Unit 7 Lesson 2: Finding Missing Sides

I. Evaluating Trig Functions

Calculate each – fix settings on your calculator to do this (MODE-DEGREE). If rounding is necessary use <u>three</u> decimal places.

a. $\sin(53) = x$ $x = .799$

b. $\cos(87) = x$ $x = .052$

c. $\tan(32) = x$ $x = .625$

d. $\cos(45) = x$ $x = .707$

e. $\tan(10) = x$ $x = .176$

f. $\sin(37) = x$ $x = .602$

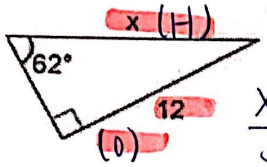
II. Using Trig to Solve

1. Identify the Reference Angle (should be marked – remember it cannot be the Right angle)!
2. Label the sides of the triangle (opposite, adjacent, hypotenuse) with respect to your reference angle.
3. Identify the trig function you should use (sin, cos, tan) based on the sides that are labeled.
4. Solve for x.

$\sin(\text{angle}) = O/H$
$\cos(\text{angle}) = A/H$
$\tan(\text{angle}) = O/A$

Find the missing side length using your knowledge of trig ratios.

1.

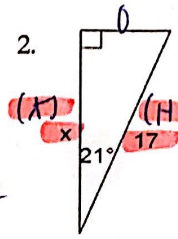


$\frac{\sin 62}{1} = \frac{12}{x}$

$\frac{x \cdot \sin 62}{\sin 62} = \frac{12}{\sin 62}$

$x = 13.591$

2.

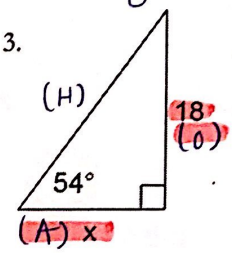


$\frac{\cos(21)}{1} = \frac{x}{17}$

$17\cos(21) = x$

$x = 15.871$

3.



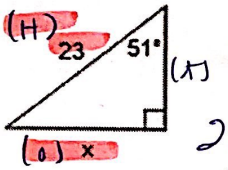
$\frac{\tan 54}{1} = \frac{18}{x}$

$x \cdot \tan 54 = 18$

$x = \frac{18}{\tan 54}$

$x = 13.078$

4.

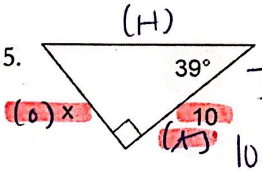


$\frac{\sin 51}{1} = \frac{x}{23}$

$23 \cdot \sin 51 = x$

$x = 17.874$

5.

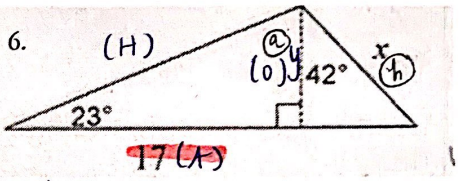


$\frac{\tan 39}{1} = \frac{x}{10}$

$10 \cdot \tan 39 = x$

$x = 8.098$

6.



$\frac{\tan 23}{1} = \frac{y}{17} \Rightarrow 17\tan 23 = y$

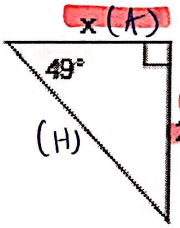
$y = 7.216$

$\frac{\cos 42}{1} = \frac{7.216}{x}$

$\frac{x \cdot \cos 42}{\cos 42} = \frac{7.216}{\cos 42}$

$x = 9.71$

7.



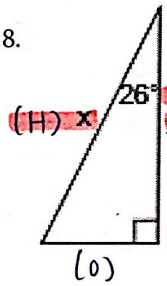
$\frac{\tan 49}{1} = \frac{24}{x}$

$x \cdot \tan 49 = 24$

$x = \frac{24}{\tan 49}$

$x = 20.863$

8.



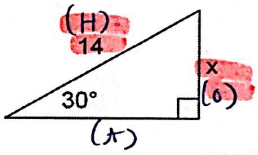
$\frac{\cos 26}{1} = \frac{36}{x}$

$\frac{x \cdot \cos 26}{\cos 26} = \frac{36}{\cos 26}$

$x = \frac{36}{\cos 26}$

$x = 40.054$

9.

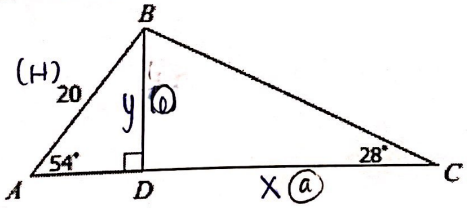


$\frac{\sin 30}{1} = \frac{x}{14}$

$14 \cdot \sin 30 = x$

$x = 7$

10. Find DC



$\sin 54 = \frac{y}{20}$

$20 \cdot \sin 54 = y$

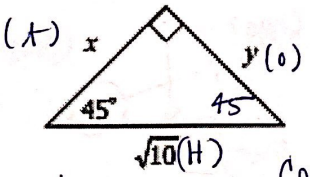
$y = 16.18$

$\tan 28 = \frac{16.18}{x}$

$\frac{x \tan 28}{\tan 28} = \frac{16.18}{\tan 28}$

$x = 30.43$

11. Find x and y.



$\frac{\sin 45}{1} = \frac{y}{\sqrt{10}}$

$\sqrt{10} \cdot \sin 45 = y$

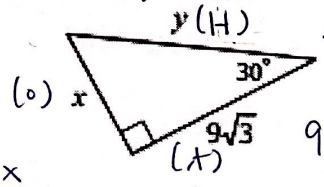
$y = 2.236$

$\cos 45 = \frac{x}{\sqrt{10}}$

$x = \sqrt{10} \cdot \cos 45$

$x = 2.236$

12. Find x and y.



$\frac{\tan 30}{1} = \frac{x}{9\sqrt{3}}$

$9\sqrt{3} \cdot \tan 30 = x$

$x = 9$

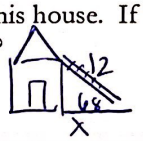
$\cos 30 = \frac{9\sqrt{3}}{y}$

$\frac{y \cdot \cos 30}{\cos 30} = \frac{9\sqrt{3}}{\cos 30}$

$y = \frac{9\sqrt{3}}{\cos 30}$

$y = 18$

13. Jake leaned a 12 foot ladder against his house. If the angle formed by the ladder and the ground is 68°, how far from the base of the house did he place the ladder?



$\cos 68 = \frac{x}{12}$

$12 \cdot \cos 68 = x$

$x = 4.495$ feet