Trig Ratios

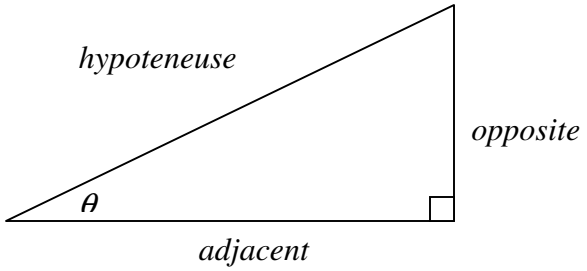
The trigonometric ratios are relationships between the lengths of sides and the measures of angles in *right* triangles.

Recall: The primary trig ratios are:

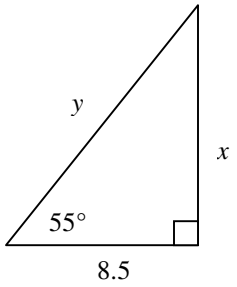
$$\sin\theta = \frac{opposite}{hypoteneuse}$$

$$\cos\theta = \frac{adjacent}{hypoteneuse}$$

$$\tan\theta = \frac{opposite}{adjacent}$$



Example 1: Determine the measure of the missing sides.



x:

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

$$\tan 55 = \frac{x}{8.5}$$

$$x = 8.5\tan 55$$

$$x \doteq 12.1$$

y:

$$\cos\theta = \frac{opp}{hyp}$$

$$\cos 55 = \frac{8.5}{y}$$

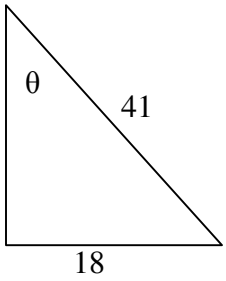
$$y\cos 55 = 8.5$$

$$y = \frac{8.5}{\cos 55}$$

$$y = 14.8$$

(pg. 80 #3, 4)

Example 2: Determine the value of the indicated angle.



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

$$\sin\theta = \frac{18}{41}$$

$$\theta = \sin^{-1}\left(\frac{18}{41}\right)$$

$$\theta = 26$$

Example 3: The cosine of an angle in a right triangle, rounded to four decimal places, is 0.8480. What might the dimensions be?

Sample Answer

Suppose the adjacent side of the triangle is 10.

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

$$0.8480 = \frac{10}{x}$$

$0.8480x = 10$ The hypotenuse is 11.8

$$x = \frac{10}{0.8480}$$

$$x = 11.8$$

$$a^2 + b^2 = c^2$$

$$10^2 + b^2 = 11.8^2$$

$b^2 = 11.8^2 - 10^2$ The remaining side is 6.3

$$b^2 = 39.24$$

$$b = 6.3$$

Practice: pg. 12 #1, 2. 3