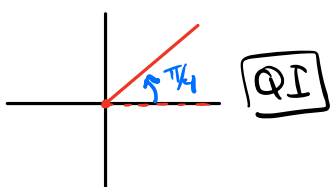


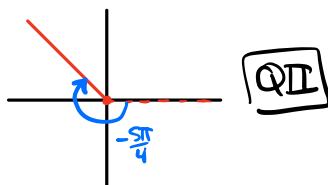
§1.1: Angular Measure & the Unit Circle

1.] Determine the quadrant in which each angle lies:

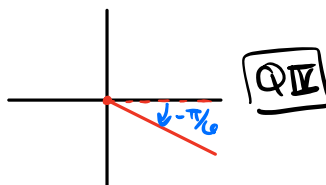
a.) $\frac{\pi}{4} = \frac{1}{4}\pi$



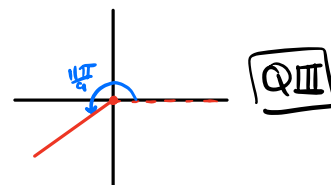
b.) $-\frac{5\pi}{4} = -1\frac{1}{4}\pi$



c.) $-\frac{\pi}{6} = -\frac{1}{6}\pi$



d.) $\frac{11\pi}{9} = 1\frac{2}{9}\pi$



2.] Determine two coterminal angles (one positive and one negative) for each angle below:

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

$$\text{Pos: } \frac{\pi}{6} + 2\pi = \frac{\pi}{6} + \frac{12\pi}{6} = \frac{13\pi}{6}$$

$$\text{Neg: } \frac{\pi}{6} - 2\pi = \frac{\pi}{6} - \frac{12\pi}{6} = \frac{-11\pi}{6}$$

b.) $\frac{8\pi}{3}$

$$\text{Pos: } \frac{8\pi}{3} + 2\pi = \frac{8\pi}{3} + \frac{6\pi}{3} = \frac{14\pi}{3}$$

$$\text{Neg: } \frac{8\pi}{3} - 2\pi = \frac{8\pi}{3} - \frac{6\pi}{3} = \frac{2\pi}{3} \rightarrow \frac{2\pi}{3} - \frac{6\pi}{3} = \frac{-4\pi}{3}$$

3.] Find (if possible) the complement and supplement of each angle below:

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

$$\text{Comp: } \frac{\pi}{2} - \frac{\pi}{6} = \frac{3\pi}{6} - \frac{\pi}{6} = \frac{2\pi}{6} = \frac{\pi}{3}$$

$$\text{Supp: } \pi - \frac{\pi}{6} = \frac{6\pi}{6} - \frac{\pi}{6} = \frac{5\pi}{6}$$

b.) $\frac{\pi}{4}$

$$\text{Comp: } \frac{\pi}{2} - \frac{\pi}{4} = \frac{2\pi}{4} - \frac{\pi}{4} = \frac{\pi}{4}$$

$$\text{Supp: } \pi - \frac{\pi}{4} = \frac{4\pi}{4} - \frac{\pi}{4} = \frac{3\pi}{4}$$

4.] Convert the following degree measures to radians:

a.) 120°

$$120^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{12}{18} \pi = \frac{2\pi}{3}$$

b.) -20°

$$-20^\circ \left(\frac{\pi}{180^\circ} \right) = -\frac{2}{18} \pi = \frac{-\pi}{9}$$

5.] Convert the following radian measures to degrees:

a.) $\frac{3\pi}{2}$

$$\frac{3\pi}{2} \left(\frac{180^\circ}{\pi} \right) = \frac{3}{2} (180^\circ) = 270^\circ$$

b.) $-\frac{7\pi}{6}$

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

6.] Convert each angle measure in degrees, minutes, and seconds to decimal degree form:

