The Radian Measure of an Angle

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Preliminaries and Objectives

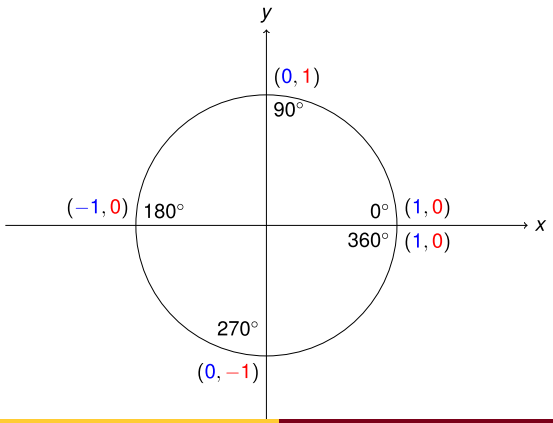
Preliminaries:

- Ratio and Proportion
- Unit circle angles, measured in degrees, including angles larger than 180° and negative angles.

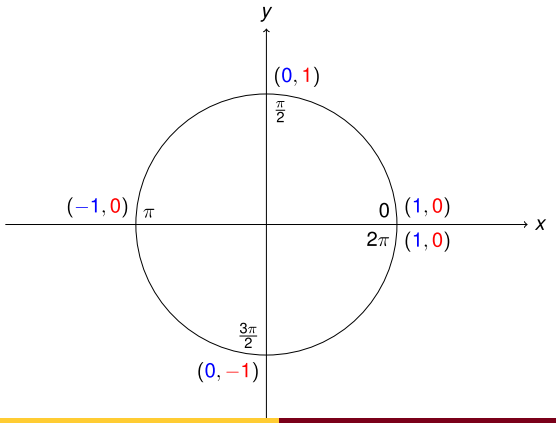
Objectives:

- Given the radian measure of an angle, convert to degrees
- Given the degree measure of an angle, convert to radians

Unit Circle in Degrees



Unit Circle in Radians



Conversion Factor

One Full Circle

360 degrees $= 2\pi$ radians

Half Circle

180 degrees $= \pi$ radians

Converting from radians to degrees

Convert $\frac{5\pi}{6}$ radians to degrees.

Solution:

$$\frac{5\pi}{6} \text{ radians } = \frac{5(180^\circ)}{6} = 150^\circ$$

Converting from degrees to radians

Convert 315° to radians

Solution:

$$\frac{\pi \text{ radians}}{180^\circ} = \frac{x}{315^\circ}$$

$$x = \frac{315\pi}{180} \text{ radians} = \frac{7\pi}{4} \text{ radians}$$

Converting from radians to degrees

Convert 4 radians to degrees

Solution:

$$\frac{180^\circ}{\pi \text{ radians}} = \frac{x}{4 \text{ radians}}$$

$$x = \frac{720^\circ}{\pi} \approx 229.18^\circ$$

Recap

- The radian measure of an angle is the same as the length of an arc of a circle of radius 1 cut off by that angle
- π radians $= 180^\circ$