Dynamics of Trigonometry

Name: Answer Key
Date: _____
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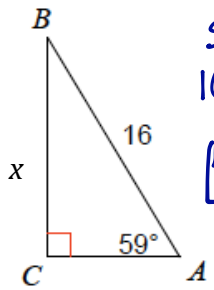
Review Unit 2

Right Triangle Trigonometry

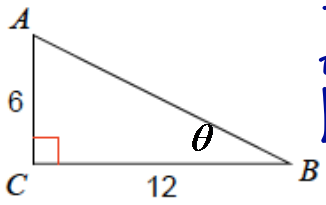
Find the missing side or angle. Show all work. Round your answer to the nearest hundredth.

1. 

$\sin 59^\circ = \frac{x}{16}$

$16 \sin 59^\circ = x$

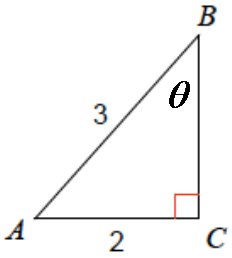
$13.71 = x$

2. 

$\tan \theta = \frac{6}{12}$

$\tan^{-1}\left(\frac{6}{12}\right) = \theta$

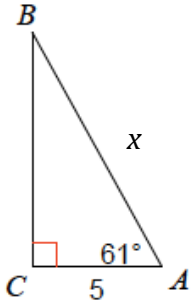
$26.57^\circ = \theta$

3. 

$\sin \theta = \frac{2}{3}$

$\sin^{-1}\left(\frac{2}{3}\right) = \theta$

$41.81^\circ = \theta$

4. 

$\cos 61^\circ = \frac{5}{x}$

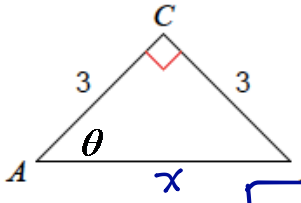
$x \cos 61^\circ = 5$

$x = \frac{5}{\cos 61^\circ}$

$x = 10.31$

Find all six trig functions values for angle θ. Leave your answer in simplest radical form.

5.



$3^2+3^2=x^2$

$9+9=x^2$

$18=x^2$

$\sqrt{18}=x$

$3\sqrt{2}=x$

$\sin\theta=\frac{3}{3\sqrt{2}}=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$

$\cos\theta=\frac{3}{3\sqrt{2}}=\frac{\sqrt{2}}{2}$

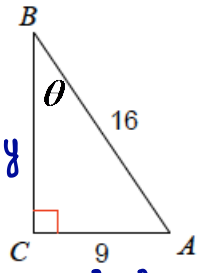
$\tan\theta=\frac{3}{3}=1$

$\csc\theta=\frac{3\sqrt{2}}{3}=\sqrt{2}$

$\sec\theta=\frac{3\sqrt{2}}{3}=\sqrt{2}$

$\cot\theta=\frac{3}{3}=1$

6.



$y^2+9^2=16^2$

$y^2=16^2-9^2$

$y^2=256-81$

$y^2=175$

$y^2=\sqrt{175}$

$y^2=5\sqrt{7}$

$\sin\theta=\frac{9}{16}$

$\cos\theta=\frac{5\sqrt{7}}{16}$

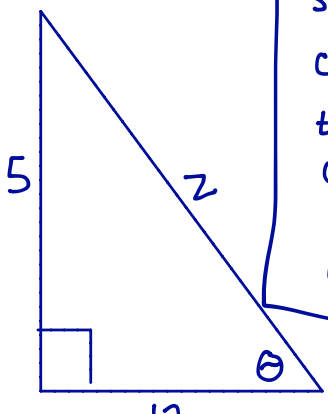
$\tan\theta=\frac{9}{5\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}}=\frac{9\sqrt{7}}{35}$

$\csc\theta=\frac{16}{9}$

$\sec\theta=\frac{16}{5\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}}=\frac{16\sqrt{7}}{35}$

