

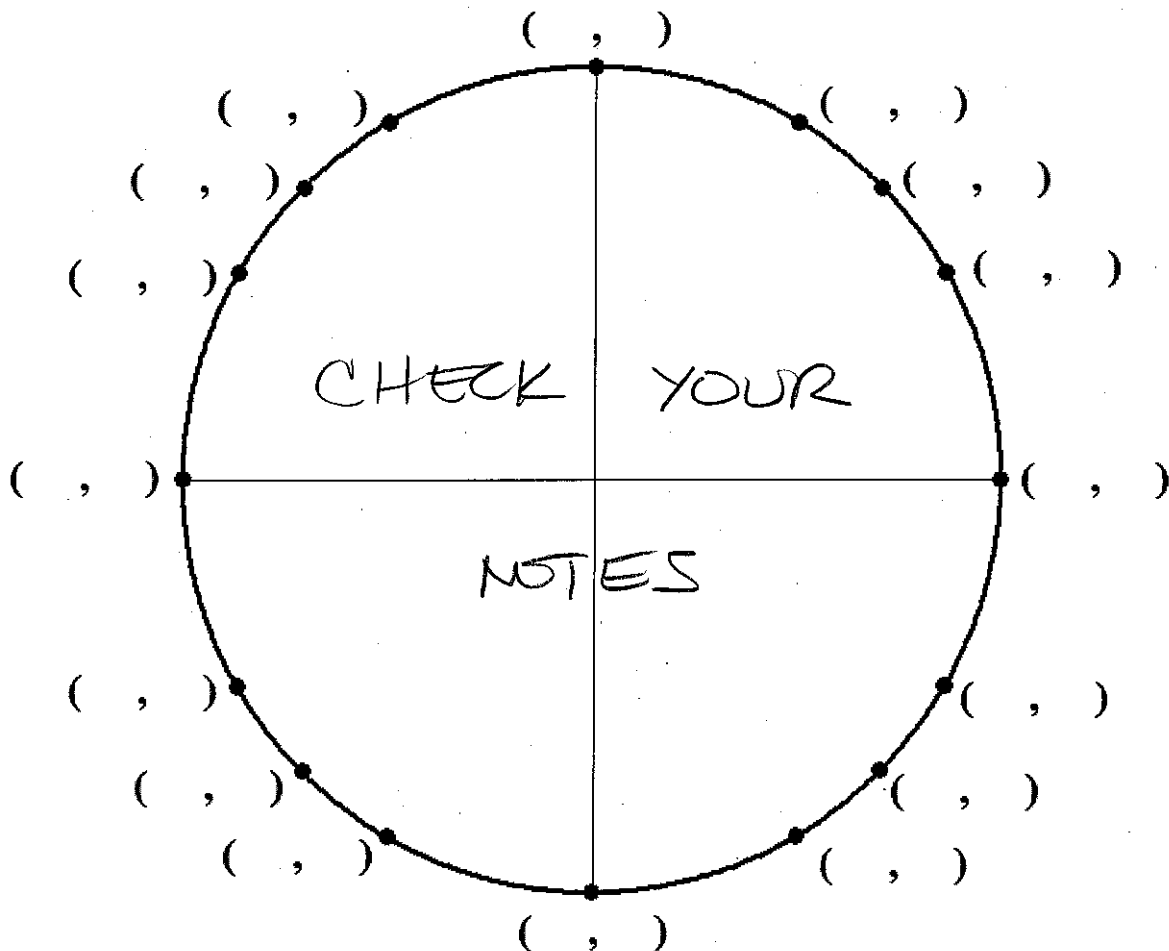
Complete the unit circle below.

Inside the circle, label the radian measure of each point.

Outside the circle, label the corresponding  $x$  - and  $y$  - coordinates of each point.

SCORE: \_\_\_\_ / 8 PTS

( $\frac{1}{2}$  POINT DEDUCTED  
FOR EACH ERROR)



Use the unit circle above to fill in the blanks below. Simplify all answers (including rationalizing denominators).  
Write "UNDEFINED" if the expression has no value.

SCORE: \_\_\_\_ / 4 PTS

[a]  $\csc \frac{7\pi}{6} = \underline{-2}$   $\frac{1}{-\frac{1}{2}} = -2$

[b]  $\tan \frac{4\pi}{3} = \underline{\sqrt{3}}$   $\frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = +\frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

[c]  $\cot \pi = \underline{\text{UNDEFINED}}$   $\frac{-1}{0}$

[d]  $\sec \frac{7\pi}{4} = \underline{\sqrt{2}}$   $\frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

Fill in the blanks below. Simplify all answers (including rationalizing denominators).

SCORE: \_\_\_\_ / 5 PTS

Write "UNDEFINED" if the expression has no value.

[a]  $-\frac{13\pi}{3}$  is co-terminal with  $\frac{5\pi}{3}$  (NOTE: Your answer must be between 0 and  $2\pi$ )

$-4\frac{1}{3}\pi$  COTERMINAL WITH  $-\frac{\pi}{3} + 2\pi = \frac{5\pi}{3}$

[b]  $\cos\left(-\frac{13\pi}{3}\right) = \frac{1}{2}$   $\cos\frac{5\pi}{3} = \frac{1}{2}$

[c] The complement of  $\frac{3\pi}{10}$  radians is  $\frac{\pi}{5}$   $\frac{\pi}{2} - \frac{3\pi}{10} = \frac{5\pi - 3\pi}{10}$

[d]  $\frac{5\pi}{9}$  radians =  $\frac{100}{1}$  degrees  $\frac{5\pi}{9} \times \frac{180}{\pi} = 100$

[e] 63 degrees =  $\frac{7\pi}{20}$  radians  $763 \times \frac{\pi}{180} = \frac{7\pi}{20}$   $= \frac{2\pi}{10} = \frac{\pi}{5}$

Suppose  $\sin t = -\frac{3}{5}$  and  $\cos t = \frac{4}{5}$ . Fill in the blanks below. Simplify all answers.

SCORE: \_\_\_\_ / 2 PTS

[a]  $\sec t = \frac{5}{4}$   $\frac{1}{\cos t} = \frac{5}{4}$

[b]  $\cos(-t) = \frac{4}{5}$   $\cos t = \frac{4}{5}$

In the diagram of a central angle on the right,

SCORE: \_\_\_\_ / 5 PTS

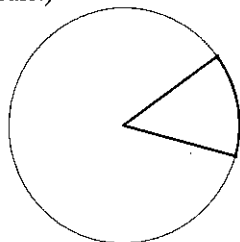
the radius of the circle is 16 mm and the intercepted arc has length 12 mm. (NOTE: The diagram is NOT drawn to scale.)

[a] The central angle is  $\frac{3}{4}$  radians.

$$s = r\theta \rightarrow \theta = \frac{s}{r} = \frac{12}{16} = \frac{3}{4}$$

[b] The area of the intercepted sector is  $96 \text{ mm}^2$ .

$$A = \frac{1}{2}r^2\theta = \frac{1}{2}(16)^2\frac{3}{4} = 96$$



[c] If an object is moving around the circle at a linear speed of 60 mm/s,

$$v = r\omega \rightarrow \omega = \frac{v}{r} = \frac{60}{16} = \frac{15}{4}$$

its angular speed is  $\frac{15}{4}$   $\frac{\text{RADIAN}}{\text{s}}$ .  
(specify the units)