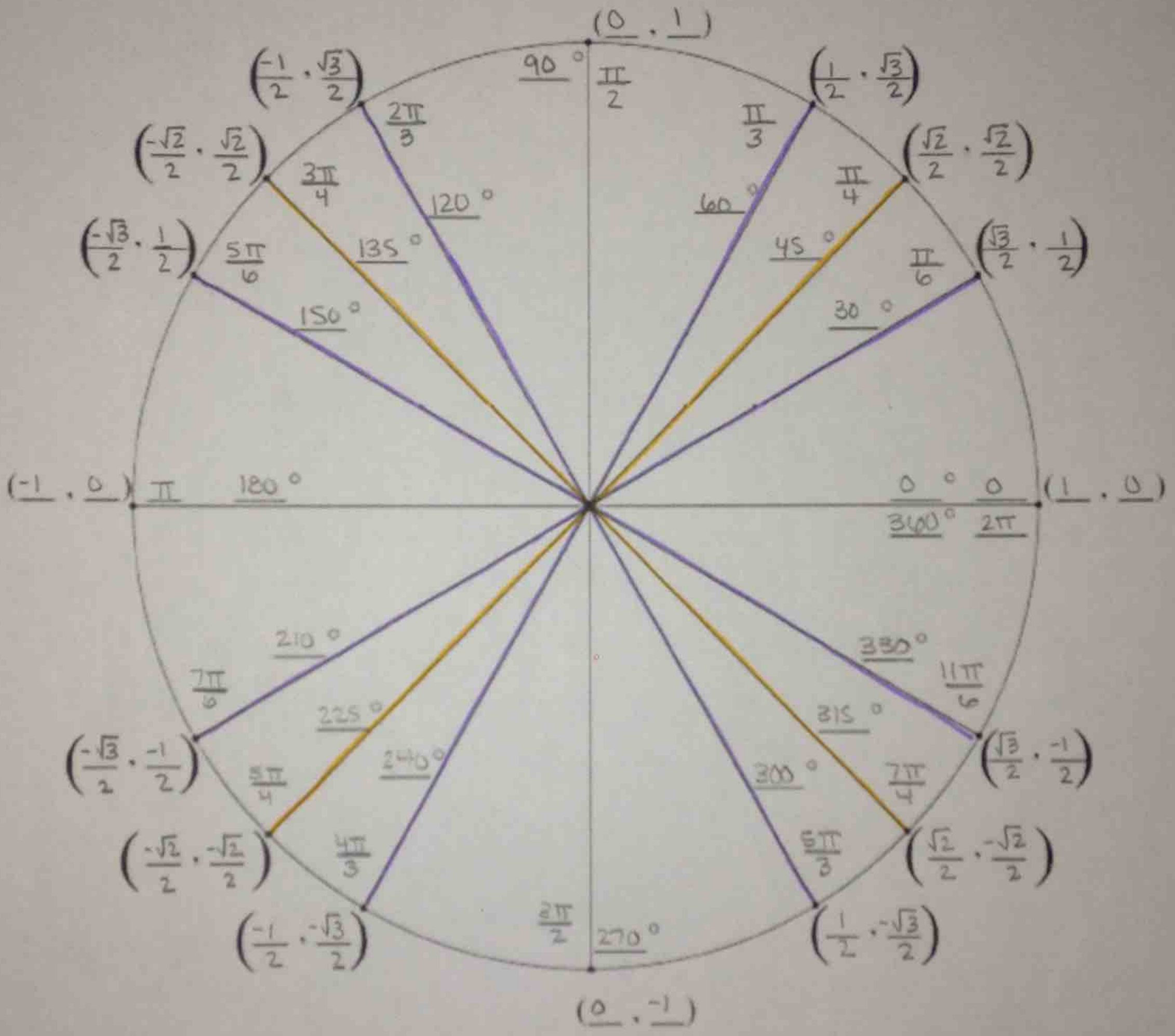
7.5 The Unit Circle

SWBAT create a unit circle and evaluate trigonometric values from the unit circle.



Each ordered pair is represented by
(x, y) = (Cosine, Sine)

Trigonometric Identities:	$\sin\theta = y$	$\cos\theta = x$	$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{y}{x}$
Reciprocal Identities:	$\csc\theta = \frac{1}{\sin\theta} = \frac{1}{y}$	$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{x}$	$\cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{x}{y}$

Example 1: Evaluate the six trigonometric functions for $\theta = \frac{\pi}{6}$

Sine $\theta = \frac{1}{2}$

Cosecant $\theta = 2$

Cosine $\theta = \frac{\sqrt{3}}{2}$

Secant $\theta = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

Tangent $\theta = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

Cotangent $\theta = \frac{3}{\sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$

Example 2: Evaluate the six trigonometric functions for $\theta = 225°$

Sine $\theta = \frac{-\sqrt{2}}{2}$

Cosecant $\theta = \frac{-2}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$

Cosine $\theta = \frac{-\sqrt{2}}{2}$

Secant $\theta = -\sqrt{2}$

Tangent $\theta = \frac{\frac{-\sqrt{2}}{2}}{\frac{-\sqrt{2}}{2}} = 1$

Cotangent $\theta = 1$

Example 3: Evaluate the six trigonometric functions for $\theta = -540°$ CT $\measuredangle = 180°$

Sine $\theta = 0$

Cosecant $\theta = \frac{1}{0} =$ undefined

Cosine $\theta = -1$

Secant $\theta = -1$

Tangent $\theta = \frac{0}{-1} = 0$

Cotangent $\theta = \frac{-1}{0} =$ undefined

Example 4: Find the six trigonometric functions for $\theta = -\frac{\pi}{2}$ CT $\measuredangle = \frac{3\pi}{2}$

Sine $\theta = -1$

Cosecant $\theta = -1$

Cosine $\theta = 0$

Secant $\theta = \frac{1}{0} =$ undefined

Tangent $\theta = \frac{-1}{0} =$ undefined

Cotangent $\theta = \frac{0}{-1} = 0$