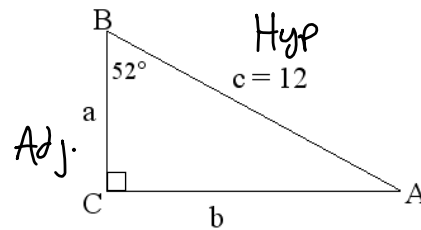
* cross
mult & divide

$$\rightarrow \frac{\tan 38^\circ}{1} = \frac{7}{b}$$

$$b = \frac{(1)(7)}{\tan 38^\circ} = 8.96 \text{ un}$$

Example 2

Find a and b.



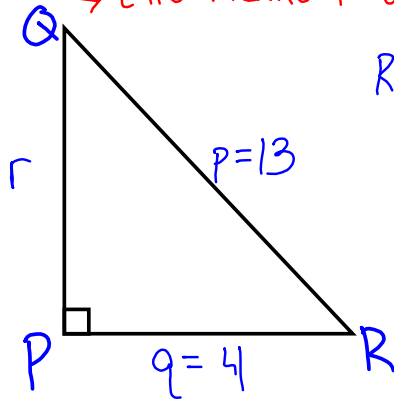
$$\cos\theta = \frac{A}{H}$$

$$\frac{\cos 52^\circ}{1} = \frac{a}{12}$$

$$a = \frac{12(\cos 52^\circ)}{1} = 7.39 \text{ un}$$

Example 3Solve $\triangle PQR$, given angle $P = 90^\circ$, $q = 4$ and $p = 13$.

\swarrow Rt. \angle
 this means find ALL missing sides & angles

Rt $\triangle \rightarrow$ use Pyth. Thm

$$r^2 + q^2 = p^2$$

$$r^2 + 4^2 = 13^2$$

$$r^2 = 153$$

$$r = \sqrt{153}$$

$$m\angle R = ?$$

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

$$\cos R = \frac{4}{13}$$

$$\cos^{-1}\left(\frac{4}{13}\right) = m\angle R = 72.1^\circ$$

$$m\angle Q = 180 - P - R = 180 - 90 - 72.1$$

$$m\angle Q = 17.9^\circ$$

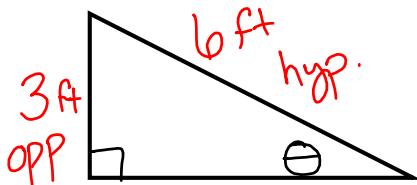
$$\text{OR} \Rightarrow \sin Q = \frac{4}{13} \Rightarrow \sin^{-1}\left(\frac{4}{13}\right) = 17.9^\circ$$

Example 4

You are going to build a jump for your friend's bike.

Using a 6-foot board you make a ramp 3 feet high.

What angle are you taking off at?



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

$$\sin \theta = \frac{3}{6}$$

$$\theta = \sin^{-1}\left(\frac{3}{6}\right) = 30^\circ$$

Example 5

An airplane is at an elevation of 25,000 feet when it begins to approach an airport. Its angle of descent is 8° . What is the distance between the airport and the point on the ground directly below the airplane when it begins its descent?

