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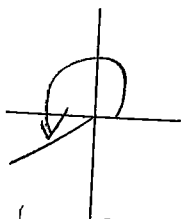
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Chapter 4 (4.1 - 4.3)

Trigonometry and the Unit Circle Assignment

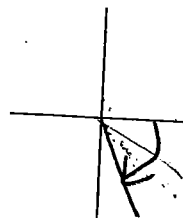
1. Draw each angle in standard position. State the quadrant that the terminal arm lies in and find the measure of 2 coterminal angles.

a) 215°



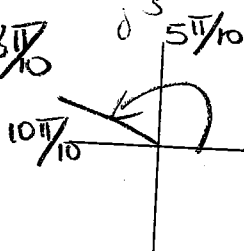
Coterminal: 575° -145° or 935°

b) -70°



Coterminal: 290° 650° or -430°

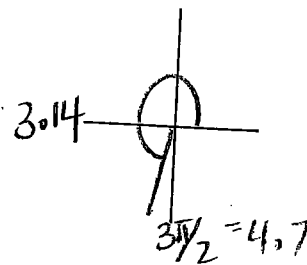
c) $\frac{4\pi}{5} = \frac{8\pi}{10}$



$\frac{4\pi}{5} + \frac{10\pi}{5}$

Coterminal: $\frac{14\pi}{5}$ $-\frac{6\pi}{5}$ $2\frac{4\pi}{5}$

d) 4.5



Coterminal: 10.78 -1.78 17.07

2. Change each radian measure into degrees. (Round to 2 decimal places).

a) $\frac{5\pi}{8} \cdot \frac{180^\circ}{\pi} = \frac{5(180^\circ)}{8} = 112.5^\circ$

b) $2.7 \cdot \frac{180^\circ}{\pi} = 154.7^\circ$

3. Change each degree measure into radians. (Exact values)

b) $310^\circ \cdot \frac{\pi}{180} = \frac{31\pi}{18}$

b) $540^\circ \cdot \frac{\pi}{180} = \frac{54\pi}{180} = 3\pi$

4. A radius of a circle is 7cm, and the length of an arc on the circle is 10cm. In radians, what is the central angle that subtends this arc length?

$$\frac{10}{2\pi(7)} = \frac{x}{2\pi}$$

$$x \cdot 2\pi(7) = 10(2\pi)$$

$$x = \frac{10(2\pi)}{2\pi(7)} \quad x = 10/7$$

or $10 = \theta \cdot 7$

$$\frac{10}{7} = \theta$$

$$\theta = 1.43 \text{ rad}$$

5. A circle has a radius of 15 and a central angle of $\frac{7\pi}{10}$. Find the arclength of the sector.

$$\frac{x}{2\pi(15)} = \frac{7\pi/10}{2\pi}$$

$$x(2\pi) = \frac{7\pi}{10} \cdot 2\pi(15)$$

$$x = \frac{7\pi/10 \cdot 2\pi(15)}{2\pi}$$

$$x = \frac{7\pi \cdot 15^2}{10 \cdot 2}$$

$$x = \frac{21\pi}{2}$$

or $x = 32.99$

or $x = \frac{7\pi \cdot 15^2}{10 \cdot 2}$

$$x = \frac{21\pi}{2}$$

6. A circle has central angle of 35° and a radius of 7ft. Find the arclength of the sector.

$$\frac{x}{2\pi(7)} = \frac{35^\circ}{360^\circ}$$

$$x(360^\circ) = 35^\circ(2\pi)(7)$$

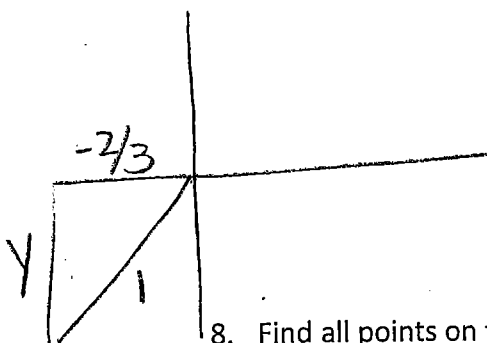
x

$$x = \frac{35^\circ(2\pi)(7)}{360^\circ}$$

$$x = \frac{7(\pi)(7)}{36} = \frac{49\pi}{36} = 4.28 \text{ ft}$$

7. The point $(-\frac{2}{3}, y)$ lies on the unit circle. Find the value of y if the point is in quadrant III.

III.



