

Geometry
Trigonometric Ratios (Day 2) - missing side

Name: _____

Date: _____

SOHCAHTOA

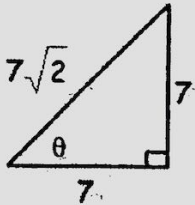
$$\begin{aligned} \sin &= \frac{o}{h} \\ \cos &= \frac{a}{h} \\ \tan &= \frac{o}{a} \end{aligned}$$

WARM-UP - Numbers 1 - 11

1. $\frac{4}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{4\sqrt{6}}{6} = \frac{2\sqrt{6}}{3}$

2. $\frac{\sqrt{5}}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{15}}{2 \cdot 3} = \frac{\sqrt{15}}{6}$

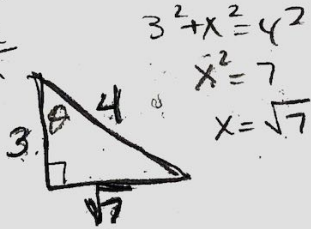
3. Find the exact value of the three trig functions for the triangle below.



$$\sin \theta = \frac{7}{7\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{7 \cdot 2} = \frac{\sqrt{2}}{2} \quad \cos \theta = \frac{7}{7\sqrt{2}} = \frac{\sqrt{2}}{2} = \frac{1\sqrt{2}}{1.2} \quad \tan \theta = \frac{7}{7} = 1$$

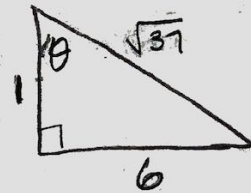
4. Sketch the triangle and find the other 2 trig functions of the acute angle.

A. $\cos \theta = \frac{3}{4} \cdot \frac{a}{h}$
 $\sin \theta = \frac{\sqrt{7}}{4}$
 $\tan \theta = \frac{\sqrt{7}}{3}$



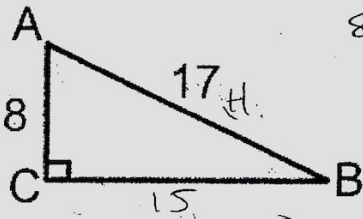
B. $\tan \theta = \frac{6}{1} \cdot \frac{o}{a}$

$$\begin{aligned} \sin \theta &= \frac{6}{\sqrt{37}} \cdot \frac{\sqrt{37}}{\sqrt{37}} = \frac{6\sqrt{37}}{37} \\ \cos \theta &= \frac{1}{\sqrt{37}} \cdot \frac{\sqrt{37}}{\sqrt{37}} = \frac{\sqrt{37}}{37} \end{aligned}$$



$$\begin{aligned} 1^2 + 6^2 &= x^2 \\ 37 &= x^2 \\ x &= \sqrt{37} \end{aligned}$$

5. Find the cosine and sine of the acute angles in the triangle shown.



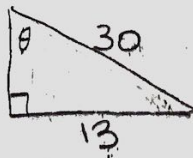
$$\begin{aligned} 8^2 + x^2 &= 17^2 \\ x^2 &= 225 \\ x &= 15 \end{aligned}$$

$$\begin{aligned} \sin A &= \frac{15}{17} \\ \cos A &= \frac{8}{17} \end{aligned}$$

$$\begin{aligned} \sin B &= \frac{8}{17} \\ \cos B &= \frac{15}{17} \end{aligned}$$

The trigonometric function of the complement of an angle is called a co-function. Sine and cosine are cofunctions of each other.

Use co-functions to answer the following:



6. $\sin \theta = \frac{13}{30}$
 $\cos(90 - \theta) = \frac{13}{30}$
 other acute \(\angle\)

7. $\cos \theta = \frac{5}{19}$
 $\sin(90 - \theta) = \frac{5}{19}$

8. $\tan \theta = \frac{22}{17}$
 $\tan(90 - \theta) = \frac{17}{22}$
 reciprocal

$\sin 62^\circ = \cos \frac{28^\circ}{90 - 62}$

10. $\sin 71^\circ = \cos \frac{19^\circ}{90 - 19}$

11. $\sin 28^\circ = \cos \frac{62^\circ}{90 - 28}$

Using the Calculator

**You must always remember to check your calculator. It needs to be in Degree mode in order to calculate the answers correctly.

Let's make sure you can use your calculator. Round your answers to two decimal places.

