

The Unit Circle - Part II



Preliminaries and Objectives

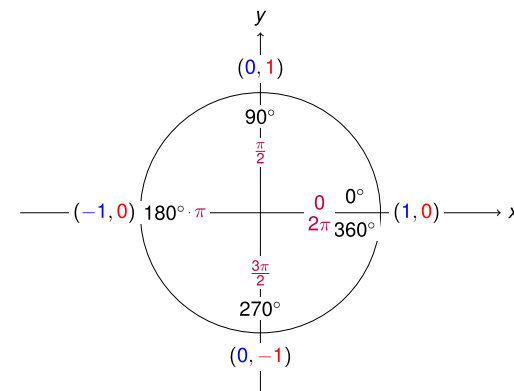
Preliminaries:

- 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

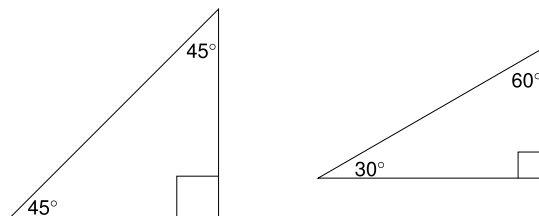
Unit Circle Values for Multiples of 90°



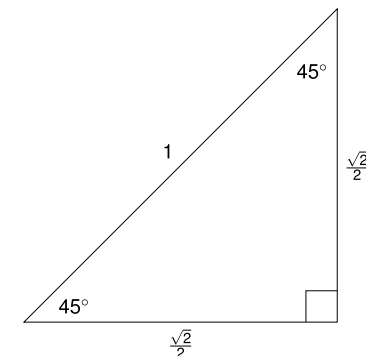
Unit Circle Values for Multiples of 90°

$\cos 180^\circ = -1$	$\sin 90^\circ = 1$
$\cos 0^\circ = 1$	$\sin -90^\circ = -1$
$\cos \frac{\pi}{2} = 0$	$\sin \frac{\pi}{2} = 1$
$\cos \pi = -1$	$\sin \pi = 0$
$\cos \frac{3\pi}{2} = 0$	$\sin \frac{3\pi}{2} = -1$
$\cos 2\pi = 1$	$\sin 2\pi = 0$
$\cos 0 = 1$	$\sin 0 = 0$
$\cos -\frac{\pi}{2} = 0$	$\sin -\frac{\pi}{2} = -1$

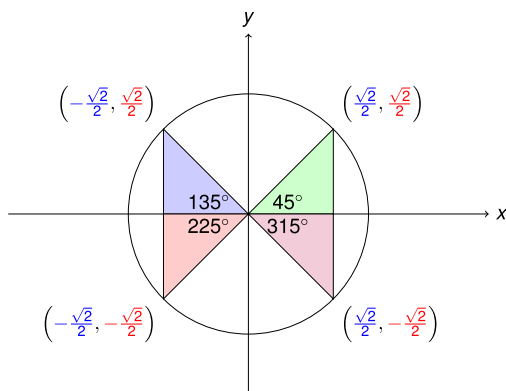
Special Triangles



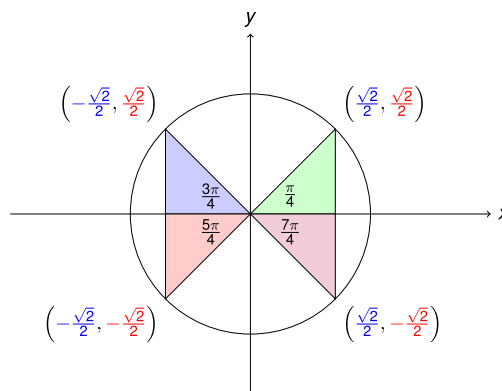
$45^\circ - 45^\circ - 90^\circ$ Triangle



$45^\circ - 45^\circ - 90^\circ$ Triangle Values on the Unit Circle



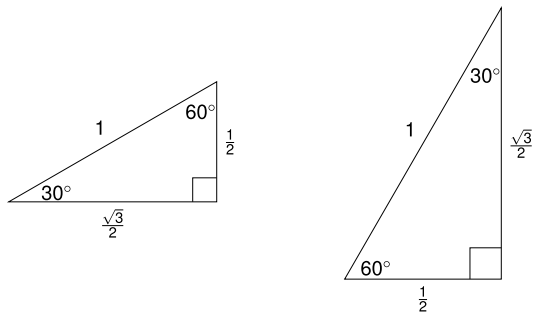
$45^\circ - 45^\circ - 90^\circ$ Triangle Values on the Unit Circle