a.) $113^\circ 20' 14''$

$$= 113 + \frac{20}{60} + \frac{14}{3600}$$

$$= \boxed{113.3372^\circ}$$

b.) $-78^\circ 45' 18''$

$$= -78 - \frac{45}{60} - \frac{18}{3600}$$

$$= \boxed{-78.7550^\circ}$$

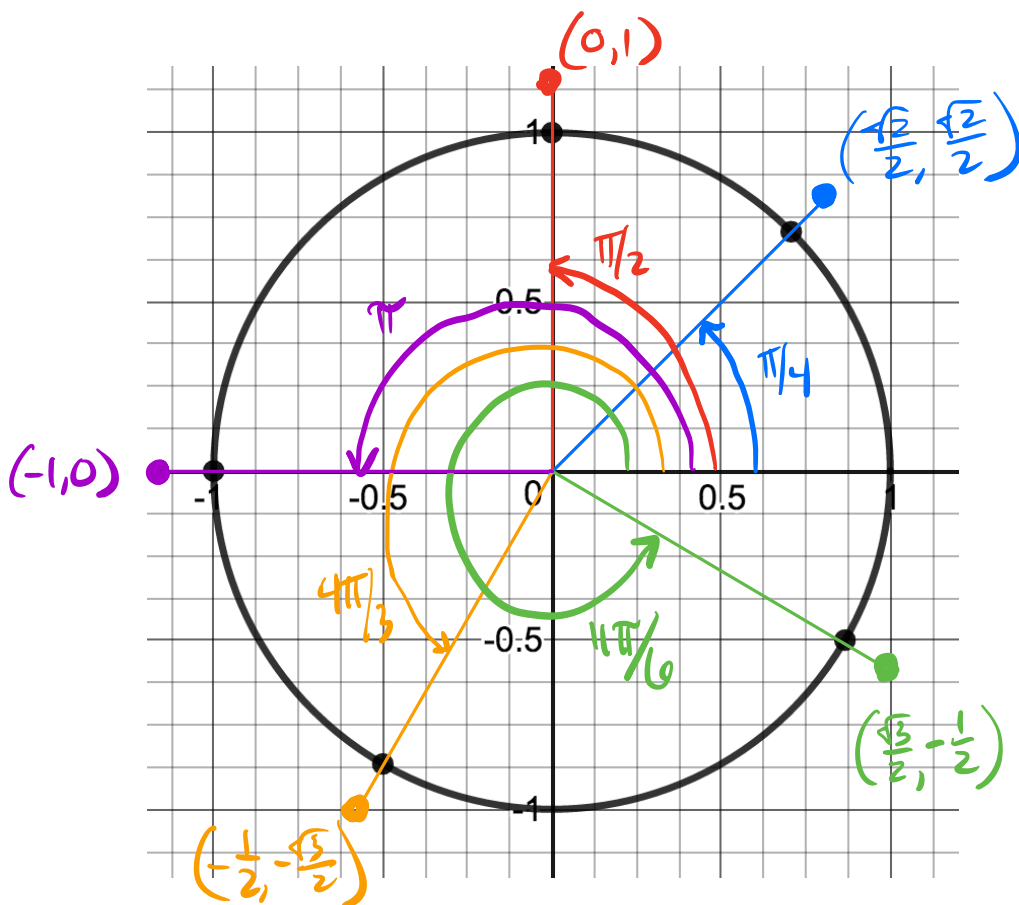
7.] Find the length of the arc on a circle of radius $r = 15$ inches intercepted by an angle of $\theta = 120^\circ$.

$$\text{Arc-length} = \theta r = \frac{2\pi}{3} (15) = \boxed{10\pi \text{ inches}}$$

↓
convert to radians:

$$120^\circ \left(\frac{\pi}{180^\circ}\right) = \frac{2\pi}{3}$$

8.] Determine the positive angle that corresponds to each point on the unit circle below, and find the cosine and sine of that angle.



$$\cos(\pi/4) = \frac{\sqrt{2}}{2}$$

$$\sin(\pi/4) = \frac{\sqrt{2}}{2}$$

$$\cos(\pi/2) = 0$$

$$\sin(\pi/2) = 1$$

$$\cos(\pi) = -1$$

$$\sin(\pi) = 0$$

$$\cos(4\pi/3) = -\frac{1}{2}$$

$$\sin(4\pi/3) = -\frac{\sqrt{3}}{2}$$

$$\cos(11\pi/6) = \frac{\sqrt{3}}{2}$$

$$\sin(11\pi/6) = -\frac{1}{2}$$