

The Unit Circle - Part II



Preliminaries and Objectives

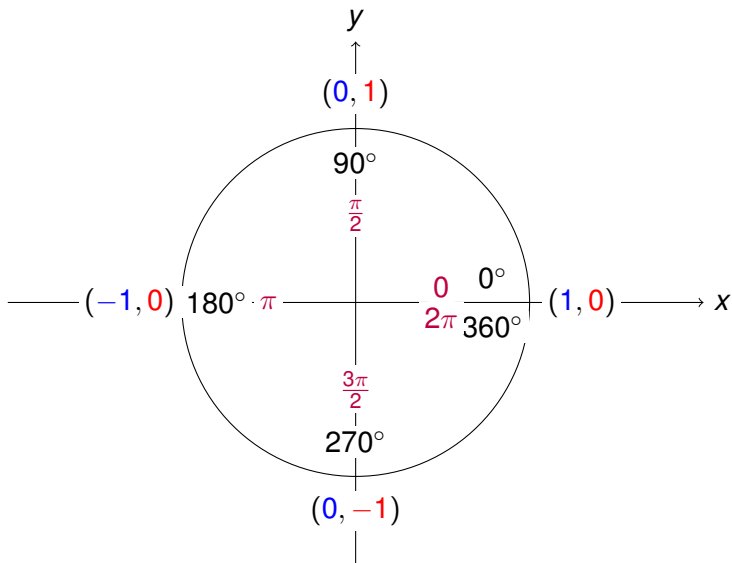
Preliminaries:

- Trigonometric definition of *sin* and *cos* (coordinates on unit circle)
- Measurement of angles in radians and degrees
- $30^\circ - 60^\circ - 90^\circ$ triangle and $45^\circ - 45^\circ - 90^\circ$

Objectives:

- Find values of $\cos \theta$ and $\sin \theta$ associated with the $30^\circ - 60^\circ - 90^\circ$ triangle and the $45^\circ - 45^\circ - 90^\circ$ triangle

Unit Circle Values for Multiples of 90°



Unit Circle Values for Multiples of 90°

$$\cos 180^\circ = -1$$

$$\sin 90^\circ = 1$$

$$\cos 0^\circ = 1$$

$$\sin -90^\circ = -1$$

$$\cos \frac{\pi}{2} = 0$$

$$\sin \frac{\pi}{2} = 1$$

$$\cos \pi = -1$$

$$\sin \pi = 0$$

$$\cos \frac{3\pi}{2} = 0$$

$$\sin \frac{3\pi}{2} = -1$$

$$\cos 2\pi = 1$$

$$\sin 2\pi = 0$$

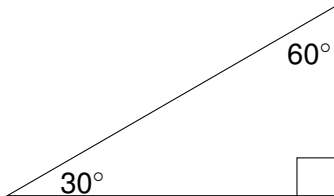
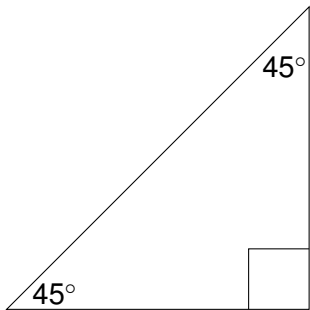
$$\cos 0 = 1$$

