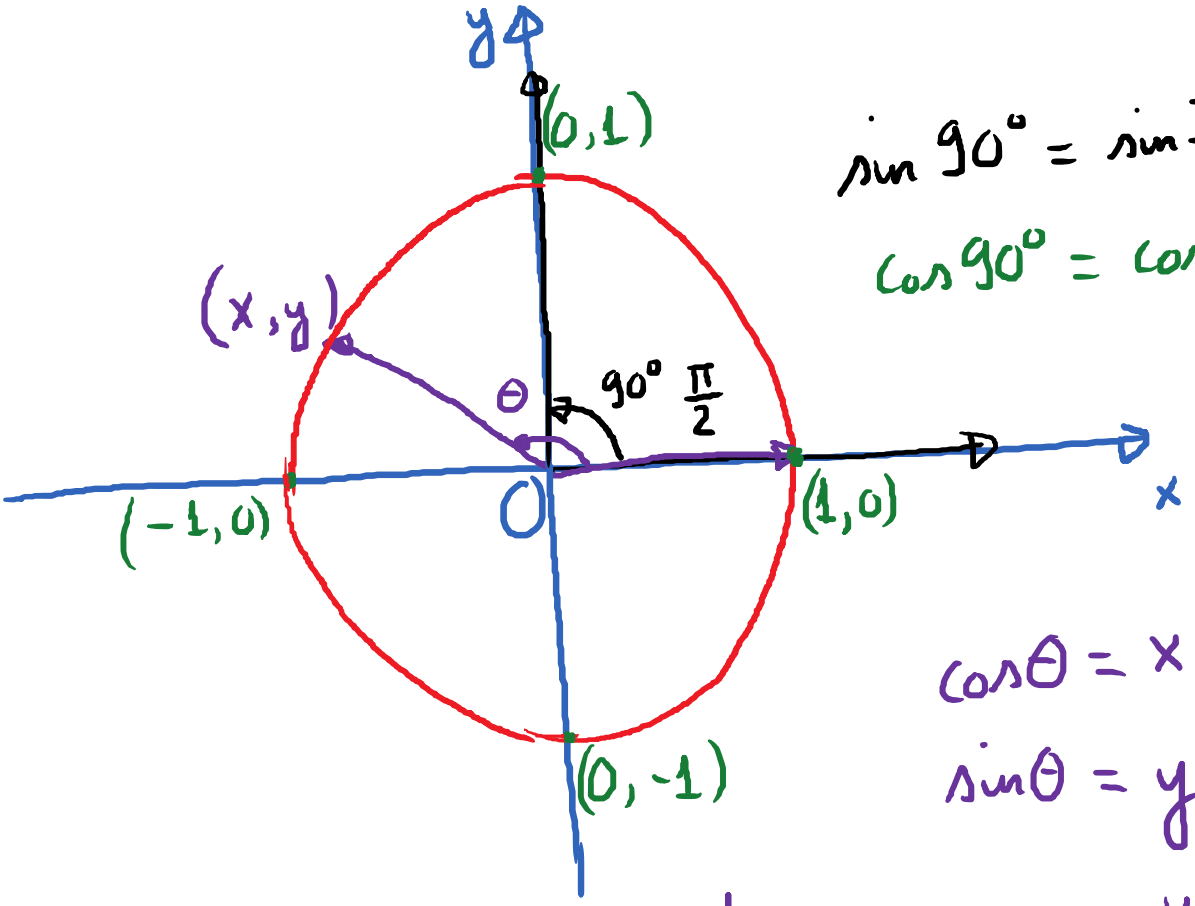
3.3. The unit circle and circular functions.

Thursday, October 5, 2017 1:37 PM

Unit circle is a circle with radius 1, centered at the origin.

