

Quiz 3 (20 pts.)

Name: KEY

True or False (1 pt. each)

Answer the following by circling TRUE or FALSE. If the answer is false you must explain why in the space provided for full credit.

1.) T F $\frac{(\frac{3}{5})^2 + (\frac{4}{5})^2}{25} = \frac{9}{25} + \frac{16}{25}$
 $= \frac{25}{25}$
 $= 1$ ✓

The point $(\frac{3}{5}, -\frac{4}{5})$ lies on the unit circle.

2.) T F _____

If a circle has radius 11.6 cm, the length of the arc subtended by a central angle of 1.74 radians is 6.667 cm.

$s = r\theta = (11.6)(1.74) = \underline{20.184}$

3.) T F $\frac{109 \cdot \pi}{180} \approx 1.9 \text{ rad}$

$109^\circ > 2$ radians

4.) T F $\frac{250 \cdot \pi}{180} = \frac{25\pi}{18}$

250° has an exact value of $\frac{25}{18}$ radians

Short Answer

5.) (2 pts) Suppose a circle has a diameter of 80ft. Find the area of the circular sector with the following central angles:

(a) 0.887 radians

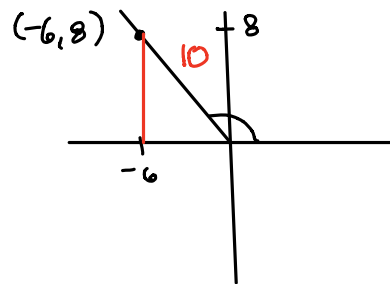
(b) 135°

$A = \frac{1}{2} r^2 \theta$
 $= \frac{1}{2} (40^2) (0.887)$
 $= \frac{1}{2} (1419.2)$
 $= \boxed{709.6 \text{ ft}^2}$

$A = \frac{\pi}{360} r^2 \theta$
 $= \frac{\pi}{360} (40^2) (135)$
 $= \frac{\pi}{360} (216000)$
 $= \boxed{600\pi \approx 1884.96}$

6.) (3 pts.) Find the exact value of each of the trigonometric functions below if the terminal side of the angle θ contains the point $(-6, 8)$. (You do not need to find θ .)

$$(a) \sin \theta = \frac{b}{r} = \frac{8}{10} = \frac{4}{5}$$



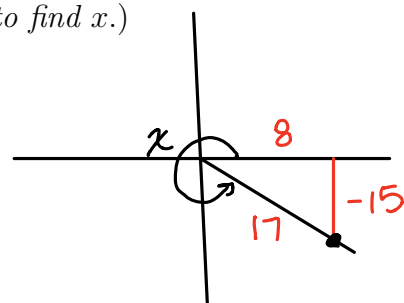
$$(b) \cos \theta = \frac{a}{r} = \frac{-6}{10} = \frac{-3}{5}$$

$$\begin{aligned} r &= \sqrt{(-6)^2 + (8)^2} \\ &= \sqrt{100} \\ &= 10 \end{aligned}$$

$$(c) \tan \theta = \frac{b}{a} = \frac{8}{-6} = \frac{4}{-3}$$

7.) (3 pts.) Find the exact value of the trigonometric functions below for the angle x given that $\tan x = -\frac{15}{8}$ and x is a Quadrant IV angle. (You do not need to find x .)

$$(a) \csc x = \frac{r}{b} = \frac{17}{-15}$$



$$(b) \sec x = \frac{r}{a} = \frac{17}{8}$$

$$\tan x = \frac{b}{a} = \frac{-15}{8}$$

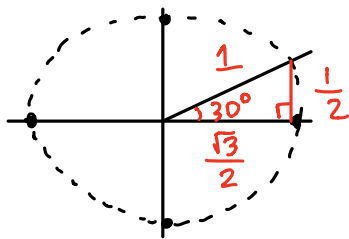
$P = (8, -15)$ since the second coordinate is negative in QIV

$$(c) \cot x = \frac{a}{b} = \frac{8}{-15}$$

$$\begin{aligned} r &= \sqrt{(8)^2 + (-15)^2} \\ &= \sqrt{289} \\ &= 17 \end{aligned}$$

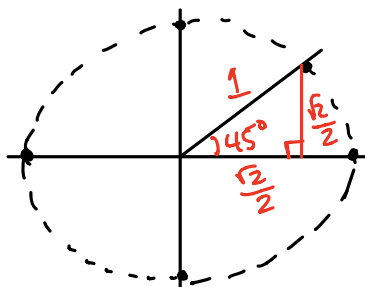
8.) (6 pts.) Use special right triangles or knowledge of the unit circle to find the exact values of the following. (You MUST show your work for full credit).

(a) $\cos(30^\circ) = \frac{\sqrt{3}}{2}$

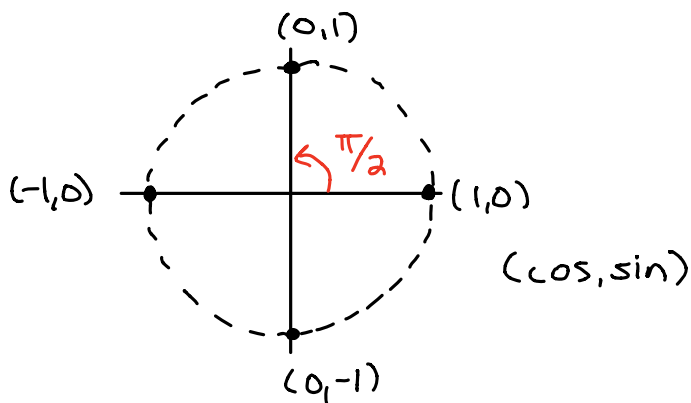


$y - y_1 = m(x - x_1)$
equation of a line
with slope m through
 (x_1, y_1)

(b) $\tan\left(\frac{\pi}{4}\right) = \frac{\left(\frac{\sqrt{2}}{2}\right)}{\left(\frac{\sqrt{2}}{2}\right)} = 1$

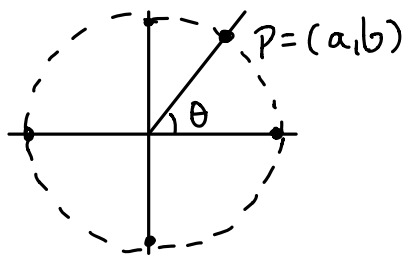


(c) $\sin(0) = 0$



(d) $\tan\left(\frac{\pi}{2}\right) = \frac{1}{0} = \text{undefined}$

9.) (2 pts) In your own words explain why we evaluate trig functions of angles using the unit circle versus any other circle centered at the origin. (What is the benefit of using a point $P = (a, b)$ on the unit circle to evaluate the trig functions of an angle θ whose terminal side contains the point $P = (a, b)$?)



For any point $P = (a, b)$ on the unit circle that lies on the terminal side of an angle θ , $\cos \theta = a$ and $\sin \theta = b$.