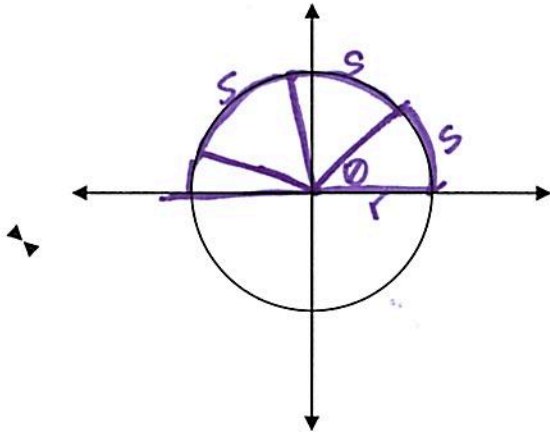


Key

## ELABORATE - Radian Measure

### Degrees versus Radians

One radian is the measure of the central angle  $\theta$  that intercepts an arc  $s$  equal in length to the radius  $r$  of the circle.



$$s = r$$

$$180^\circ = 3.1415... \text{ radians} \\ \text{or} \\ \pi$$

$$360^\circ = 6.2831... \text{ radians} \\ \text{or} \\ 2\pi$$

The radian measure of one full revolution is  $360^\circ = 2\pi$  or  $180^\circ = \pi$

Converting between degrees and radians: You can convert from degrees to radians and back.

★ Degrees to Radians: Multiply the degree measure by  $\frac{\pi}{180}$

Ex.)  $60^\circ \cdot \frac{\pi}{180} = \frac{60\pi}{180} = \boxed{\frac{\pi}{3}}$

★ Radians to Degrees: Multiply the radian measure by  $\frac{180}{\pi}$

Ex.)  $\frac{3\pi}{2} \cdot \frac{180}{\pi} = \frac{540}{2} = \boxed{270^\circ}$

Examples:

1. Convert the following angles from degree to radian measure in terms of  $\pi$ .

a.  $45^\circ \cdot \frac{\pi}{180} = \frac{45\pi}{180} = \boxed{\frac{\pi}{4}}$

b.  $135^\circ \cdot \frac{\pi}{180} = \frac{135\pi}{180} = \boxed{\frac{3\pi}{4}}$

c.  $225^\circ \cdot \frac{\pi}{180} = \frac{225\pi}{180} = \boxed{\frac{5\pi}{4}}$

d.  $315^\circ \cdot \frac{\pi}{180} = \frac{315\pi}{180} = \boxed{\frac{7\pi}{4}}$

2. Convert the following angles from radian measure to degree.

a.  $\frac{\pi}{6} \cdot \frac{180}{\pi} = \frac{180}{6} = \boxed{30^\circ}$

b.  $\frac{5\pi}{3} \cdot \frac{180}{\pi} = \frac{900}{3} = \boxed{300^\circ}$