$$\sin 0 = 0$$

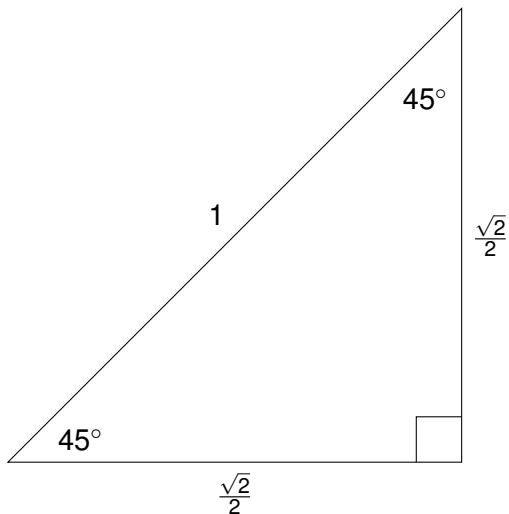
$$\cos -\frac{\pi}{2} = 0$$

$$\sin -\frac{\pi}{2} = -1$$

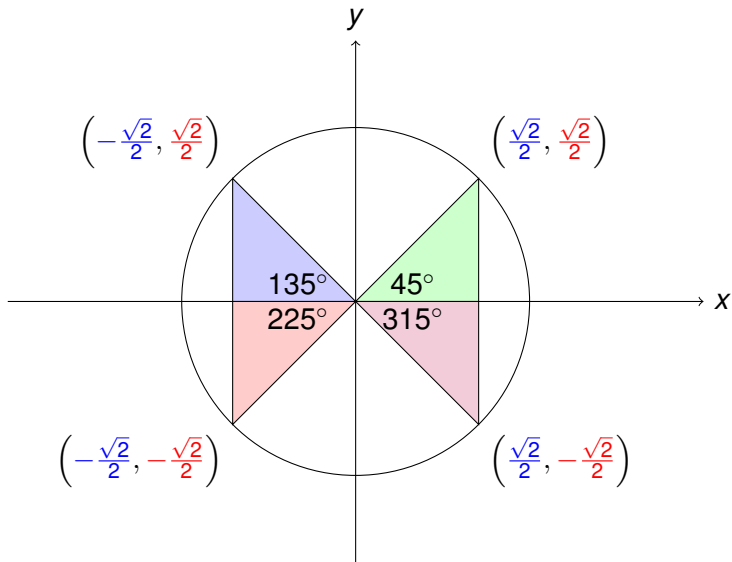
Special Triangles



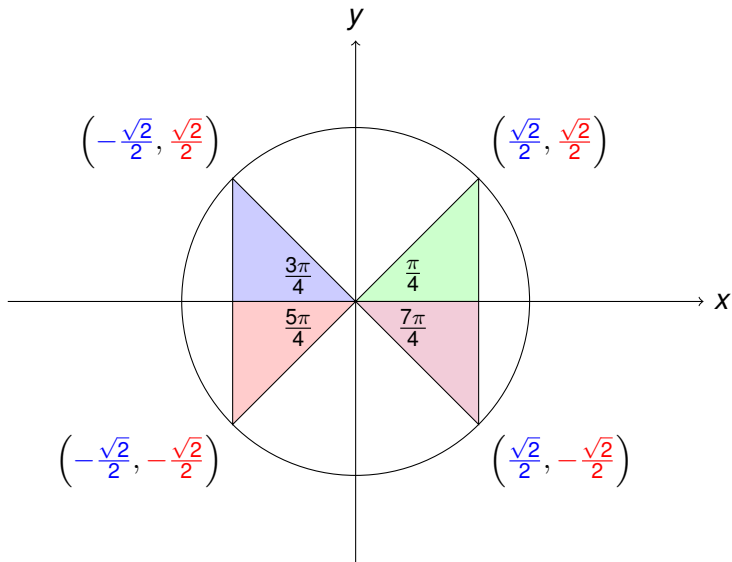
45° - 45° - 90° Triangle



45° - 45° - 90° Triangle Values on the Unit Circle



45° - 45° - 90° Triangle Values on the Unit Circle



45° - 45° - 90° Triangle Values on the Unit Circle

$$\cos 225^\circ = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

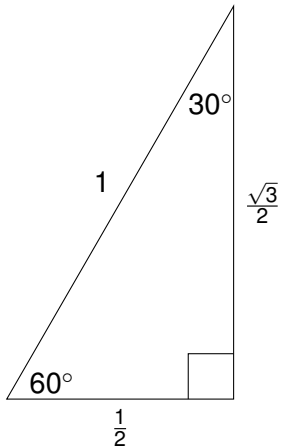
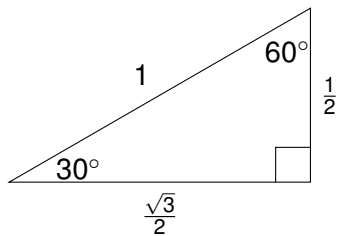
$$\sin \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$$

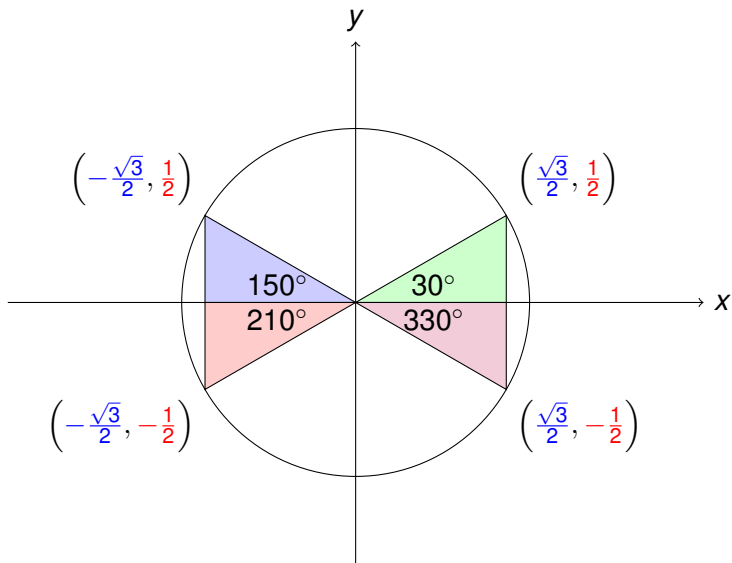
$$\cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$\sin 135^\circ = \frac{\sqrt{2}}{2}$$

