

LESSON #8: FINDING AND A SIDE/ANGLE USING SOHCAHTOA

Now: Use the right triangle $\triangle ABC$ to answer exercises 1-3.

1. Name the side of the triangle opposite $\angle A$.

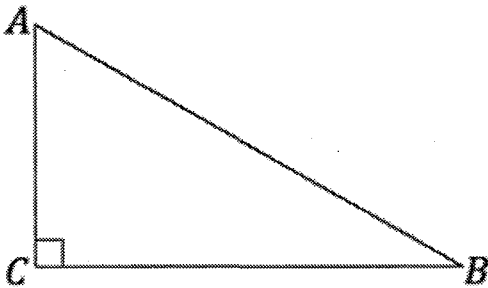
BC

2. Name the side of the triangle opposite $\angle B$.

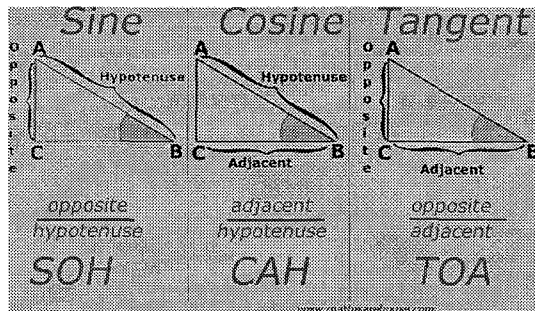
AC

3. Name the side of the triangle opposite $\angle C$.

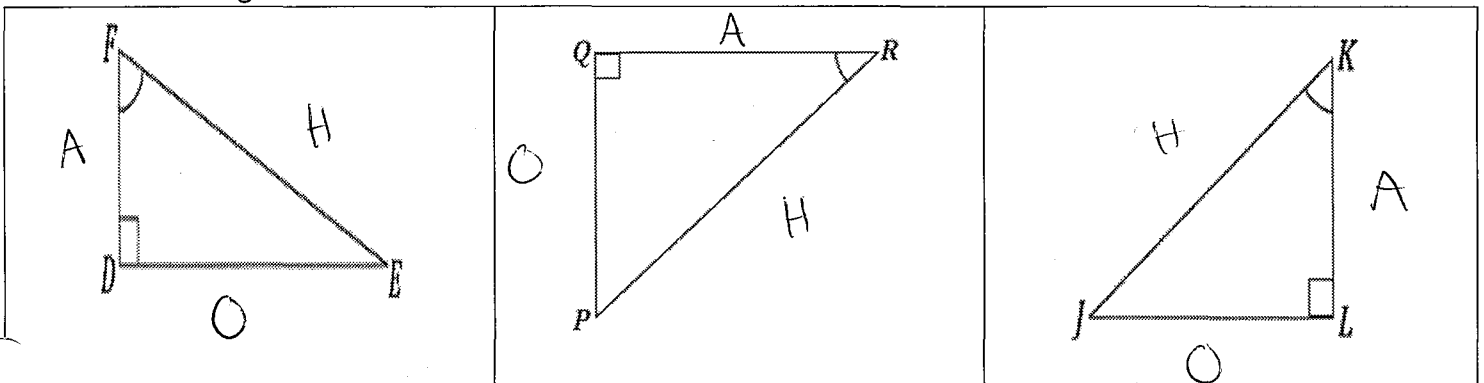
AB



LET'S REVIEW SOHCAHTOA!!!



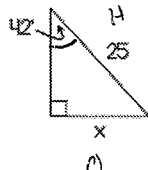
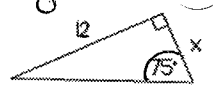
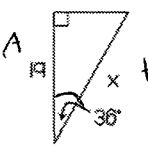
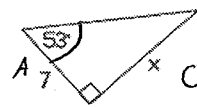
For exercises 1-3, label the appropriate sides as *adjacent*, *opposite*, and *hypotenuse*, with respect to the marked acute angle.



FINDING SIDES

STEPS:

1. Use SOHCAHTOA to determine which trig function you are using.
2. Set up proportion.
3. Cross multiply and solve for x.

