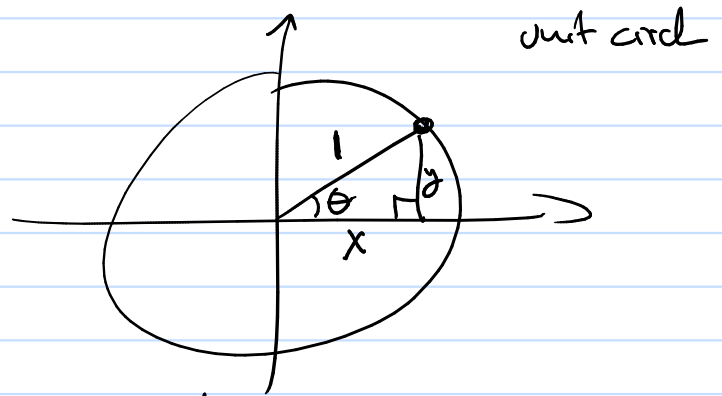
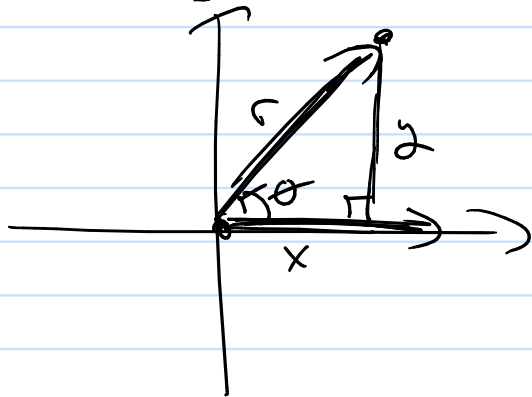


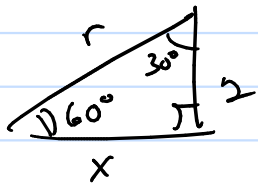
# Math 112

## Trigonometry



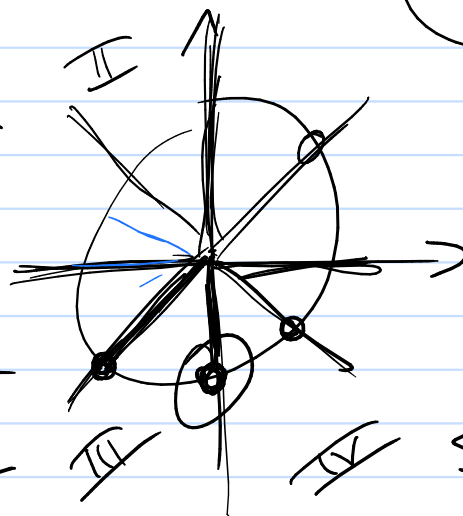
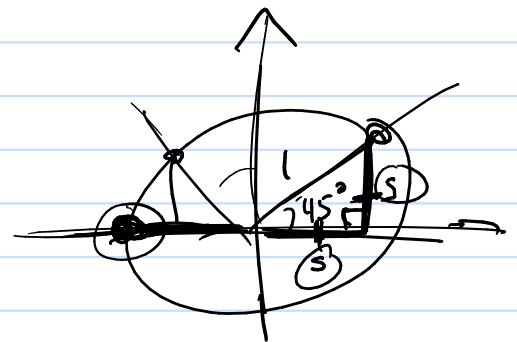
$$\theta \xrightarrow{1} x \quad \text{call this } x = \cos(\theta)$$

$$\theta \xrightarrow{1} y \quad \text{call this } y = \sin(\theta)$$



Values for these functions

$\theta$	$x = \cos(\theta)$	$y = \sin(\theta)$
$0^\circ$ or $0$	1	0
$45^\circ$ or $\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$
$90^\circ$ or $\pi/2$	0	1
$135^\circ$ or $3\pi/4$	$-\sqrt{2}/2$	$\sqrt{2}/2$
$180^\circ$ or $\pi$	-1	0
$225^\circ$ or $5\pi/4$	$-\sqrt{2}/2$	$-\sqrt{2}/2$
$270^\circ$ or $3\pi/2$	0	-1
$315^\circ$ or $7\pi/4$	$\sqrt{2}/2$	$-\sqrt{2}/2$



