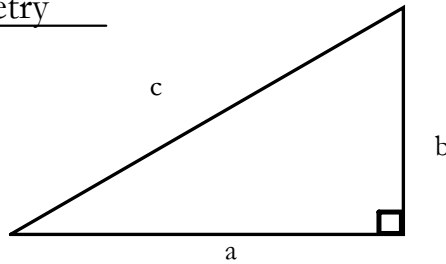


Chapter 4- Right Triangle Trigonometry

Review...

Recall :

Pythagorean Theorem: $c^2 = a^2 + b^2$

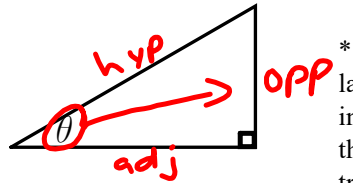


(This only works for right angle triangles. a and b are interchangeable, but c must be opposite the right angle.)

Primary Trigonometric Ratios:

(These also only work for right angle triangles.)

θ (Theta) is a variable commonly used for angles.



**We need to label our sides in order to use the primary trig ratios...

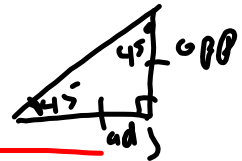
$\frac{\sin \theta}{1} = \frac{\text{opp}}{\text{hyp}}$

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

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

Using your calculator:

$\sin \theta, \cos \theta, \tan \theta = \text{ratio}$ (written as a fraction or a decimal. Has no units)



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

$\cos^{-1}(\text{ratio}) = \theta$

$\tan^{-1}(\text{ratio}) = \theta$

$\frac{1}{1}$

Example 1: Determine the value of each trigonometric ratio to 4 decimal places.

a) $\sin 33^\circ = 0.5446$

b) $\cos 27^\circ = 0.8910$

c) $\tan 46^\circ = 1.0355$

Example 2- Determine the measure of $\angle A$ to the nearest degree.

a) $\sin A = 0.8660$
 $\sin^{-1}(0.8660) = 60^\circ$

b) $\cos A = 0.7071$
 $\cos^{-1}(0.7071) = 45^\circ$

c) $\tan A = \frac{5}{16} = 0.3125$
 $\tan^{-1}(0.3125) = 17.35^\circ$

Example 3: Determine the value of x in each proportion.

a) $\frac{x}{8} = \frac{15}{6} \rightarrow 6x = 120$

$\frac{6x}{6} = \frac{120}{6}$

$x = 20$

b) $\frac{12}{x} = \frac{16}{12} \rightarrow 144 = 16x$

$\frac{144}{16} = \frac{16x}{16}$

$9 = x$

→ find all side lengths + angles.

Solving Right Triangles: With two sides given

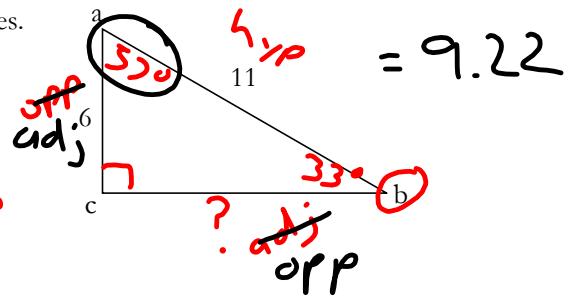
- Use the Pythagorean theorem to find the missing side
- Choose an angle and label the triangle (opp, adj and hyp)
- Choose a ratio to use
- Use your calculator to determine the desired angle
- (the given angle) equals (the missing angle) - 90

$$\frac{\sin 57^\circ}{1} = \frac{?}{11}$$

Example 1: Solve the triangle abc for all sides and angles.

$$\sin b = \frac{6}{11}$$

$$\sin(0.5455) = 33.05^\circ$$

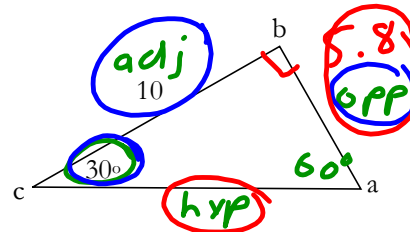


Your turn...

Determine the length of AB, AC to the nearest tenth of a centimetre.

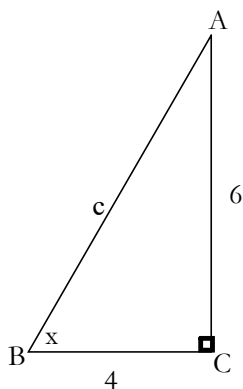
$$\tan 30^\circ = \frac{AB}{10}$$
~~$$0.5774 = \frac{AB}{10}$$~~

$$AB = 5.8$$

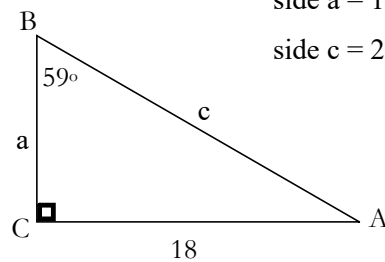


$$AC = 11.6$$

Example 2: Solve Each Triangle.



- <B (x) = 56.31°
- <A = 33.69°
- side c = 7.21



- <A = 31°
- side a = 10.82
- side c = 21