$x = 0 ; y = 1$



$\sin 90° = \sin \frac{\pi}{2} = y = 1$

$\cos 90° = \cos \frac{\pi}{2} = x = 0$

$\cos\theta = x$

$\sin\theta = y$

$\sec\theta = \frac{1}{x}$

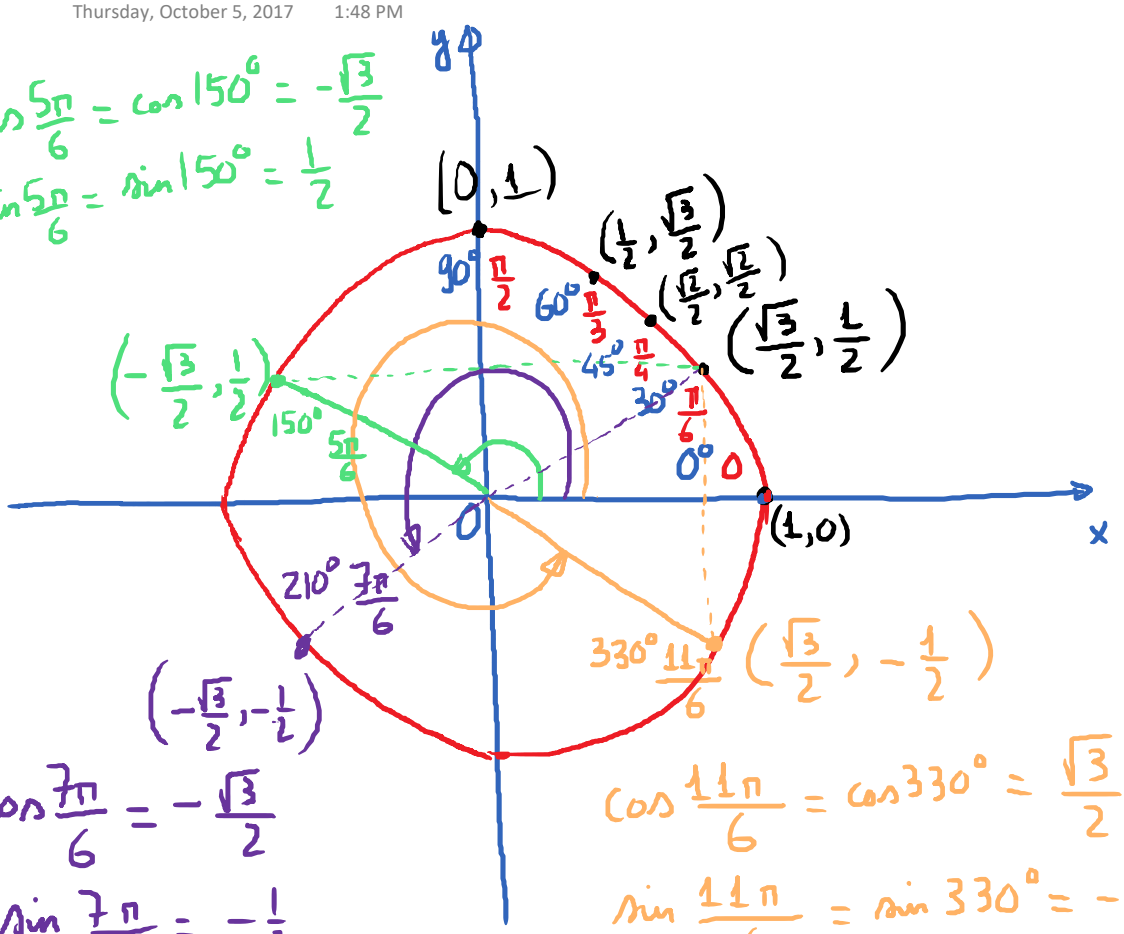
$\tan\theta = \frac{y}{x}$

$\csc\theta = \frac{1}{y}$