$$\sin^2 + \cos^2 = 1$$

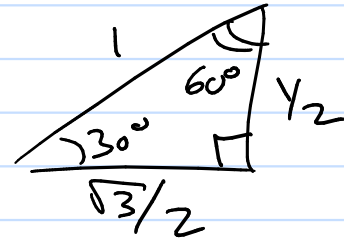
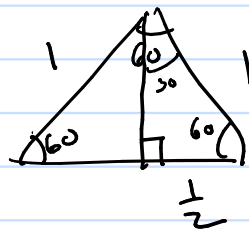
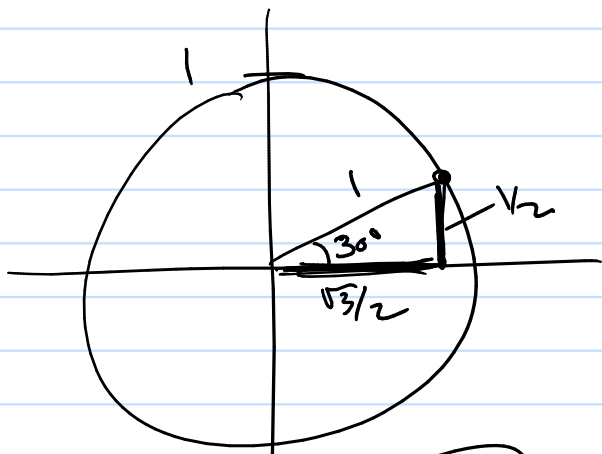
$$2 \sin^2 = 1$$