$$\left(-\frac{2}{3}\right)^2 + y^2 = 1^2$$

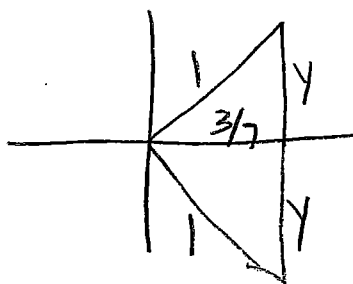
$$\frac{4}{9} + y^2 = 1$$

$$y^2 = \frac{9}{9} - \frac{4}{9}$$

$$y^2 = \frac{5}{9}$$

$$y = -\frac{\sqrt{5}}{3}$$

8. Find all points on the unit circle that have an x-coordinate of $x = \frac{3}{7}$.



$$\left(\frac{3}{7}\right)^2 + y^2 = 1^2$$

$$\frac{9}{49} + y^2 = 1$$

$$y^2 = \frac{49}{49} - \frac{9}{49}$$

$$y^2 = \frac{40}{49}$$

$$y = \pm \frac{\sqrt{40}}{7}$$

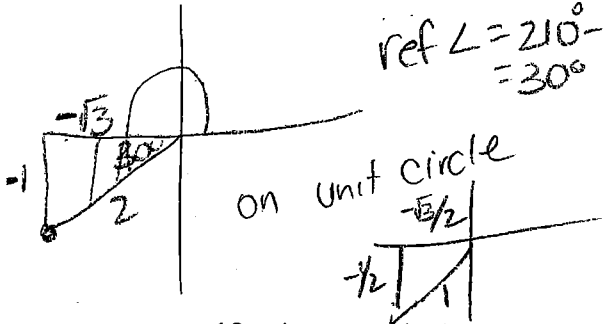
or $y = \pm \frac{2\sqrt{10}}{7}$

5

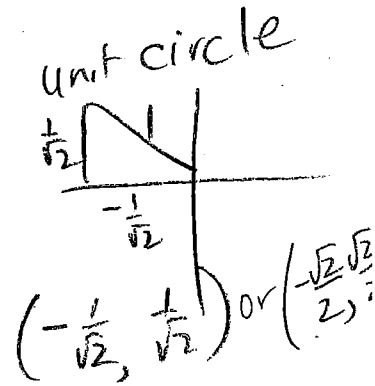
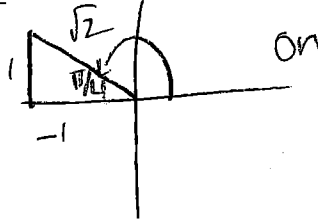
9. The point $P(x,y)$ is located where the terminal arm of angle θ and the unit circle intersect. Determine the coordinates of point P if:

a) $\theta = 210^\circ$

ref $\angle = 210^\circ - 180^\circ = 30^\circ$

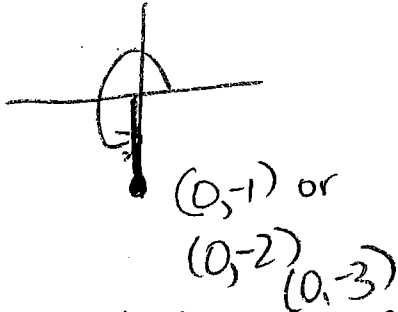


b) $\theta = \frac{3\pi}{4}$



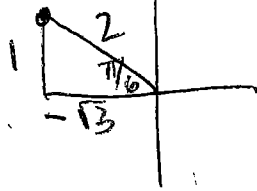
10. The point $P(x,y)$ is located on the terminal arm of angle θ . Determine possible coordinates of point P if:

b) $\theta = 270^\circ$



$(0, -1)$ or
 $(0, -2)$
 $(0, -3)$

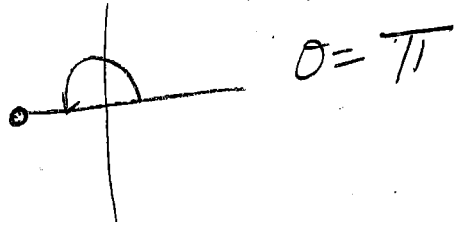
b) $\theta = \frac{5\pi}{6}$



$(-\sqrt{3}, 1)$
or $(-\sqrt{3}/2, 1/2)$

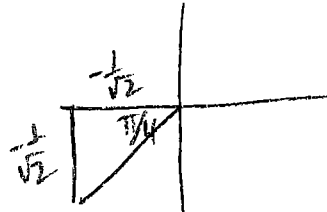
11. Identify a measure for θ in the interval $0 \leq \theta < 2\pi$ such that $P(\theta)$ is the given point.