$\cot\theta = \frac{x}{y}$

$\cos\frac{5\pi}{6} = \cos 150^\circ = -\frac{\sqrt{3}}{2}$

$\sin\frac{5\pi}{6} = \sin 150^\circ = \frac{1}{2}$

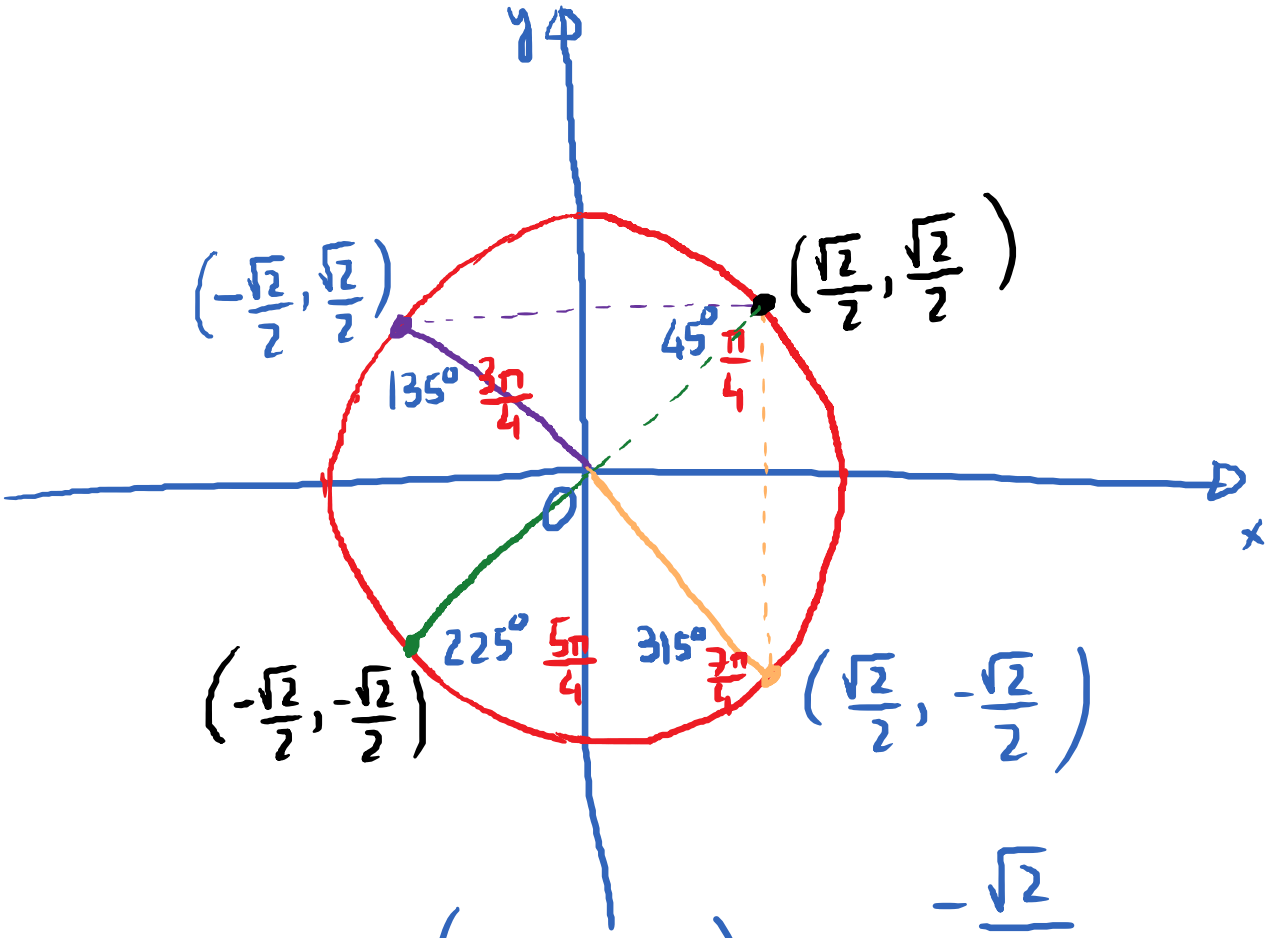


$\cos\frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$