$$\sin^2 = 1/2$$

$$\sin = \sqrt{1/2} \text{ or } -\sqrt{1/2}$$

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

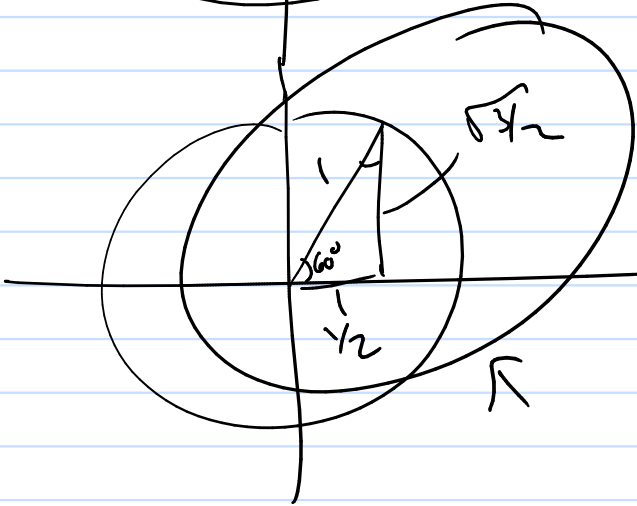
$$= \frac{\sqrt{2}}{2}$$



$$x^2 + y^2 = 1$$

$$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = 1$$

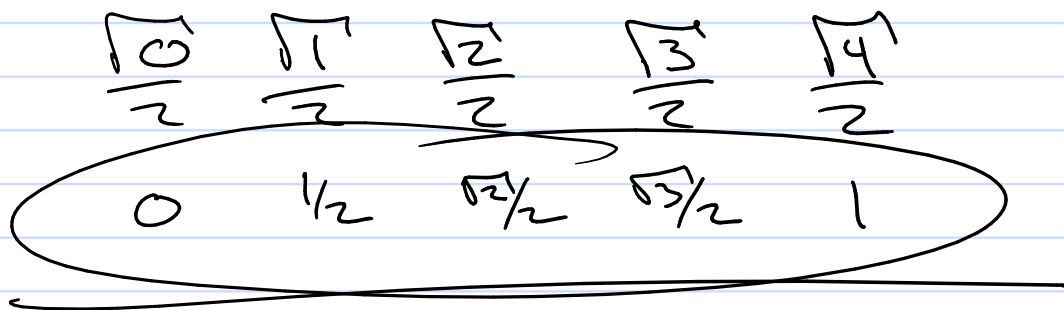
$$\frac{3}{4} + \frac{1}{4} = 1$$



$$30^\circ \left( \frac{\pi}{180^\circ} \right) = \frac{\pi}{6}$$

$\theta$	$x = \cos \theta$	$y = \sin \theta$
$0^\circ$ or $0$	1	0
$30^\circ$ or $\pi/6$	$\sqrt{3}/2$	$1/2$
$45^\circ$ or $\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$
$60^\circ$ or $\pi/3$	$1/2$	$\sqrt{3}/2$
$90^\circ$ or $\pi/2$	0	1

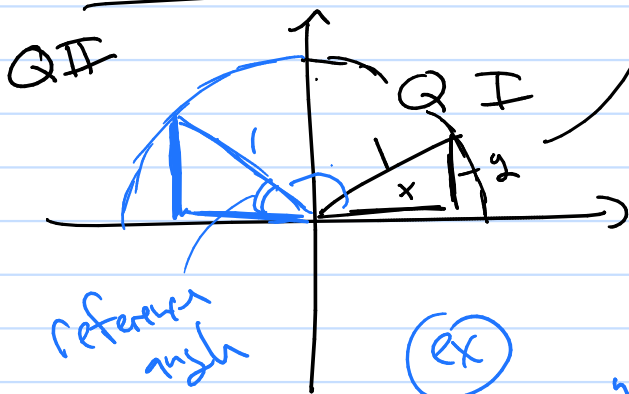
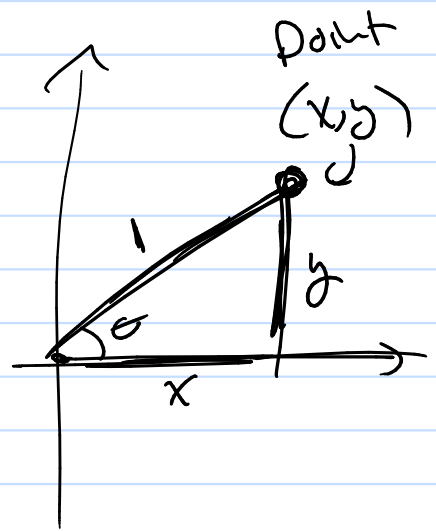
to make the  $\cos \theta$ ,  $\sin \theta$  table?



or  $\sqrt{\frac{0}{4}}$ ,  $\sqrt{\frac{1}{4}}$ ,  $\sqrt{\frac{2}{4}}$ ,  $\sqrt{\frac{3}{4}}$ ,  $\sqrt{\frac{4}{4}}$   
 $0$ ,  $\frac{1}{2}$ ,  $\frac{\sqrt{2}}{2}$ ,  $\frac{\sqrt{3}}{2}$ ,  $1$

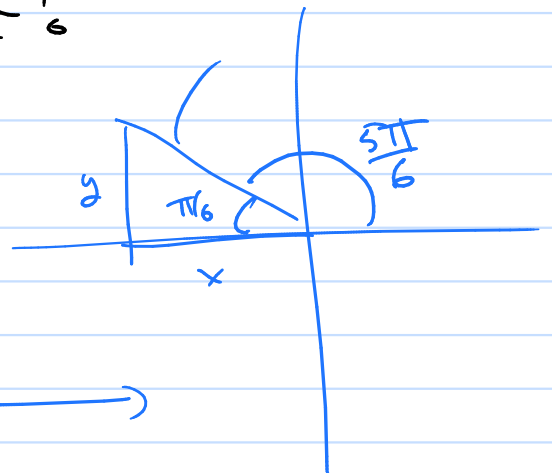
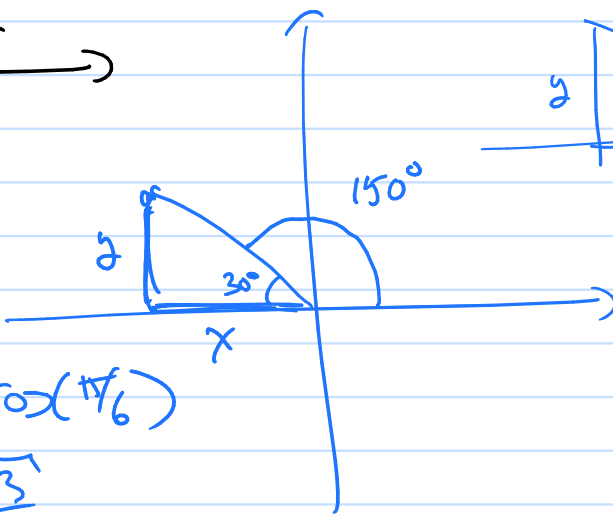
⊛

