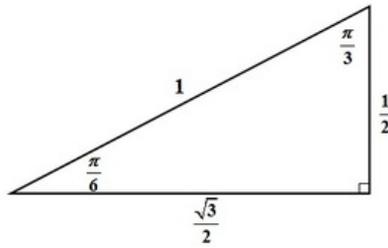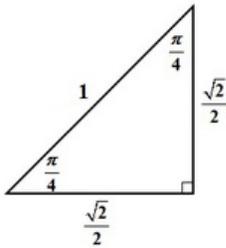# 6.2 Trigonometric Ratios & Special Angles

Review of Prerequisite Skills


$$\frac{1}{\sin\theta} = \csc\theta = \frac{hypotenuse}{opposite}$$

$$\frac{1}{\cos\theta} = \sec\theta = \frac{hypotenuse}{adjacent}$$

$$\frac{1}{\tan\theta} = \cot\theta = \frac{adjacent}{opposite}$$

The **principal angle θ** is shown in **standard position**.

- Positive angles are drawn _____

- Negative angles are drawn _____

- A principal angle is a counter-clockwise angle between the initial arm and terminal arm of an angle in standard position.
$$0° \le \theta \le 2\pi$$

- Angles that share the same terminal arm are known as **co-terminal angles**

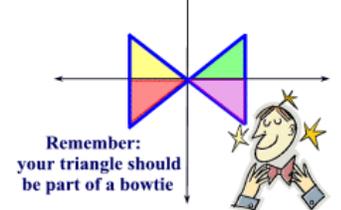- **CAST Rule:** indicates which trigonometric ratio is positive in the specific quadrant
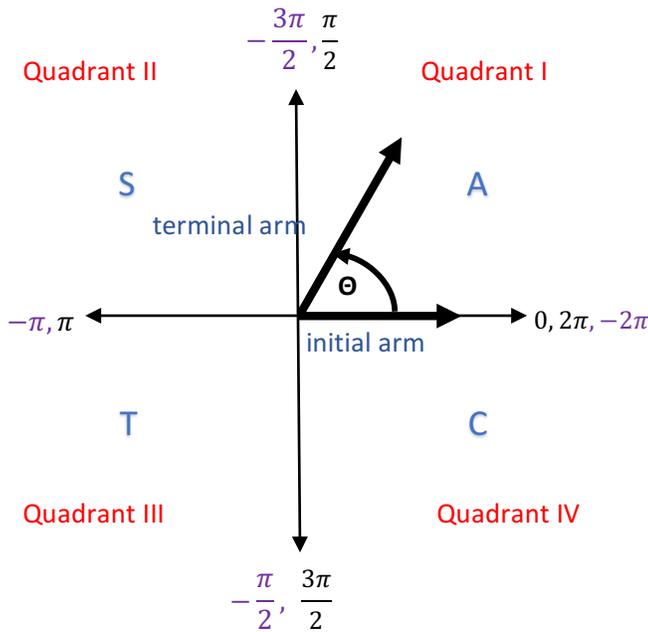
The **related acute angle β (the reference angle RA)** is the acute angle between the terminal arm of an angle in standard position and the x-axis.
$$0° < \beta < 90°$$

- **In QI, $\beta = \theta$**

- **In QII, $\beta = \pi - \theta$**

- **In QIII, $\beta = \pi + \theta$**

- **In QIV, $\beta = 2\pi - \theta$**
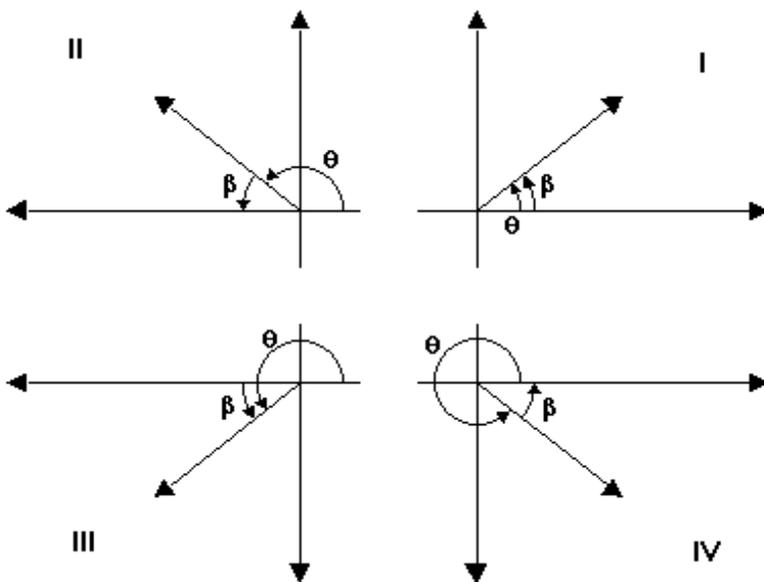
Reference triangles are drawn to the x-axis.

Remember: your triangle should be part of a bowtie

Ex. 1 Evaluate. (No Calculator Permitted ☺☺☺)

a) $\sin\left(\frac{11\pi}{3}\right)$

b) $\tan\left(-\frac{5\pi}{6}\right)$

c) $\sec\left(\frac{11\pi}{6}\right)$

d) $\csc(-\frac{7\pi}{6})$

Ex. 2 Each of the following points lies on the terminal arm of an angle in standard position.
i)   Sketch each angle
ii) Determine the primary and reciprocal (secondary) trigonometric ratios for the angle.
iii) Calculate the radian value of θ, to the nearest hundredth, where $0 \leq \theta \leq 2\pi$

a) P(2, -5)

b) P(-3, -7)

Ex. 3 Given $\cos\theta = -\frac{3}{8}$.
a) In what quadrant(s) could θ be in? Include a diagram.
b) Determine the all the other possible (primary) trigonometric ratios.
c) Determine the value(s) of θ.