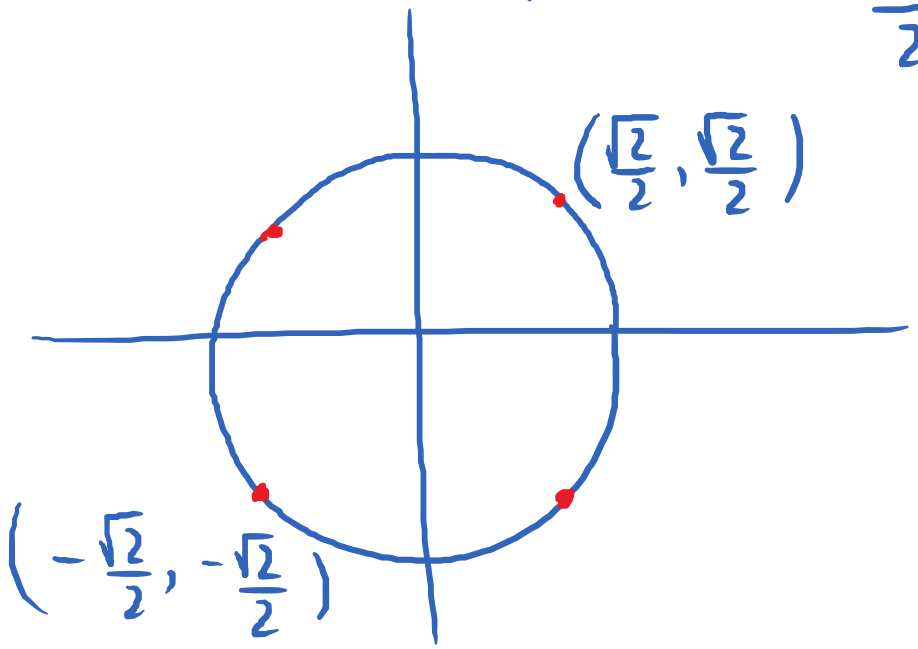
$\sin\frac{7\pi}{6} = -\frac{1}{2}$

$\cos\frac{11\pi}{6} = \cos 330^\circ = \frac{\sqrt{3}}{2}$

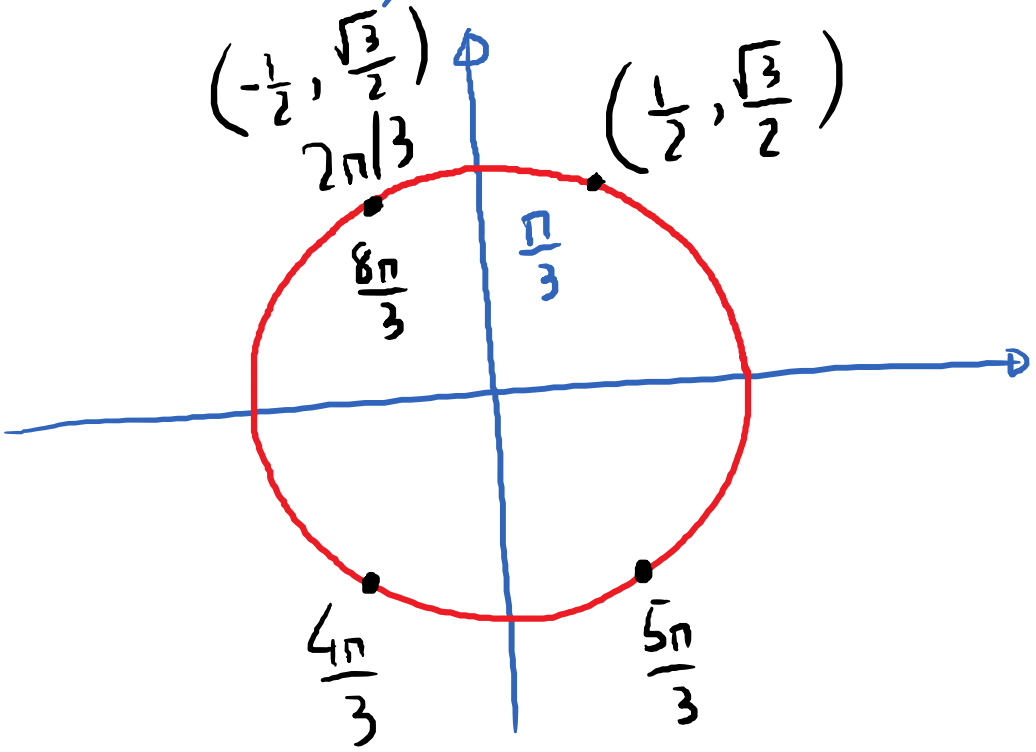
$\sin\frac{11\pi}{6} = \sin 330^\circ = -\frac{1}{2}$



