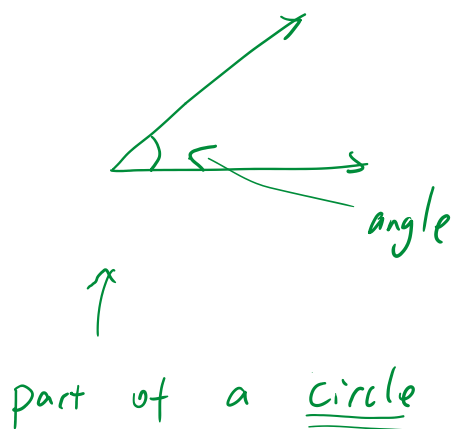
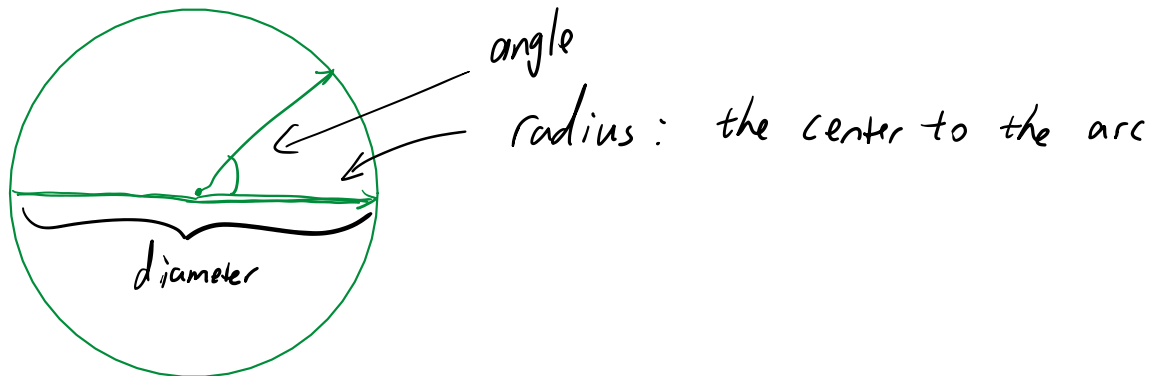


I. Angles and Radian

Angle is in degree measures between two lines.

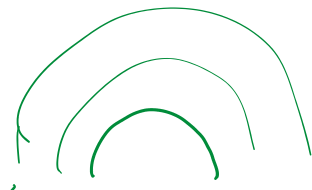


A circle is the unit circle, in this class!



○ is in 360° . ◐ is 180° .

$\Rightarrow 2\pi$ radian , π radian ← we skip 'radian', when π is there. (π already means radian)

$\pi \approx 3.14$,  1 radian \Leftrightarrow)

$$180^\circ = \pi \text{ radian}$$

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

Since we have $180^\circ = \pi$, then $1 \cdot 180^\circ = 1 \cdot \pi$,

Thus,

$$1 = \frac{\pi}{180^\circ}$$

$$1 = \frac{180^\circ}{\pi}$$

$$\frac{180^\circ}{180^\circ} = \frac{\pi}{180^\circ} \rightarrow$$

$$\frac{180^\circ}{\pi} = \frac{\pi}{\pi} \leftarrow$$

eg. Convert 60° measures to radian.

sol:

$$60^\circ = \cancel{60^\circ} \cdot \frac{\pi}{\cancel{180^\circ} 3}$$

$$= \boxed{\frac{\pi}{3}} \text{ or } \boxed{\frac{\pi}{3} \text{ radian}}$$

eg. Convert each degree to radian.

a. -135°

b. 300°

$$\text{sol: a. } -135^\circ = \overset{3}{\uparrow} \overset{9}{\cancel{27}} \overset{36}{\cancel{135}} \cdot \frac{\pi}{\cancel{180^\circ} 4} \overset{+2}{\cancel{36}} \overset{4}{\cancel{144}}$$

$$= \boxed{-\frac{3\pi}{4}}$$

$$\begin{array}{r} 27 \\ 5 \overline{) 135} \\ \underline{10} \\ 35 \\ \underline{35} \\ 0 \end{array}$$

$$- \boxed{\frac{\pi}{4}}$$

$$b. 300^\circ = \overset{5}{\cancel{15}} \cancel{300}^\circ \cdot \frac{\cancel{2\pi}}{\cancel{360}^\circ}$$

$\cancel{18}$
 $\cancel{6}$
3

$$\leftarrow 300^\circ \cdot \frac{\pi}{180^\circ} \checkmark$$

$$= \boxed{\frac{5\pi}{3}}$$

eg. Convert $\frac{\pi}{4}$ radian to degree measures.

sol:

$$\frac{\pi}{4} = \frac{\cancel{1} \pi}{\cancel{4}} \cdot \frac{\cancel{180}^\circ}{\cancel{\pi}} \overset{45}{}$$

$$= \boxed{45^\circ}$$

eg. Convert each radian to degree.

a. $\frac{9\pi}{4}$

b. $-\frac{5\pi}{6}$

c. 4.25

sol: a. $\frac{9\pi}{4} = \frac{\cancel{9} \pi}{\cancel{4}} \cdot \frac{\cancel{180}^\circ}{\cancel{\pi}} \overset{45}{}$

$$= \boxed{405^\circ}$$

b. $-\frac{5\pi}{6} = -\frac{\cancel{5} \pi}{\cancel{6}} \cdot \frac{\cancel{180}^\circ}{\cancel{\pi}} \overset{30}{}$

$$b. -\frac{5\pi}{6} = -\frac{5\pi}{6} \cdot \frac{180^\circ}{\pi}$$
$$= \boxed{-150^\circ}$$

$$c. 4.25 = 4.25 \cdot \frac{180^\circ}{\pi}$$
$$\approx \boxed{244^\circ}$$