4.2 The Unit Circle

Review:

Special Triangles

Unit Circle

Equation of a Circle of radius, r, centered around the origin

Example 1: Find the coordinates for all points on the unit circle that satisfy the following conditions. Draw a diagram each time.

a.) the x coordinate is 5

i. Possible quadrants?

ii. Equation of unit circle

iii. Put in known information

iv. Solve for the variable

b.) the x coordinate is -0.3

c.) the x coordinate is $\frac{4}{5}$

The Relationship between θ and a point (x, y)

Notation: $P(\theta) = (x, y)$ [This is only found in this textbook and you are unlikely to encounter this notation elsewhere.] This is a relationship between **arc length θ** of a central angle in the unit circle **to the co-ordinates, (x, y)** on the terminal arm and arc of unit circle.

Some of the points on the ***unit circle*** correspond to exact values of the special angles, $\frac{\pi}{3}, \frac{\pi}{4}, and \frac{\pi}{6},$ learned last year.

Example 2: Find

a) $P\left(\frac{5\pi}{6}\right)$

i. Draw it

ii. Find the reference angle

iii. Drop perpendicular to x axis

iv. Label sides (careful of the sign)

v. State point

b.) $P\left(\frac{4\pi}{3}\right)$

c.) $P\left(\frac{-3\pi}{4}\right)$

Example 3 : Find a measure for the central angle θ in the interval $0 \leq \theta < 2\pi$ such that $P(\theta)$ is the given point.

a.) $(\frac{\sqrt{3}}{2}, \frac{1}{2})$

Draw the unit circle

Plot point

Draw the triangle

Find angle

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

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