

Pre – Calculus 30
Unit 4 Review
Trigonometry and the Unit Circle

1. If each angle is in standard position, in which quadrant does it terminate? Sketch each angle.

a) 100°

b) 500°

c) 10

d) $\frac{29\pi}{6}$

2. Draw each angle in standard position. Convert each degree measure to radian measure and each radian measure to degree measure. Give answers as **exact values**.

a) $\frac{5\pi}{2}$

b) 240°

c) -405°

d) -3.5

3. Determine the measure of all angles coterminal with each angle in the domain $-720^\circ \leq \theta \leq 720^\circ$ or $-4\pi \leq \theta \leq 4\pi$. Draw a diagram showing the quadrant in which each angle terminates.

a) 6.75

b) 400°

c) -3

d) -105°

4. Write an expression for all angles coterminal with each angle. Indicate what your variable represents.

a) 250°

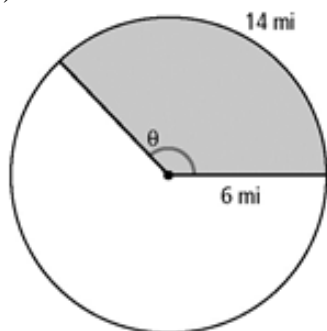
b) $\frac{5\pi}{2}$

c) -300°

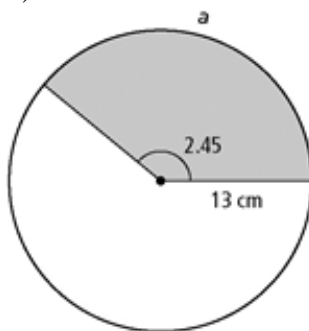
d) 6

5. Use the information in each diagram to determine the value of the variable. Give your answers to the nearest hundredth of a unit.

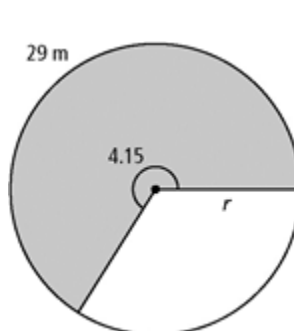
a)



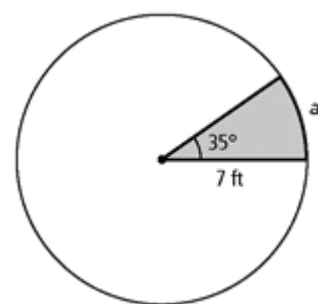
b)



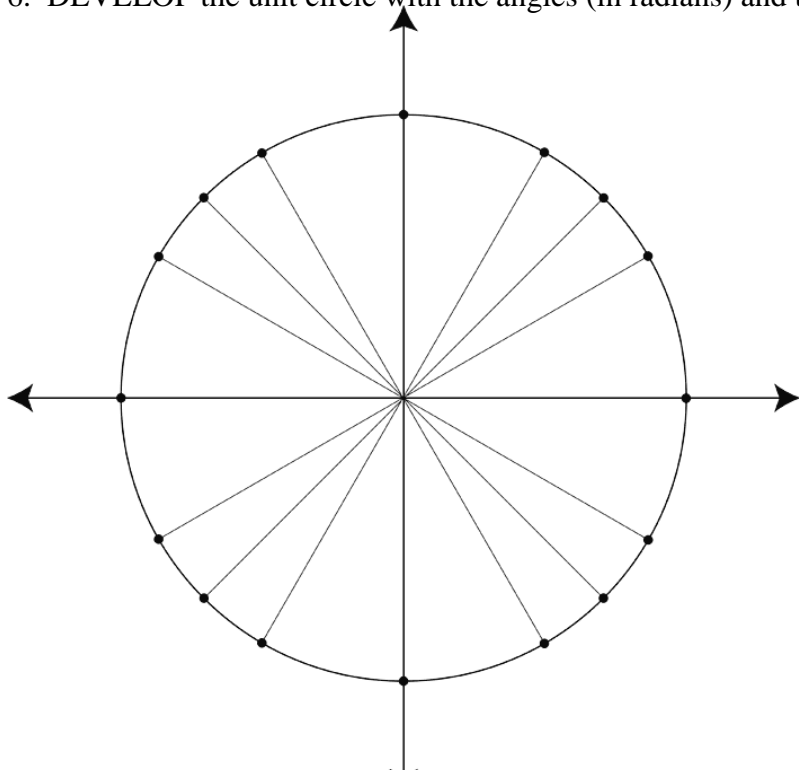
c)



d)