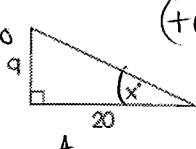
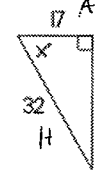
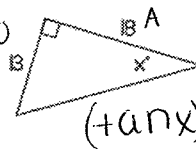
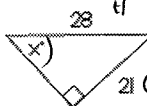
<p>EXAMPLE 1</p>  $\sin 42 = \frac{x}{25}$ $x = 25 \sin 42$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 16.7$</div>	<p>EXAMPLE 2</p>  $\tan 75 = \frac{12}{x}$ $12 = x \tan 75$ $x = \frac{12}{\tan 75}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 3.2$</div>
<div style="border: 2px solid black; border-radius: 50%; width: 100px; height: 100px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p style="margin: 0;">Finding missing SIDES with TRIGONOMETRY</p> </div>	
<p>EXAMPLE 3</p>  $\cos 36 = \frac{19}{x}$ $19 = x \cos 36$ $x = \frac{19}{\cos 36}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 23.5$</div>	<p>EXAMPLE 4</p>  $\tan 53 = \frac{x}{7}$ $x = 7 \tan 53$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 9.3$</div>

FINDING ANGLES

STEPS:

1. Use SOHCAHTOA to determine which trig function you are using.
2. Set up proportion.
3. Using the 2nd button in your calculator, enter the ratio. **DO NOT**

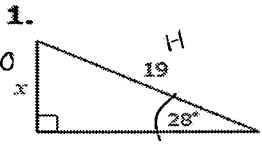
CROSS MULTIPLY!

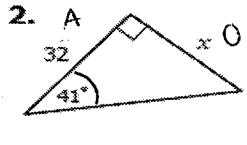
<p>EXAMPLE 1</p>  $(\tan x)^{-1} = \left(\frac{9}{20}\right)^{-1}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 24.2^\circ$</div>	<p>EXAMPLE 2</p>  $(\cos x)^{-1} = \left(\frac{17}{32}\right)^{-1}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 57.9^\circ$</div>
<div style="border: 2px solid black; border-radius: 50%; width: 100px; height: 100px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p style="margin: 0;">Finding missing ANGLES with TRIGONOMETRY</p> </div>	
<p>EXAMPLE 3</p>  $(\tan x)^{-1} = \left(\frac{13}{18}\right)^{-1}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 35.8^\circ$</div>	<p>EXAMPLE 4</p>  $(\sin x)^{-1} = \left(\frac{21}{28}\right)^{-1}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$x = 48.6^\circ$</div>

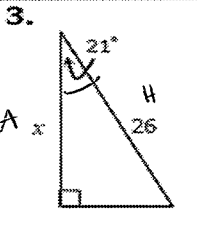
FINDING MISSING SIDES WITH TRIG RATIOS

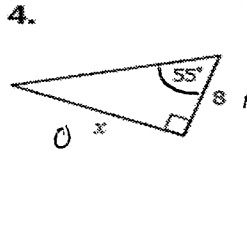
Make sure your calculator is in DEGREE MODE!

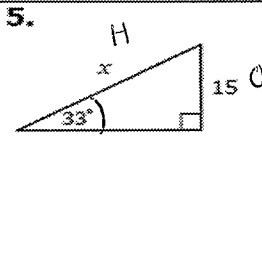
Directions: Solve for x . Round to the nearest tenth.

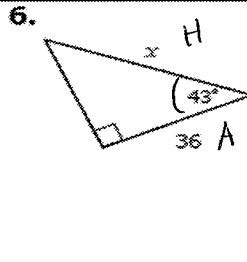
1.  $\frac{\sin 28}{1} = \frac{x}{19}$
 $x = 19 \sin 28$
 $x = 8.9$

2.  $\frac{\tan 41}{1} = \frac{x}{32}$
 $x = 32 \tan 41$
 $x = 27.8$

3.  $\frac{\cos 21}{1} = \frac{x}{26}$
 $x = 26 \cos 21$
 $x = 24.3$

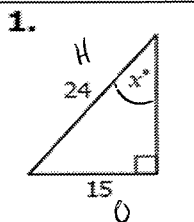
4.  $\frac{\tan 55}{1} = \frac{x}{8}$
 $x = 8 \tan 55$
 $x = 11.4$

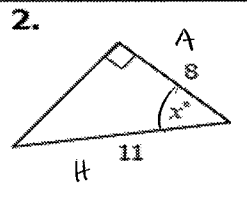
5.  $\frac{\sin 33}{1} = \frac{15}{x}$
 $15 = x \frac{\sin 33}{\sin 33}$
 $x = 27.5$

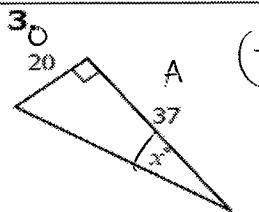
6.  $\frac{\cos 43}{1} = \frac{36}{x}$
 $36 = x \frac{\cos 43}{\cos 43}$
 $x = 49.2$

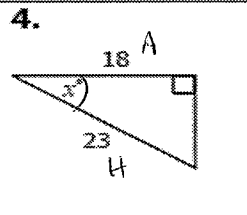
FIND MISSING ANGLES WITH TRIG RATIOS

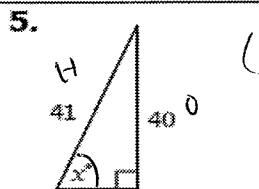
Examples: Find the value of x . Round to the nearest tenth.

