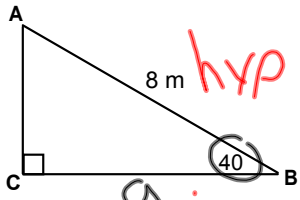
Using Sine, Cosine, and Tangent to Find Angle Measurements

DO IT NOW!!

Find the length of side 'a'



$\cos 40 = \frac{a}{8}$

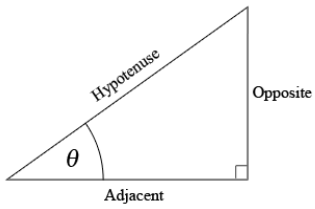
$8(\cos 40) = a$

$a = 6.13\ m$

Review

Each angle has its own unique sine, cosine, and tangent ratio that never changes

S $\frac{O}{H}$ **C** $\frac{A}{H}$ **T** $\frac{O}{A}$



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

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

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

How do we use trig to find angles?

- If $\tan\theta = 2$

- calculate the inverse tangent of 2 to find the measure of θ

$\theta = \tan^{-1}(2)$

-put that in on your calculator and you get:

$\theta = 63.43$

The inverse trigonometric functions ($\sin^{-1}$, $\cos^{-1}$, and $\tan^{-1}$) allow you to find the measure of an angle in a right triangle. All that you need to know are any two sides as well as how to use SOHCAHTOA.

Note: The -1 is not an exponent, it is a notation telling us that it is an inverse function. Regular trig functions take angles as inputs and gives us side ratios. Oppositely, inverse trig functions take side ratios as inputs and give us angles.

You Try

Find each angle measure:

1) Sin θ = 10/26

$\theta = \sin^{-1}(10/26)$

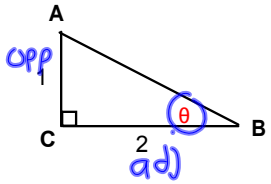
$\theta = 22.62°$

2) Cos θ = 0.25

$\theta = \cos^{-1}(0.25)$

$= 75.52°$

1



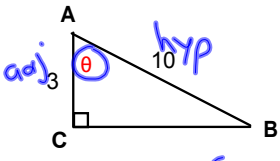
Find the measure of the indicated angle

$\tan\theta = \frac{1}{2}$

$\theta = \tan^{-1}(1/2)$

$= 26.57°$

2



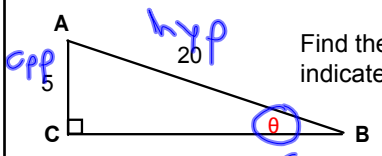
Find the measure of the indicated angle

$\cos\theta = \frac{3}{10}$

$\theta = \cos^{-1}(3/10)$

$\theta = 72.54°$

3



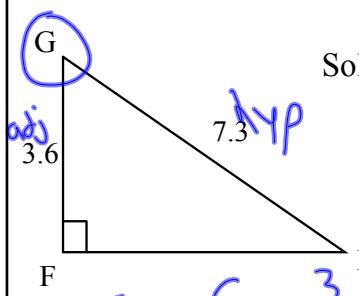
Find the measure of the indicated angle

$\sin\theta = \frac{5}{20}$

$\theta = \sin^{-1}(5/20)$

$\theta = 14.48°$

4



Solve for angle G

$\cos G = \frac{3.6}{7.3}$

$\angle G = \cos^{-1}\left(\frac{3.6}{7.3}\right)$

$\angle G = 60.45^\circ$

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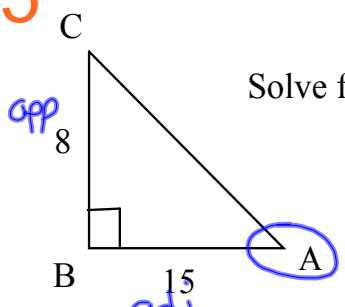


Solve for angle A

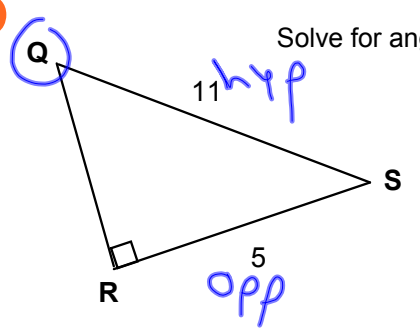
adj

$\tan A = \frac{8}{15}$

$\angle A = \tan^{-1}\left(\frac{8}{15}\right)$

$\angle A = 28.07^\circ$

6



Solve for angle Q

$\sin Q = \frac{5}{11}$

$\angle Q = \sin^{-1}\left(\frac{5}{11}\right)$

$\angle Q = 27.04$

SOLVE THE TRIANGLE

Solve a Triangle: Find the measurements of each of the sides and angles

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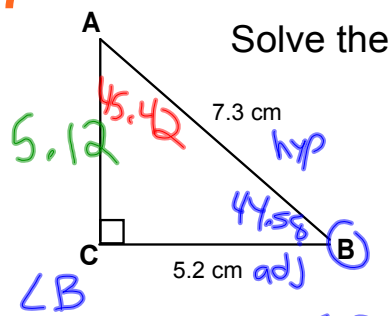

Solve the triangle

5.12 45.42 hyp 44.58 adj

∠B

$\cos B = \frac{5.2}{7.3}$

$\angle B = 44.58$

∠A

$\angle A = 180 - 90 - 44.58$

$= 45.42$

Side b

$\tan 44.58 = \frac{b}{5.2}$

$5.2(\tan 44.58) = b$

$b = 5.12$ cm