$\theta$	$x = \cos(\theta)$	$y = \sin(\theta)$
$0^\circ = 0$	1	0
$30^\circ = \pi/6$	$\sqrt{3}/2$	$1/2$
$45^\circ = \pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$
$60^\circ = \pi/3$	$1/2$	$\sqrt{3}/2$
$90^\circ = \pi/2$	0	1

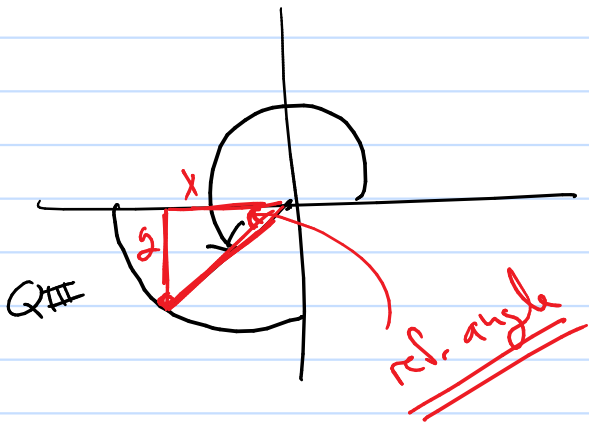


Know the table!

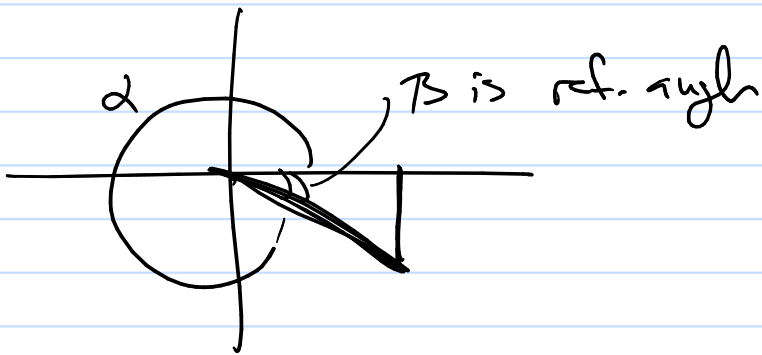
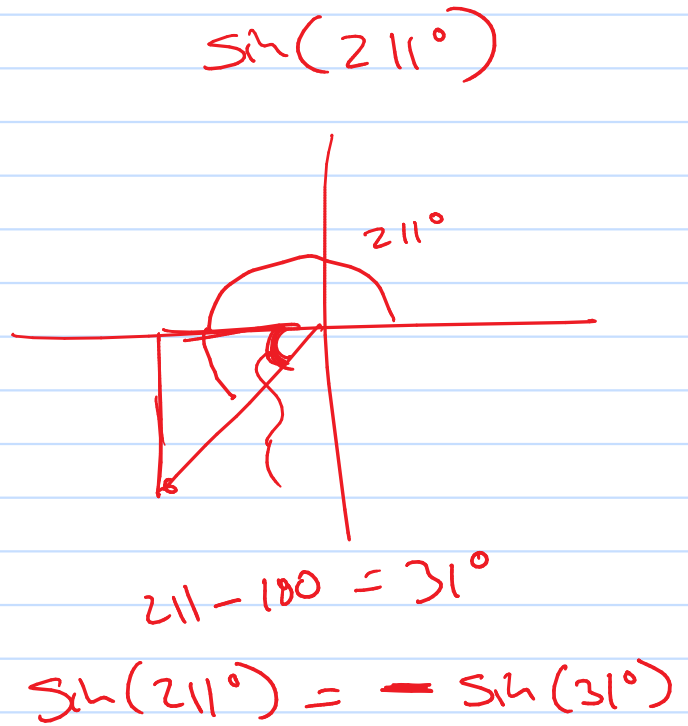
ex



