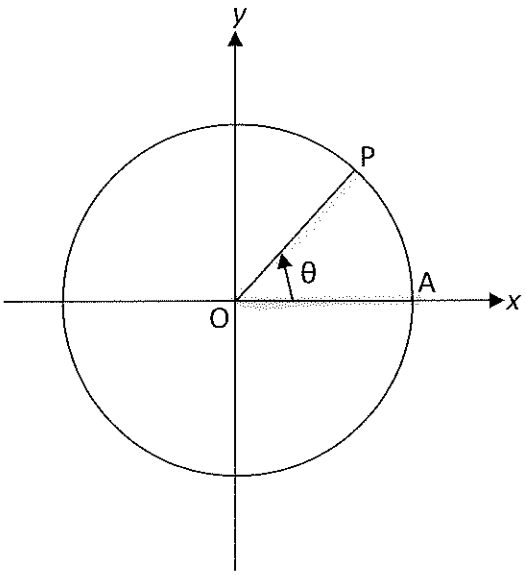
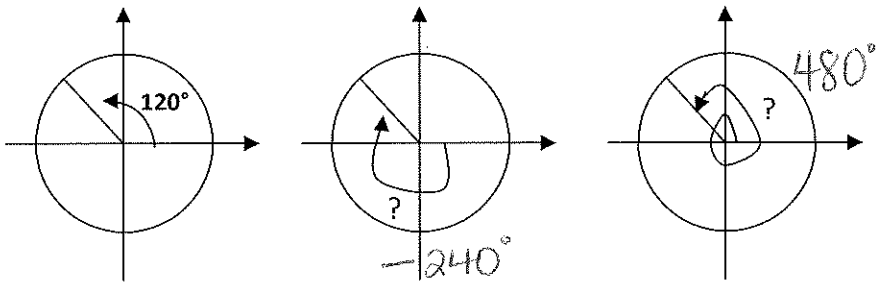
Pre-Calculus 12 Name:_____

θ.1 – Trig Ratios for any Angle in Standard Position (Part I) Block: _____



OA: Initial Arm
OP: Terminal Arm

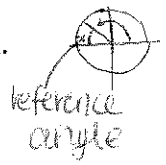


Note: If the rotation is counterclockwise, then $\theta > 0$.
If the rotation is clockwise, then $\theta < 0$.

Definitions: Angles in standard position with the same terminal arm are called **coterminal angles**.

To find coterminal angles, add or subtract multiples of 360°. $\theta + 360n \ (n \in \mathbb{Z})$

Reference Angle: The acute angle between the x-axis and the terminal arm.



Primary Trig Functions: Sine, Cosine and Tangent

Reciprocal Trig Functions: Cosecant, Secant and Cotangent

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta} \qquad \cot\theta = \frac{1}{\tan\theta}$$

Ex. 1. Determine each value to 4 decimal places.

a) $\cos 130° =$ −0.6428

b) $\sin(-60°) =$ −0.8660

c) $\csc 225° = \frac{1}{\sin 225°} =$ −1.4142

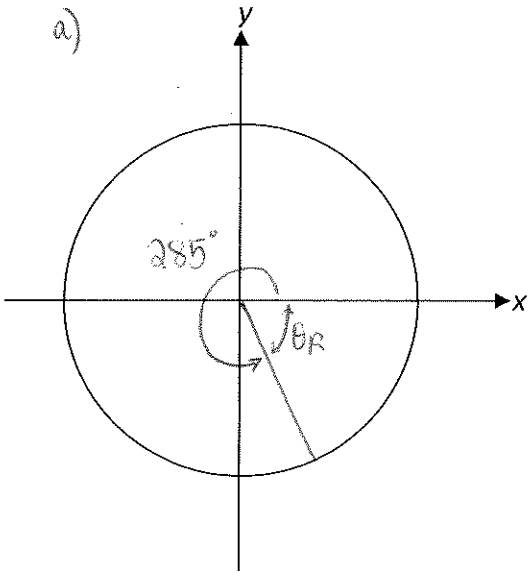
d) $\cot(-140°) = \frac{1}{\tan(-140)} =$ 1.1918

Ex. For each angle θ:

a) Draw the angle in standard position
b) Determine the reference angle
c) Determine 2 other angles coterminal with θ
d) Write the expression to represent all angles coterminal with θ.

2. $\theta = 285°$

a)



b) $\theta_R = 360° - 285° = 75°$

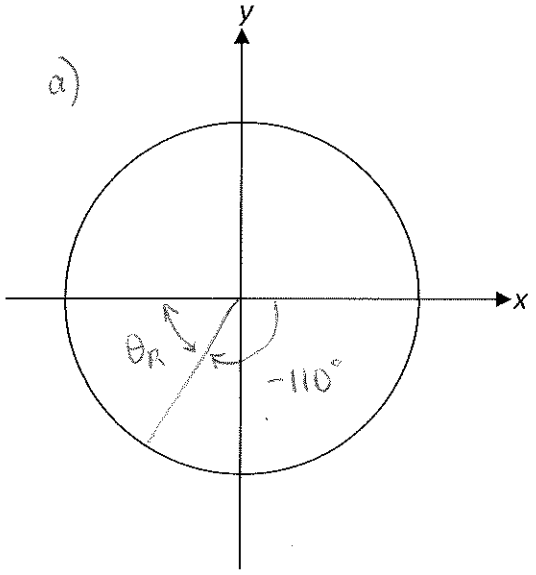
c) $285° + 360° = 645°$

$285 - 360° = -75°$

d) $285° + 360°n \quad (n \in \mathbb{Z})$

3. $\theta = -110°$

a)



b) $\theta_R = 180° - 110° = 70°$

c) $-110° + 360° = 250°$

$-110° - 360° = -470°$

d) $-110° + 360°n \quad (n \in \mathbb{Z})$