

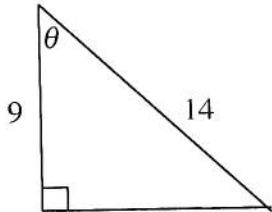
Advanced Algebra 2

Practice Quiz #13-1

Name Key

Use the triangle below to evaluate the six trigonometric ratios of θ . Leave answers in exact form and reduce ratios if possible.

1.



Missing side

$$9^2 + b^2 = 14^2$$

$$b = \sqrt{115}$$

Sin θ $\frac{\sqrt{115}}{14}$

Csc θ $\frac{14\sqrt{115}}{115}$

Cos θ $\frac{9}{14}$

Sec θ $\frac{14}{9}$

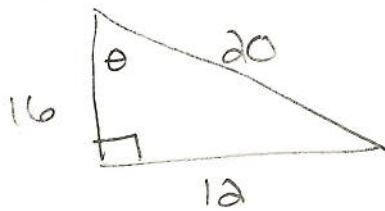
Tan θ $\frac{\sqrt{115}}{9}$

Cot θ $\frac{9\sqrt{115}}{115}$

2. In a right triangle, $\csc \theta = \frac{20}{120}$. Draw and label the triangle. Then evaluate θ for the other 5 trigonometric ratios.

Reduce!

P.T. ↓



Sin θ $\frac{3}{5}$

Csc θ $\frac{5}{3}$

Cos θ $\frac{4}{5}$

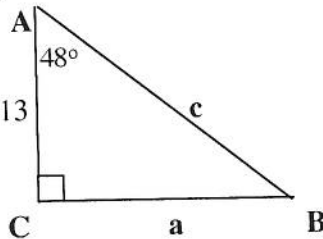
Sec θ $\frac{5}{4}$

Tan θ $\frac{3}{4}$

Cot θ $\frac{4}{3}$

Solve each triangle below. (Find ALL missing angles and sides.) Show set-up and answers. Round decimals to two significant digits.

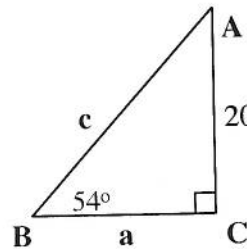
3.



$$\tan 48 = \frac{a}{13}$$

$$\cos 48 = \frac{13}{c}$$

4.



$$\tan 54 = \frac{20}{a}$$

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

3. B 42°

a 14.44

c 19.43

4. A 31°

a 14.53

b 24.72

Find one positive and one negative angle that are co-terminal with the given angle.

5. $314^\circ \pm 360^\circ$

6. $\frac{5\pi}{4} \pm 2\pi$

5. 674° & -46°

6. $\frac{13\pi}{4}$ & $-\frac{3\pi}{4}$

Find the reference angle θ' for each given angle.
 ← always +

7. $\theta = 173^\circ$ II

$180 - 173$

8. $\theta = -136^\circ$



9. $\theta = \frac{5\pi}{7}$

$\frac{7\pi}{7} = \pi$ so Q2

$\pi - \frac{5\pi}{7}$

7. 7°

8. 44°

9. $\frac{2\pi}{7}$

10. A ladder must make an angle of 70° with the level ground and reach to a point on a house 7.5 ft. above the ground. To the nearest tenth of a foot, how long should the ladder be? Sketch a picture and show the equation you use.



$\sin 70 = \frac{7.5}{x}$

8 ft.

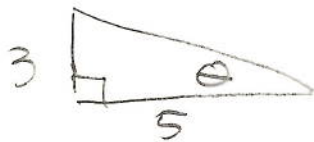
11. Solve the equation for θ . $\tan \theta = 1.57$; $180^\circ \leq \theta \leq 270^\circ$ III

$\tan^{-1} 1.57 \rightarrow \theta = 57.5^\circ$



$180 + 57.5 = 237.5^\circ$

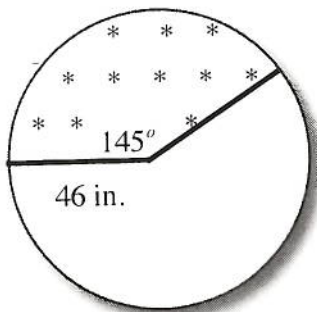
12. A 3-foot high skateboard ramp casts a 5-foot shadow along the ground. What is the angle of elevation of the shadow cast by the sun? Sketch a picture and show the equation you use.



$\tan \theta = \frac{3}{5}$

Arc length $S = r\theta$

13. You are planting flowers in part of a circle in your backyard. Find the arc length of this part of the circle. Then find the area of this.



arc length $S = r\theta$

$\theta 145^\circ$ must be in radians

$\frac{145\pi}{180} = \frac{29\pi}{36}$

$S = 46 \cdot \frac{29\pi}{36} = \frac{667\pi}{18}$ in.

Area = $\frac{1}{2} r^2 \cdot \theta$

$A = \frac{1}{2} (46)^2 \cdot \left(\frac{29\pi}{36}\right) = \frac{15341\pi}{18}$ in²

Evaluate each expression. *- unit circle*

1. $\tan 60^\circ = \frac{y}{x} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

2. $\csc \frac{2\pi}{3} = \frac{r}{y} = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2\sqrt{3}}{3}$

1. $\frac{\sqrt{3}}{2}$
2. $\frac{2\sqrt{3}}{3}$

3. $\cos(-30^\circ) = 330^\circ$
x

4. $\sin\left(-\frac{\pi}{4}\right)$

3. $\frac{\sqrt{3}}{2}$
4. $-\frac{\sqrt{2}}{2}$

Evaluate the expression, if possible. Give your answer in both degrees and radians.

5. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{y}{r}$
Q I or III

6. $\tan^{-1}(-1) = \frac{y}{x} = \frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}$
only Q II or IV

5. $60^\circ \frac{\pi}{3}$

6. $-45^\circ \frac{3\pi}{4} \frac{-\pi}{4}$

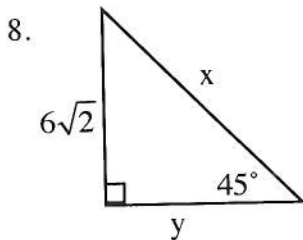
7. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{x}{r}$

Q I or II

7. $45^\circ \frac{\pi}{4}$

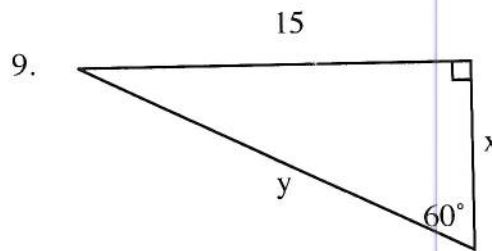
* remember $r=1$

Find the exact values of x and y.



$x = 12$ $y = 6\sqrt{2}$

$6\sqrt{2} \cdot \sqrt{2} = 6 \cdot 2$



$x = 5\sqrt{3}$ $y = 10\sqrt{3}$

$\frac{15}{\sqrt{3}} = \frac{15\sqrt{3}}{3}$