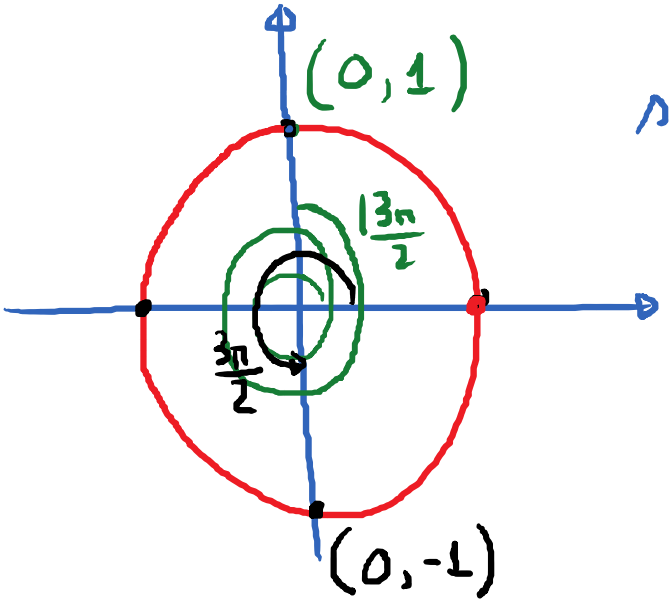
Find $\tan\left(-\frac{11\pi}{4}\right) = \frac{-\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = 1$



E.g. $\csc\left(\frac{8\pi}{3}\right) = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$.



E.g. Find $\sin\frac{3\pi}{2}$, $\cos\frac{3\pi}{2}$, $\tan\frac{3\pi}{2}$.



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

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

$\tan\frac{3\pi}{2} = \frac{-1}{0} =$ undefined

Find $\sin\frac{13\pi}{2}$, $\cos\frac{13\pi}{2}$, $\tan\frac{13\pi}{2}$

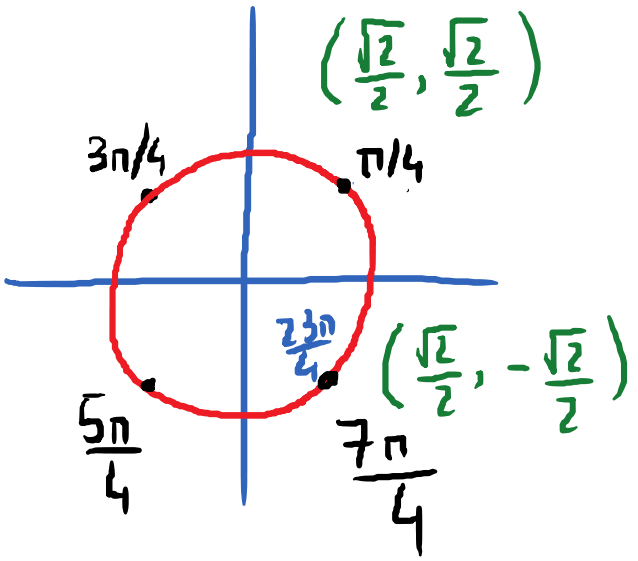
$$\frac{13\pi}{2} = \frac{12\pi}{2} + \frac{\pi}{2} = 6\pi + \frac{\pi}{2}$$
$$= 3\cdot 2\pi + \frac{\pi}{2}$$

$\sin\frac{13\pi}{2} = 1$; $\cos\frac{13\pi}{2} = 0$; $\tan\frac{13\pi}{2}$ = undefined.

E.g. $\sin\frac{7\pi}{4}$, $\cos\frac{7\pi}{4}$.

$\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$

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



E.g. $\csc\frac{23\pi}{4}$; $\sin\frac{23\pi}{4} = -\frac{\sqrt{2}}{2}$

$$\frac{23\pi}{4} = \frac{16\pi + 7\pi}{4}$$
$$= 4\pi + \frac{7\pi}{4}$$

$$\csc\frac{23\pi}{4} = -\frac{2}{\sqrt{2}} = -\sqrt{2}$$

E.g. $\tan\left(-\frac{5\pi}{3}\right)$

$\sin\left(-\frac{5\pi}{3}\right) = \frac{\sqrt{3}}{2}$

$\cos\left(-\frac{5\pi}{3}\right) = \frac{1}{2}$

$\tan\left(-\frac{5\pi}{3}\right) = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$

$= \sqrt{3}$