a) $(-1, 0)$



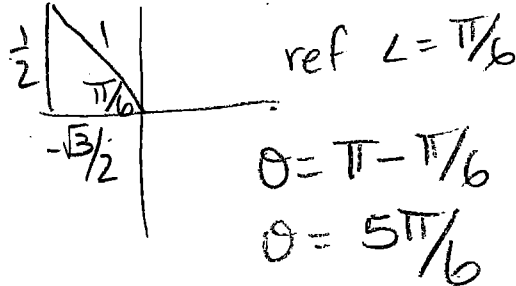
$\theta = \pi$

b) $(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}})$



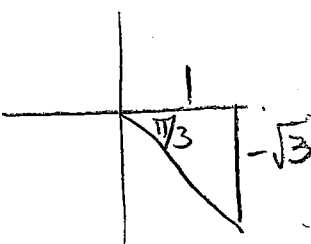
ref $\angle = \frac{\pi}{4}$
 $\theta = \pi + \frac{\pi}{4} = \frac{5\pi}{4}$

c) $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$



ref $\angle = \frac{\pi}{6}$
 $\theta = \pi - \frac{\pi}{6} = \frac{5\pi}{6}$

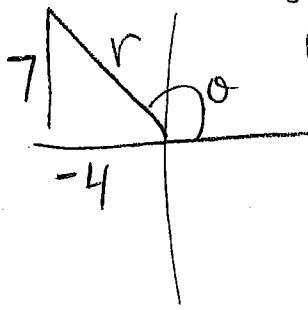
d) $(1, -\sqrt{3})$



ref $\angle = \frac{\pi}{3}$
 $\theta = 2\pi - \frac{\pi}{3} = \frac{5\pi}{3}$

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12. The point $(-4, 7)$ is on the terminal arm of angle θ . Draw the angle and find all six trig ratios for the angle.



$$\begin{aligned} (-4)^2 + 7^2 &= r^2 \\ 16 + 49 &= r^2 \\ 65 &= r^2 \\ r &= \sqrt{65} \end{aligned}$$

$$\sin \theta = \frac{7}{\sqrt{65}}$$

$$\csc \theta = \frac{\sqrt{65}}{7}$$

$$\cos \theta = -\frac{4}{\sqrt{65}}$$

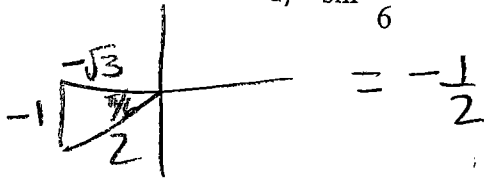
$$\sec \theta = -\frac{\sqrt{65}}{4}$$

$$\tan \theta = -\frac{7}{4}$$

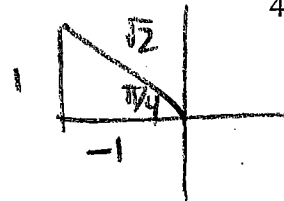
$$\cot \theta = -\frac{4}{7}$$

13. Determine the exact value of each of the following.

a) $\sin \frac{7\pi}{6}$ ref $L = \pi/6$

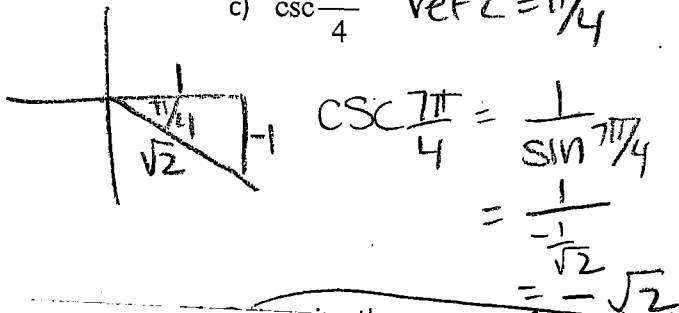


b) $\sec \frac{3\pi}{4}$

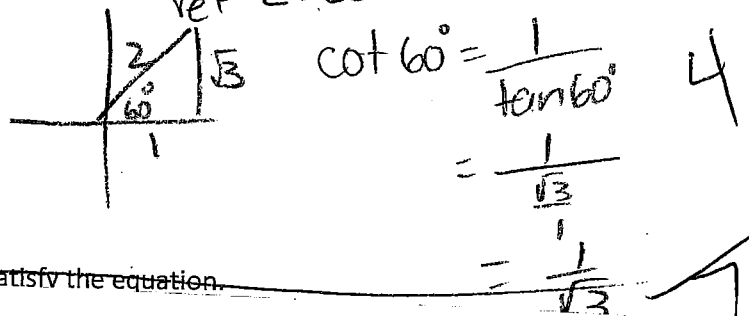


$$\begin{aligned} \text{ref } L &= \pi/4 \\ \sec \frac{3\pi}{4} &= \frac{1}{\cos \frac{3\pi}{4}} \\ &= \frac{1}{-\frac{1}{\sqrt{2}}} = -\sqrt{2} \end{aligned}$$

c) $\csc \frac{7\pi}{4}$ ref $L = \pi/4$



d) $\cot 60^\circ$ ref $L = 60^\circ$



the measure of all angles that satisfy the equation.