

Converting Between Radians & Degrees

$$360^\circ = 2\pi \text{ radians}$$

$$\frac{360^\circ}{2\pi} \rightarrow \left(\frac{180^\circ}{\pi}\right) \text{ conversion factor!}$$

Ex 1 $90^\circ \rightarrow \text{radian}$

$$90^\circ \left(\frac{\pi}{180^\circ}\right) = \frac{90\pi}{180} \rightarrow \left(\frac{\pi}{2}\right)$$

Ex 2 $200^\circ \rightarrow \text{radian}$

$$200^\circ \left(\frac{\pi}{180^\circ}\right) = \frac{200\pi}{180} \rightarrow \left(\frac{10\pi}{9}\right)$$

Ex 3 $\frac{5\pi}{4} \rightarrow \text{degrees}$


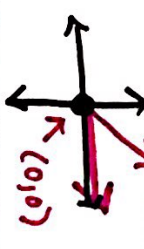
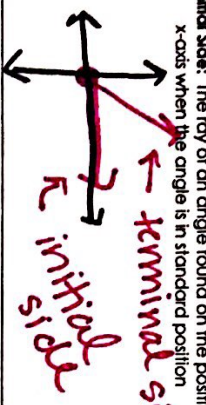
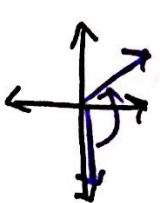
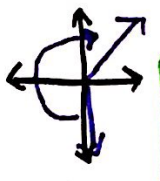
$$\frac{5\pi}{4} \left(\frac{180^\circ}{\pi}\right) = \frac{900}{4} \rightarrow \left(225^\circ\right)$$

Ex 4 $\frac{7\pi}{6} \rightarrow \text{degrees}$

$$\frac{7\pi}{6} \left(\frac{180^\circ}{\pi}\right) \rightarrow \left(210^\circ\right)$$

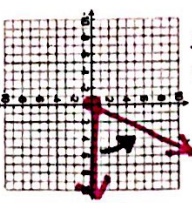
7.1a Angles and Coterminal Angles

Important Vocabulary

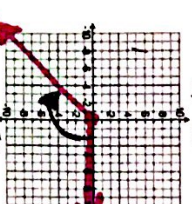
<p>Angle: Formed by two rays with the same endpoint Vertex: The endpoint of an angle</p> 	<p>Standard Position: When the vertex of an angle is at the origin of the coordinate plane and one ray is on the positive x-axis the positive x-axis</p> 
<p>Initial Side: The ray of an angle found on the positive x-axis when the angle is in standard position</p>  <p>Terminal Side: The ray of an angle not found on the positive x-axis when the angle is in standard position (where the angle ends)</p>	<p>Positive Angles: Angles with degrees greater than 0 (counterclockwise)</p> 
<p>Negative Angles: Angles with degrees less than 0 (clockwise)</p> 	

Example 1: Draw an angle with the given measure in standard position.

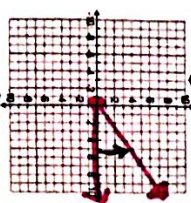
a) 70°



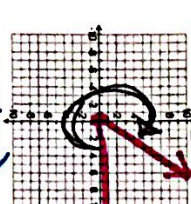
b) -135°



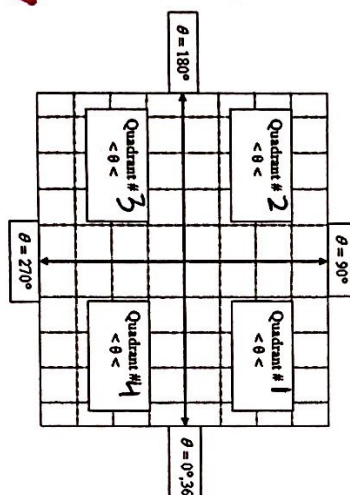
c) $\frac{\pi}{6}$



d) $-\frac{5\pi}{3}$



$\frac{\pi}{6} (\frac{180}{\pi}) = 30^\circ$
 $-\frac{5\pi}{3} (\frac{180}{\pi}) = -300^\circ$

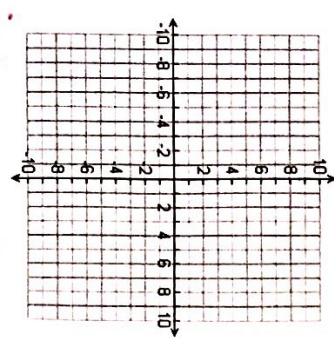


Coterminal Angles: Two angles in standard position that share the same terminal side

- To find positive coterminal angles: add 360° or 2π
- To find negative coterminal angles: subtract 360° or 2π

Example 2: Find the measure of a coterminal angle with the listed angle.

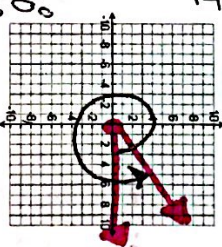
- a) Find two positive coterminal angles with -410°
- $-410^\circ + 360^\circ = -50^\circ$ $-50^\circ + 360^\circ = 310^\circ$
- b) Find two negative coterminal angles 579°
- $579^\circ - 360^\circ = 219^\circ$ $219^\circ - 360^\circ = -141^\circ$
- c) Find one positive and one negative coterminal angles with $\frac{5\pi}{4}$
- $\frac{5\pi}{4} + 2\pi = \frac{13\pi}{4}$ $\frac{5\pi}{4} - 2\pi = -\frac{3\pi}{4}$
- d) Find the measure of an angle between 0 and 2π with $-\frac{\pi}{3}$
- $-\frac{\pi}{3} + 2\pi = \frac{5\pi}{3}$
- e) Find the measure of an angle between 0 and 360° with 1054°
- $1054^\circ - 360^\circ = 694^\circ$ $694^\circ - 360^\circ = 334^\circ$



Example 3: Sketch a graph each of the following in standard position. Be sure that your swoosh marks match the number of turns around the unit circle.

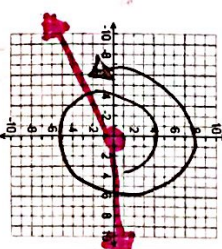
a) $\frac{13\pi}{6}$

$\frac{13\pi}{6} (\frac{180}{\pi}) = 390^\circ$



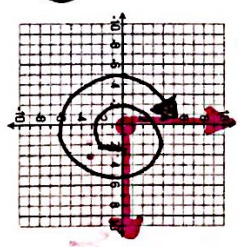
b) 553°

$553^\circ - 360^\circ = 193^\circ$



c) $-\frac{7\pi}{2}$

$-\frac{7\pi}{2} (\frac{180}{\pi}) = -630^\circ$



d) 1000°

$1000^\circ - 360^\circ = 640^\circ$ $640^\circ - 360^\circ = 280^\circ$

