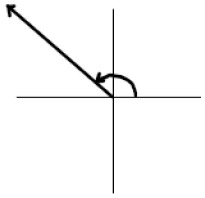
Trig Ratios Practice Test

PC 12 Trigonometric Ratios Practice Test Name: _____

/32

1. Draw each angle in standard position. Convert each degree measure to radians and each radian measure to degrees. Express your answers as exact values and as approximate measures, to the nearest tenth of a degree/radian. [4]

a) 140°

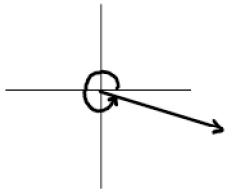


$140 \times \frac{\pi}{180}$

$= \frac{7\pi}{9}$ ← exact

≈ 2.4 ← approximate

b) $\frac{12\pi}{7}$



$\frac{12\pi}{7} \times \frac{180}{\pi}$

$= \frac{2160}{7}^\circ$ include degree symbol!

$\approx 308.6^\circ$

2. Determine one positive and one negative angle that is coterminal to $\frac{3\pi}{5}$. [2]

$\frac{3\pi}{5} + 2\pi = \frac{3\pi}{5} + \frac{10\pi}{5} = \frac{13\pi}{5}$

$\frac{3\pi}{5} - 2\pi = \frac{3\pi}{5} - \frac{10\pi}{5} = \frac{-7\pi}{5}$

Convert 2 radians to degrees

$2 \times \frac{180}{\pi} = \frac{360}{\pi}^\circ \approx 114.6^\circ$

3. Write ~~an expression for~~ all the angles coterminal to $\frac{5\pi}{8}$ within the domain $-2\pi \leq \theta < 4\pi$. Then state an expression for all coterminal angles in general form. Indicate what your variable represents. [4]

$\frac{5\pi}{8} + 2\pi = \frac{21\pi}{8}$

$\frac{5\pi}{8} - 2\pi = \frac{-11\pi}{8}$

Angles within domain: $\frac{-11\pi}{8}, \frac{21\pi}{8}$

General form: $\frac{5\pi}{8} \pm 2\pi n, \; n \in W$

(n is any whole number)

4. Determine the arc length subtended by a central angle of 150° and a radius of 7 cm. State your answer in exact form and as an approximate measure, to the nearest hundredth. [2]

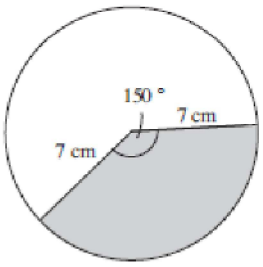
$150 \times \frac{\pi}{180} = \frac{5\pi}{6}$

$a = r\theta$

$= 7 \cdot \frac{5\pi}{6}$

$= \frac{35\pi}{6}$

$a = \frac{35\pi}{6}$ cm ≈ 18.33 cm



5. A sector with angle 60° has an arc length of 5 m. Determine the radius of a circle, to the nearest hundredth. [2]

$60 \times \frac{\pi}{180} = \frac{\pi}{3}$

$r = \frac{a}{\theta}$

$= \frac{5}{\pi/3}$

$= \frac{15}{\pi}$

$r \approx 4.77$ m

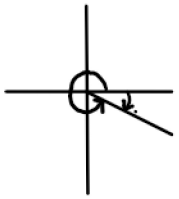
6. In which quadrant(s) does the terminal arm of θ lie if $\cos\theta > 0$ and $\csc\theta < 0$? [1]

QI, QIV $\quad \sin\theta < 0$ $\quad$ QIV

QIII, QIV

7. For each point, sketch two coterminal angles in standard position of which the terminal arm contains the point. Provide one positive and one negative angle, in radians to the nearest hundredth, where neither angle exceeds one full rotation. [6]

a) $(4,-1)$



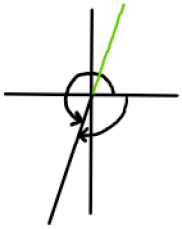
$\theta = \tan^{-1}\left(\frac{-1}{4}\right)$

$\doteq -0.24$

$-0.24 + 2\pi \doteq 6.04$

$\theta = -0.24$ or 6.04

b) $(-2,-5)$



$\theta = \tan^{-1}\left(\frac{-5}{-2}\right)$

$= \tan^{-1}\left(\frac{5}{2}\right)$ → calculator thinks the point is (2,5)

$\doteq 1.19$ ← This is in QI but we need the angle in QIII

$1.19 + \pi \doteq 4.33$

$1.19 - \pi \doteq -1.95$

$\theta = -1.95$ or 4.33

8. The point $(-\frac{4}{5}, y)$ lies on the terminal arm of an angle θ in standard position and on the unit circle. If the point lies in quadrant II, determine the value of y and state the six trigonometric ratios. [4]

$\left(-\frac{4}{5}\right)^2 + y^2 = 1^2$

$\frac{16}{25} + y^2 = 1$

$y^2 = 1 - \frac{16}{25}$

$y^2 = \frac{9}{25}$

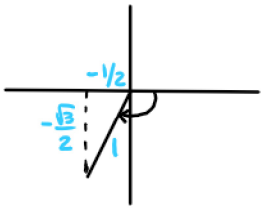
$y = \sqrt{\frac{9}{25}} = \frac{3}{5}$ ← positive because point is in QII

$\sin\theta = \frac{3}{5}$ $\quad \cos\theta = -\frac{4}{5}$ $\quad \tan\theta = \frac{3/5}{-4/5} = -\frac{3}{4}$

$\csc\theta = \frac{5}{3}$ $\quad \sec\theta = -\frac{5}{4}$ $\quad \cot\theta = -\frac{4}{3}$

9. Determine the exact value of each expression. [4]

a) $\csc\left(\frac{-2\pi}{3}\right)$

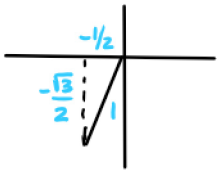


$\sin\left(\frac{-2\pi}{3}\right) = \frac{-\sqrt{3}}{2}$

$\csc\left(\frac{-2\pi}{3}\right) = -\frac{2}{\sqrt{3}}$ or $-\frac{2\sqrt{3}}{3}$

b) $\left(\tan\frac{4\pi}{3}\right)^2 - \left(\sin\frac{3\pi}{2}\right)^2$

(0,-1)



$= \left(\frac{-\sqrt{3}/2}{-1/2}\right)^2 - (-1)^2$

$= (\sqrt{3})^2 - 1$

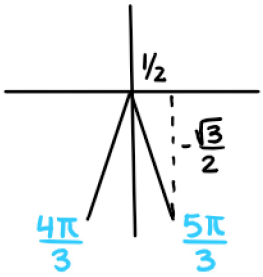
$= 3 - 1$

$= 2$

10. Determine the exact measure of all angles that satisfy the following. [3]

a) $\sin\theta = -\frac{\sqrt{3}}{2}$ in the domain $-\pi \le \theta < 2\pi$

QIII, QIV (since $\sin\theta < 0$)



$\frac{4\pi}{3} - 2\pi = \frac{-2\pi}{3}$

$\frac{5\pi}{3} - 2\pi = \frac{-\pi}{3}$

$\theta = -\frac{2\pi}{3}, -\frac{\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

b) $\sec\theta = 1$ in the domain $-2\pi \le \theta \le 2\pi$

$\therefore \cos\theta = 1 \rightarrow (1,0)$

↓ positive x-axis

2π is not included in the domain

$\theta = -2\pi, 0$