$\cot\theta=\frac{5\sqrt{7}}{9}$

7. $\tan\theta=\frac{5}{12}$



$5^2+12^2=z^2$

$25+144=z^2$

$169=z^2$

$\sqrt{169}=z$

$13=z$

$\sin\theta=\frac{5}{13}$

$\cos\theta=\frac{12}{13}$

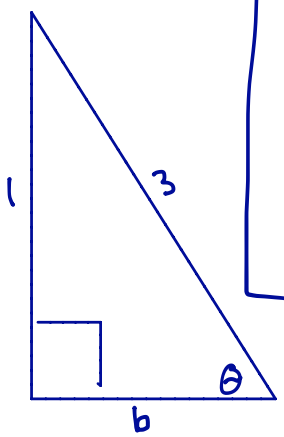
$\tan\theta=\frac{5}{12}$

$\csc\theta=\frac{13}{5}$

$\sec\theta=\frac{13}{5}$

$\cot\theta=\frac{12}{5}$

8. $\csc\theta=3=\frac{3}{1}$



$1^2+b^2=3^2$

$b^2=3^2-1^2$

$b^2=9-1$

$b^2=8$

$b=\sqrt{8}$

$b=2\sqrt{2}$

$\sin\theta=\frac{1}{3}$

$\cos\theta=\frac{2\sqrt{2}}{3}$

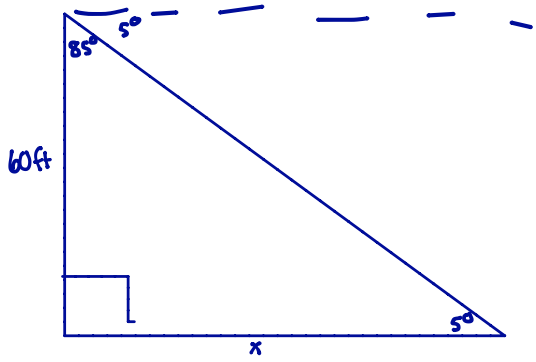
$\tan\theta=\frac{1}{2\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}=\frac{\sqrt{2}}{4}$

$\csc\theta=3$

$\sec\theta=\frac{3}{2\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}=\frac{3\sqrt{2}}{4}$

$\cot\theta=\frac{2\sqrt{2}}{1}=2\sqrt{2}$

9. An observer on top of a 60-foot tall lighthouse sees a boat in distress at a 5º angle of depression. How far is the boat from the base of the lighthouse?

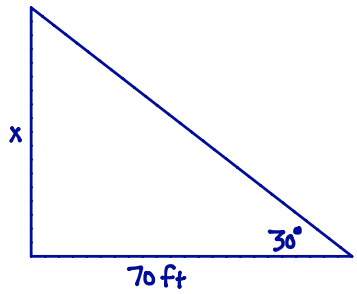


$\tan 85^\circ = \frac{x}{60}$

$60 \tan 85^\circ = x$

685.80 ft

10. A tree casts a shadow 70 feet long at an angle of elevation of 30º. How tall is the tree?

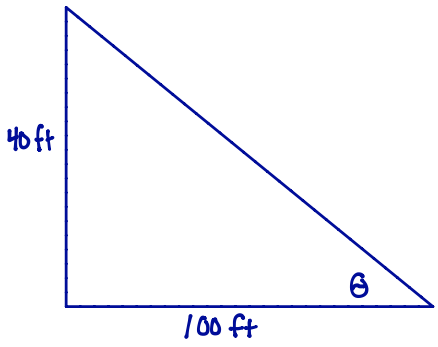


$\sin 30^\circ = \frac{x}{70}$

$70 \sin 30^\circ = x$

$35\text{ ft} = x$

11. You are looking up at a fourth story window, 40 feet up in a building. You are 100 feet away from the building, across the street. What is the angle of elevation?

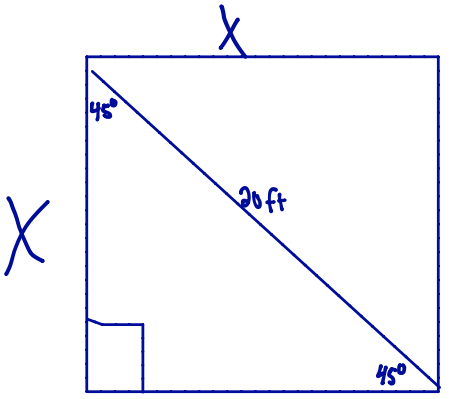


$\tan \theta = \frac{40}{100}$

$\tan^{-1}\left(\frac{40}{100}\right) = \theta$

$21.80^\circ = \theta$

12. A square has a diagonal of 20 feet. What is the area of this square?



$\sin 45^\circ = \frac{x}{20}$

$20 \sin 45^\circ = x$

$14.14 = x$

$\text{Area} = x^2$

$\text{Area} = (14.14)^2$

$\text{Area} = 199.94\text{ ft}^2$

$\sin 45^\circ = \frac{x}{20}$

$20 \sin 45^\circ = x$

$20\left(\frac{\sqrt{2}}{2}\right) = x$

$\frac{20\sqrt{2}}{2} = x$

$10\sqrt{2} = x$

$\text{Area} = x^2$

$\text{Area} = (10\sqrt{2})^2$

$\text{Area} = 100 \cdot 2$

$\text{Area} = 200\text{ ft}^2$

13. Fill in the chart below with the exact values for each of the trigonometric functions at the special angles given.

θ in degrees	θ in radians	Sinθ	Cosθ	Tanθ
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	U