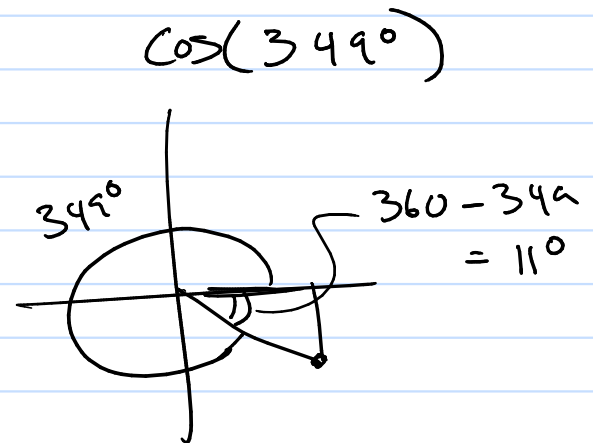
$$\cos\left(\frac{5\pi}{6}\right) = -\cos\left(\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$



ex

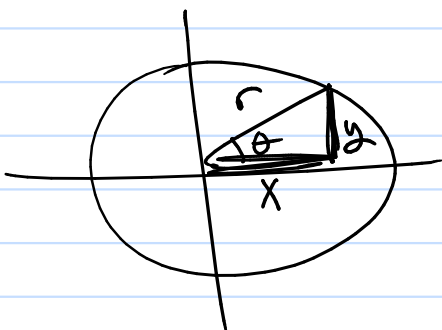


ex



so  $\cos(349^\circ) = +\cos(11^\circ)$

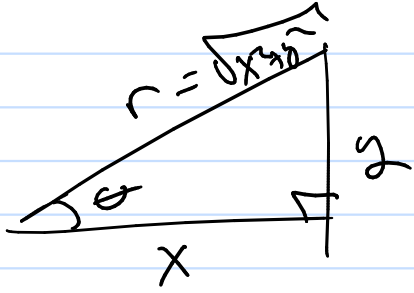
right triangle functions / circular function



$$\cos \theta = \frac{x}{r} \quad r \quad x = r \cos \theta$$

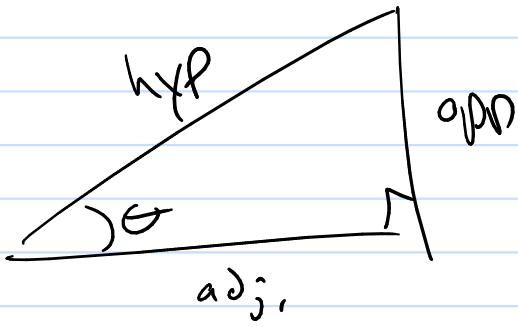
$$\sin \theta = \frac{y}{r} \quad r \quad y = r \sin \theta$$

$$r^2 = x^2 + y^2 \quad \text{so} \quad r = \sqrt{x^2 + y^2}$$



$$\cos(\theta) = \frac{x}{\sqrt{x^2 + y^2}}$$

$$\sin(\theta) = \frac{y}{\sqrt{x^2 + y^2}}$$



$$\cos(\theta) = \frac{\text{adj}}{\text{hyp}}$$

$$\sin = \frac{\text{opp}}{\text{hyp}}$$