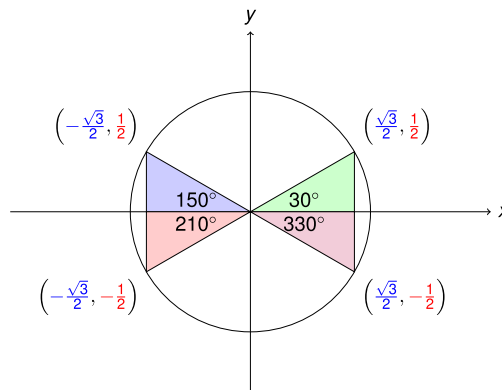
$45^\circ - 45^\circ - 90^\circ$ Triangle Values on the Unit Circle

$\cos 225^\circ = -\frac{\sqrt{2}}{2}$	$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$
$\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$	$\sin 45^\circ = \frac{\sqrt{2}}{2}$
$\sin \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$	$\cos \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$
$\cos 45^\circ = \frac{\sqrt{2}}{2}$	$\sin 135^\circ = \frac{\sqrt{2}}{2}$

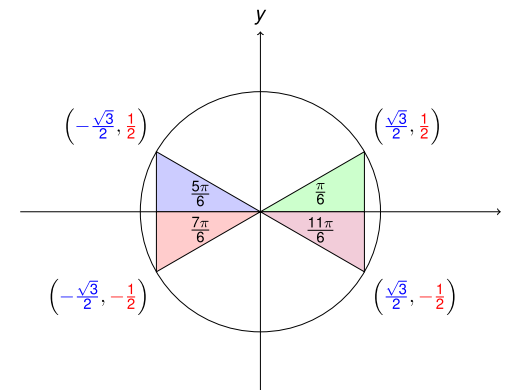
30° - 60° - 90° Triangle



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



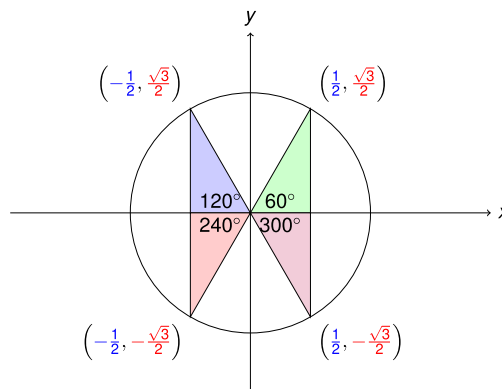
30° - 60° - 90° Triangle Values on the Unit Circle



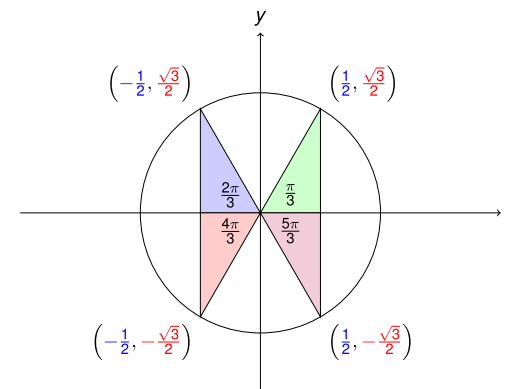
30° - 60° - 90° Triangle Values on the Unit Circle

$$\begin{aligned} \sin \frac{7\pi}{6} &= -\frac{1}{2} & \cos 30^\circ &= \frac{\sqrt{3}}{2} \\ \cos \frac{7\pi}{6} &= -\frac{\sqrt{3}}{2} & \sin 330^\circ &= -\frac{1}{2} \\ \cos 150^\circ &= -\frac{\sqrt{3}}{2} & \sin \frac{5\pi}{6} &= \frac{1}{2} \\ \sin 30^\circ &= \frac{1}{2} & \sin \frac{11\pi}{6} &= -\frac{1}{2} \end{aligned}$$

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

$$\begin{aligned} \sin 300^\circ &= -\frac{\sqrt{3}}{2} & \cos 60^\circ &= \frac{1}{2} \\ \cos \frac{2\pi}{3} &= -\frac{1}{2} & \sin 300^\circ &= -\frac{\sqrt{3}}{2} \\ \cos 120^\circ &= -\frac{1}{2} & \sin \frac{5\pi}{3} &= -\frac{\sqrt{3}}{2} \\ \sin 240^\circ &= -\frac{\sqrt{3}}{2} & \cos \frac{4\pi}{3} &= -\frac{1}{2} \end{aligned}$$

Recap

