The Radian Measure of an Angle

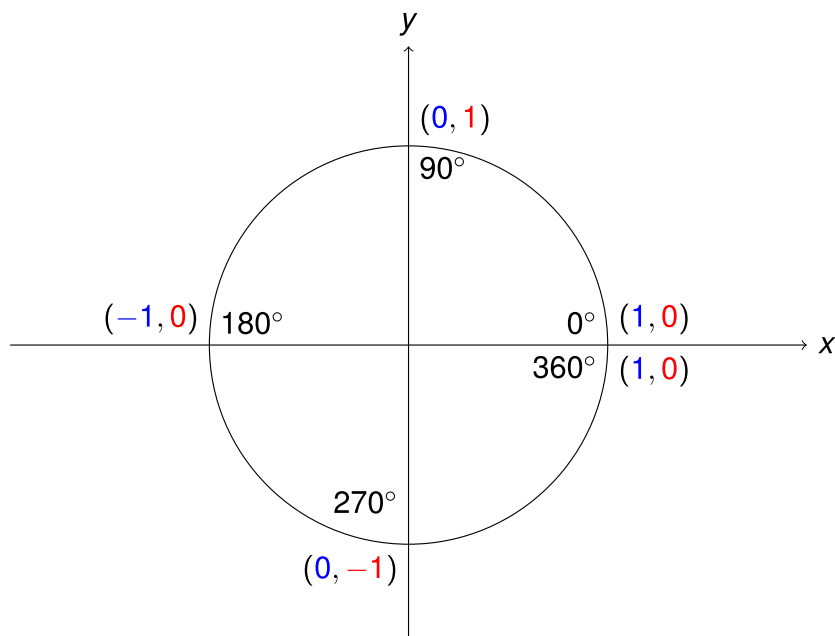UNIVERSITY OF MINNESOTA

Preliminaries and Objectives

Preliminaries:

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

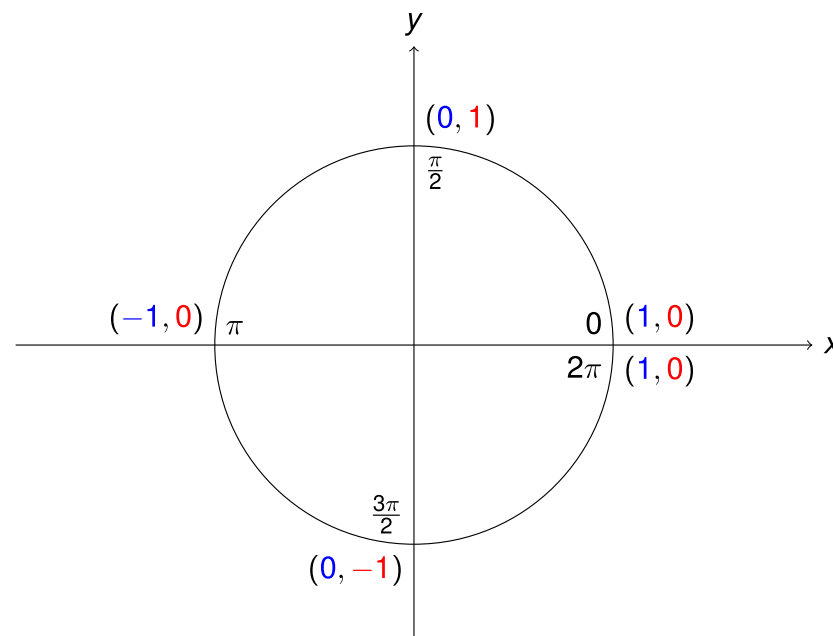Objectives:

- 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 $\dfrac{5\pi}{6}$ radians to degrees.

Solution:

$$\dfrac{5\pi}{6} \text{ radians } = \dfrac{5(180°)}{6} = 150°$$

Converting from degrees to radians

Convert $315°$ to radians

Solution:

$$\dfrac{\pi \text{ radians}}{180°} = \dfrac{x}{315°}$$

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

Converting from radians to degrees

Convert 4 radians to degrees

Solution:

$$\dfrac{180°}{\pi \text{ radians}} = \dfrac{x}{4 \text{ radians}}$$

$$x = \dfrac{720°}{\pi} \approx 229.18°$$

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 $= 180°$