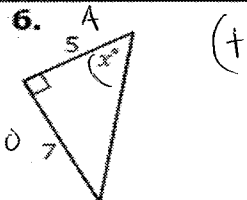
1.  $(\sin x)^{-1} = \left(\frac{15}{24}\right)^{-1}$
 $x = 38.7^\circ$

2.  $(\cos x)^{-1} = \left(\frac{8}{11}\right)^{-1}$
 $x = 43.3^\circ$

3.  $(\tan x)^{-1} = \left(\frac{20}{37}\right)^{-1}$
 $x = 28.4^\circ$

4.  $(\cos x)^{-1} = \left(\frac{18}{23}\right)^{-1}$
 $x = 38.5^\circ$

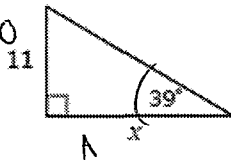
5.  $(\sin x)^{-1} = \left(\frac{40}{41}\right)^{-1}$
 $x = 77.3^\circ$

6.  $(\tan x)^{-1} = \left(\frac{5}{7}\right)^{-1}$
 $x = 35.5^\circ$

Review: Finding Sides & Angles

Directions: Find the value of x . Round to the nearest tenth.

7.

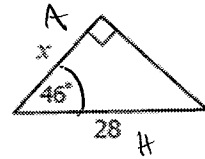


$$\frac{\tan 39}{1} = \frac{11}{x}$$

$$x \tan 39 = \frac{11}{\tan 39}$$

$$x = 13.6$$

8.

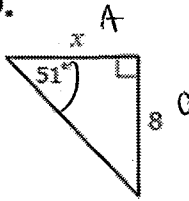


$$\frac{\cos 46}{1} = \frac{x}{28}$$

$$x = 28 \cos 46$$

$$x = 19.5$$

9.

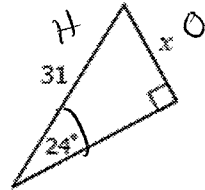


$$\frac{\tan 51}{1} = \frac{8}{x}$$

$$8 = \frac{x \tan 51}{\tan 51}$$

$$x = 6.5$$

10.

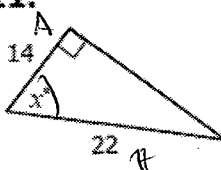


$$\frac{\sin 24}{1} = \frac{x}{31}$$

$$x = 31 \sin 24$$

$$x = 12.6$$

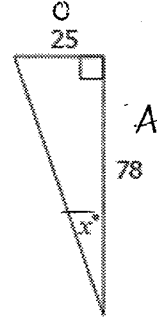
11.



$$(\cos x)^{-1} = \left(\frac{14}{22}\right)^{-1}$$

$$x = 50.5^\circ$$

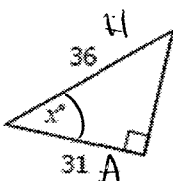
12.



$$(\tan x)^{-1} = \left(\frac{25}{78}\right)^{-1}$$

$$x = 17.8^\circ$$

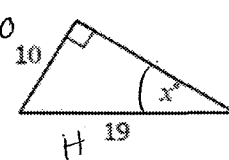
13.



$$(\cos x)^{-1} = \left(\frac{31}{36}\right)^{-1}$$

$$x = 30.6$$

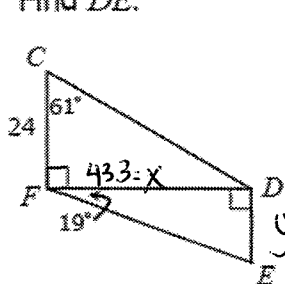
14.



$$(\sin x)^{-1} = \left(\frac{10}{19}\right)^{-1}$$

$$x = 31.8^\circ$$

15. Find DE.



$$\frac{\tan 61}{1} = \frac{x}{24}$$

$$x = 24 \tan 61$$

$$x = 43.3$$

$$\frac{\tan 19}{1} = \frac{y}{43.3}$$

$$y = 43.3 \tan 19$$

$$y = 14.9$$