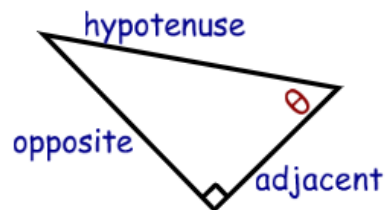
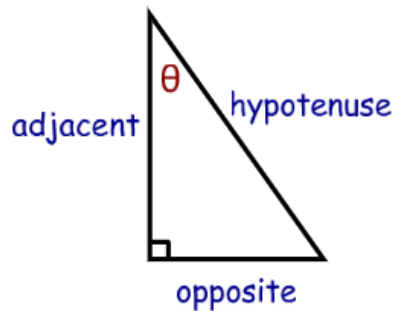


Trigonometric ratios are based on sides, relative to a given angle.

hypotenuse: the side across from the right angle.

opposite: the side *across* from a given angle θ .

adjacent: the side that is *beside* a given angle θ .



hypotenuse

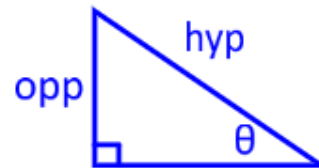
opposite

adjacent

In right triangles, trigonometry relates the measures of sides to the measure of an angle.

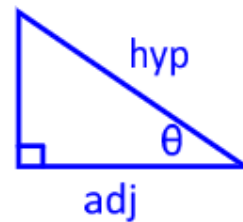
The Sine Ratio

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$



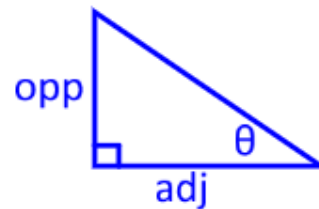
The Cosine Ratio

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$



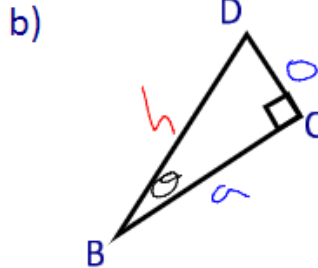
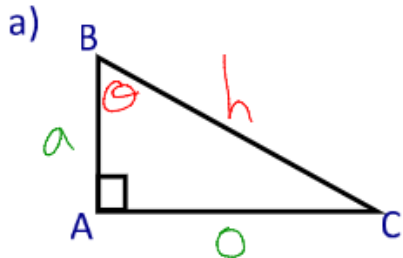
The Tangent Ratio

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



SOH-CAH-TOA

Ex. 1 Label the sides (o,a,h) of each triangle in terms of angle B.



Ex. 2 Determine the value for the following ratios to four decimal places, using your calculator.

D or DEG

a) $\sin 47^\circ$

$$\doteq 0.7314$$

b) $\tan 72^\circ$

$$\doteq 3.0777$$

c) $\cos 12^\circ$

$$\doteq 0.9781$$

Ex. 3 Determine the angle measure, to the nearest degree, for the following trig ratios.

a) $\sin \theta = 0.5432$

$$\theta = \sin^{-1}(0.5432)$$

$$\doteq 33^\circ$$

b) $\tan A = \frac{3}{4}$

$$A = \tan^{-1}\left(\frac{3}{4}\right)$$

$$\doteq 37^\circ$$

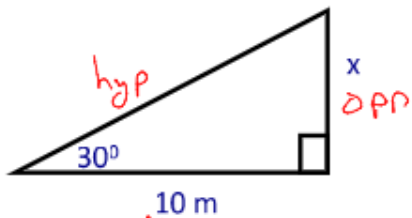
c) $\cos \theta = \frac{8}{9}$

$$\theta = \cos^{-1}\left(\frac{8}{9}\right)$$

$$\doteq 27^\circ$$

Ex. 4 Solve for the unknowns.

a)



adj
 ① Which trig ratio involves 'o' & 'a'?
 TAN

$$\tan \theta = \frac{o}{a}$$

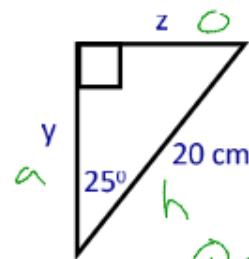
$$\tan 30^\circ = \frac{x}{10}$$

$$10 \cdot \tan 30^\circ = x$$

$$x = 5.8$$

$$\therefore x = 5.8 \text{ cm}$$

b)



$$\textcircled{1} \cos 25^\circ = \frac{y}{20}$$

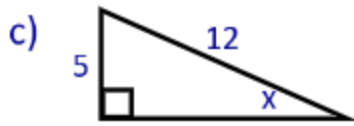
$$20 \cdot \cos 25^\circ = y$$

$$y = 18.1 \text{ cm}$$

$$\textcircled{2} \sin 25^\circ = \frac{z}{20}$$

$$20 \cdot \sin 25^\circ = z$$

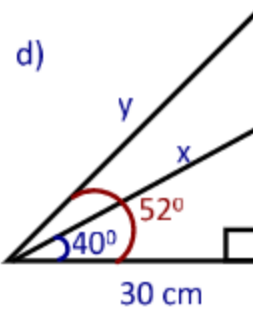
$$z = 8.5 \text{ cm}$$



$$\sin x = \frac{5}{12}$$

$$x = \sin^{-1}\left(\frac{5}{12}\right)$$

$$\approx 24.6^\circ$$



$$\textcircled{1} \cos 40^\circ = \frac{30}{x}$$

$$x \cdot \cos 40^\circ = 30$$

$$x = \frac{30}{\cos 40^\circ}$$

$$\approx 39.2 \text{ cm}$$

$$\textcircled{2} \cos 52^\circ = \frac{30}{y}$$

$$y = \frac{30}{\cos 52^\circ}$$

$$\approx 48.7 \text{ cm}$$