6. DEVELOP the unit circle with the angles (in radians) and their coordinates. (don't just copy it..)



7. $P(\theta) = (x, y)$ is the point where the terminal arm of an angle θ intersects the unit circle. What are the coordinates for each point?

a) $P\left(\frac{5\pi}{6}\right)$ b) $P(-150^\circ)$ c) $P\left(-\frac{11\pi}{2}\right)$ d) $P(45^\circ)$ e) $P(120^\circ)$ f) $P\left(\frac{11\pi}{3}\right)$

8. Identify all measures for θ in the interval $-2\pi \leq \theta \leq 2\pi$ such that $P(\theta)$ is the given point.

a) $(0, 1)$ b) $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ c) $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ d) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

9. If $P(\theta) = \left(\frac{\sqrt{5}}{3}, -\frac{2}{3}\right)$ what is the measure of θ ?

10. Without using a calculator, determine the exact value of each trigonometric ratio. Sketch and find the reference angle.

a) $\sin\left(-\frac{3\pi}{2}\right)$ b) $\cos\left(\frac{3\pi}{4}\right)$ c) $\cot\left(\frac{7\pi}{6}\right)$
d) $\sec(-210^\circ)$ e) $\tan(720^\circ)$ f) $\csc(300^\circ)$

11. If $\cos \theta = \frac{1}{3}$, $0^\circ \leq \theta \leq 270^\circ$, what is the value of each of the other 5 trigonometric ratios of θ ?

12. Determine the approximate measure of all angles that satisfy the following. Give answers to the nearest hundredth of a unit. Draw a sketch to show the quadrant(s) involved.

a) $\sin \theta = 0.54$, $-2\pi \leq \theta \leq 2\pi$ b) $\tan \theta = 9.3$, $-180^\circ \leq \theta \leq 360^\circ$
c) $\cos \theta = -0.77$, $-\pi \leq \theta \leq \pi$ d) $\csc \theta = 9.5$, $-270^\circ \leq \theta \leq 90^\circ$

13. Determine each trigonometric ratio, to three decimal places.

a) $\sin 285^\circ$ b) $\cot 130^\circ$ c) $\cos 4.5$ d) $\sec 7.38$

14. Factor each trigonometric expression.

a) $\cos^2 \theta + \cos \theta$ b) $\sin^2 \theta - 3\sin \theta - 4$ c) $\cot^2 \theta - 9$ d) $2\tan^2 \theta - 9\tan \theta + 10$

15. Determine the exact roots for each trigonometric equation.

a) $\csc \theta = \sqrt{2}$, $0^\circ \leq \theta \leq 360^\circ$ b) $2\cos \theta + 1 = 0$, $0 \leq \theta \leq 2\pi$
c) $3\tan \theta - \sqrt{3} = 0$, $-180^\circ \leq \theta \leq 360^\circ$ d) $\cot \theta + 1 = 0$, $-\pi \leq \theta \leq \pi$

16. Solve for θ . Give solutions as exact values where possible. Otherwise, give approximate measures, to the nearest thousandth.

a) $2\sin x + 1 = 0$, $0 \leq x \leq 2\pi$ b) $\cos^2 x = \cos x$, $0 \leq \theta \leq 360^\circ$
c) $\tan^3 x - \tan x = 0$, $0 \leq x \leq 360^\circ$ d) $4\cos^2 x - 3 = 0$, $0 \leq x \leq 2\pi$
e) $2\sin^2 x = -3\sin x - 1$, $0 \leq x \leq 2\pi$ f) $6\cos^2 \theta + \cos \theta = 1$, $0 \leq \theta \leq 360^\circ$

17. Determine the **general solution** for the following equations.

a) $12\sin^3 x - 3\sin x = 0$ b) $2\cos^2 x + 1 = -3\cos x$
c) $4\sin^2 x - 3 = 0$ d) $\tan^3 x = 3\tan x$