$\sin 48^\circ$.74
 $\tan 22^\circ$.40
 $\cos 52^\circ$.62

How would you solve these equations? Cross Multiply

$$\sin 20^\circ = \frac{a}{12}$$

$$12(\sin 20^\circ) = a$$

$$a = 4.10$$

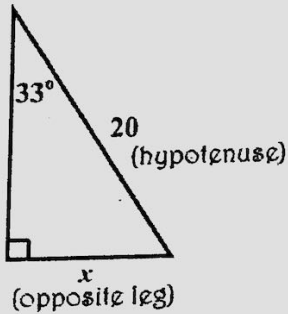
$$\cos 80^\circ = \frac{25}{b}$$

$$b \cos 80^\circ = 25$$

$$b = \frac{25}{\cos 80^\circ}$$

$$b = 143.97$$

When given an acute angle measure and a side length, we can use trig to find another side length of the triangle.



Which trig ratio contains "hypotenuse" and "opposite leg"? Sine

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Write an equation that would allow us to solve for x . Then,

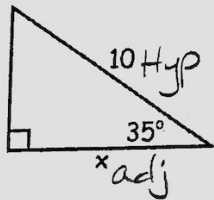
solve for x .

$$\sin 33^\circ = \frac{x}{20}$$

$$20 \sin 33^\circ = x$$

$x \approx 10.89$

Let's try another one.

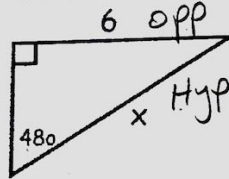


$$\cos 35^\circ = \frac{x}{10}$$

$$10 \cos 35^\circ = x$$

$x \approx 8.19$

One More...

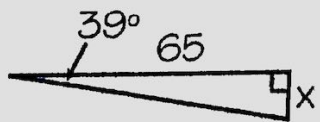


$$\sin 48^\circ = \frac{6}{x}$$

$$x = \frac{6}{\sin 48^\circ}$$

$x \approx 8.07$

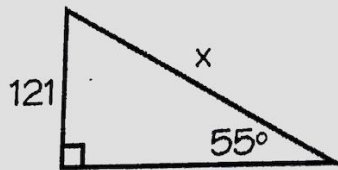
Work with your neighbor on these problems. $S = \frac{O}{H}$ $C = \frac{A}{H}$ $T = \frac{O}{A}$



$$\tan 39^\circ = \frac{x}{65}$$

$$65 \tan 39^\circ = x$$

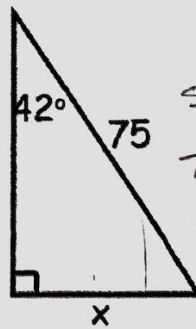
$x \approx 52.64$



$$\sin 55^\circ = \frac{121}{x}$$

$$x = \frac{121}{\sin 55^\circ}$$

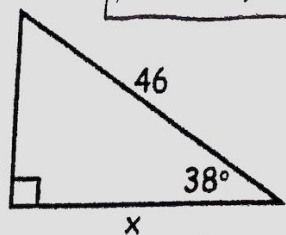
$x \approx 147.71$



$$\sin 42^\circ = \frac{x}{75}$$

$$75 \sin 42^\circ = x$$

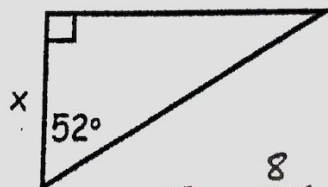
$x \approx 50.18$



$$\cos 38^\circ = \frac{x}{46}$$

$$46 \cos 38^\circ = x$$

$x \approx 36.25$

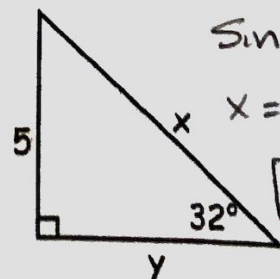


$$\tan 52^\circ = \frac{8}{x}$$

$$x = \frac{8}{\tan 52^\circ}$$

$x \approx 6.25$

Find x and y .



$$\sin 32^\circ = \frac{5}{x}$$

$$x = \frac{5}{\sin 32^\circ}$$

$x \approx 9.44$

$$\tan 32^\circ = \frac{5}{y}$$

$$y = \frac{5}{\tan 32^\circ}$$

$y \approx 8.00$