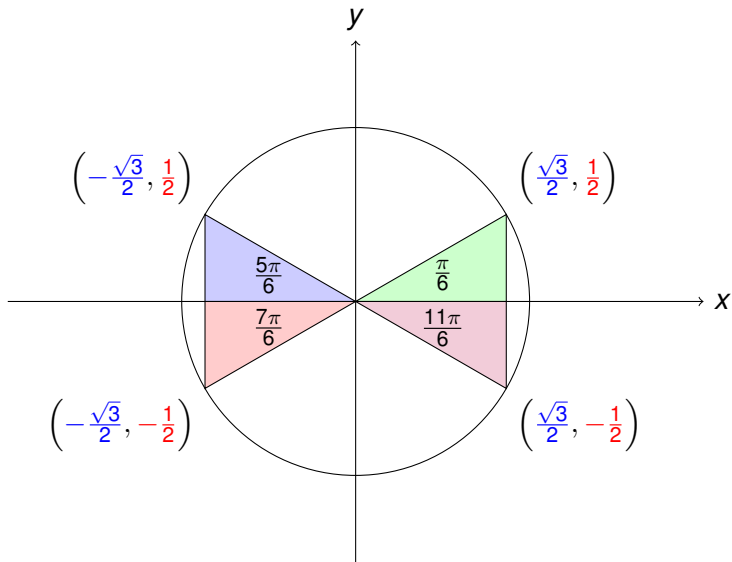
30° - 60° - 90° Triangle



30° - 60° - 90° Triangle Values on the Unit Circle



30° - 60° - 90° Triangle Values on the Unit Circle



30° - 60° - 90° Triangle Values on the Unit Circle

$$\sin \frac{7\pi}{6} = -\frac{1}{2}$$

$$\cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$$

$$\cos 150^\circ = -\frac{\sqrt{3}}{2}$$

$$\sin 30^\circ = \frac{1}{2}$$

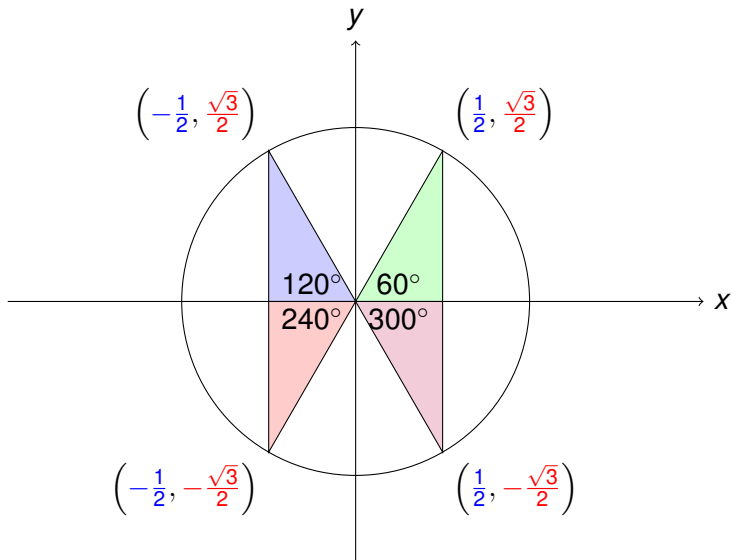
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\sin 330^\circ = -\frac{1}{2}$$

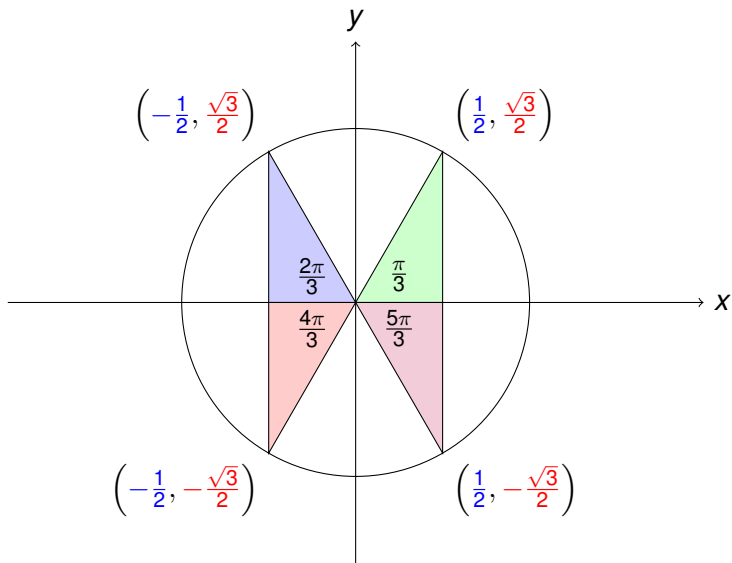
$$\sin \frac{5\pi}{6} = \frac{1}{2}$$

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

30° - 60° - 90° Triangle Values on the Unit Circle



30° - 60° - 90° Triangle Values on the Unit Circle



30° - 60° - 90° Triangle Values on the Unit Circle

$$\sin 300^\circ = -\frac{\sqrt{3}}{2}$$

$$\cos 60^\circ = \frac{1}{2}$$

$$\cos \frac{2\pi}{3} = -\frac{1}{2}$$

$$\sin 300^\circ = -\frac{\sqrt{3}}{2}$$

$$\cos 120^\circ = -\frac{1}{2}$$

$$\sin \frac{5\pi}{3} = -\frac{\sqrt{3}}{2}$$

$$\sin 240^\circ = -\frac{\sqrt{3}}{2}$$

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

Recap

