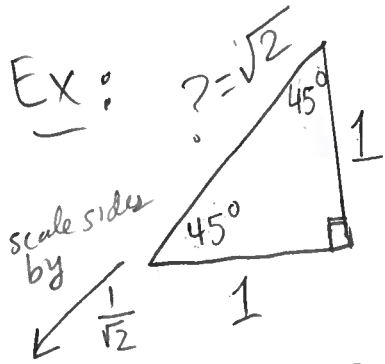


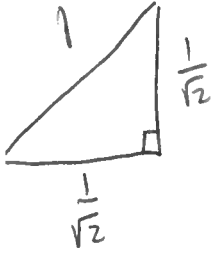
①



$$\Rightarrow \sin(45^\circ) = \frac{1}{\sqrt{2}} = \left(\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{\sqrt{2}}{2}$$

$$\cos(45^\circ) = \frac{1}{\sqrt{2}}$$

$$\tan(45^\circ) = 1$$



$$1^2 + 1^2 = ?^2$$

$$? = \pm\sqrt{2}$$

Recall: radian measure

$$360^\circ = 1 \text{ revolution} = 2\pi \text{ rad} \Rightarrow 1 = \frac{2\pi \text{ rad}}{360^\circ}$$

Ex:  $45^\circ = (45^\circ) \left( \frac{2\pi \text{ rad}}{360^\circ} \right) = \frac{90\pi}{360} \text{ rad}$

We won't write "rad" all the time

$$= \frac{\pi}{4}$$

$$30^\circ = (30^\circ) \left( \frac{2\pi \text{ rad}}{360^\circ} \right) = \frac{60\pi}{360} = \frac{\pi}{6}$$

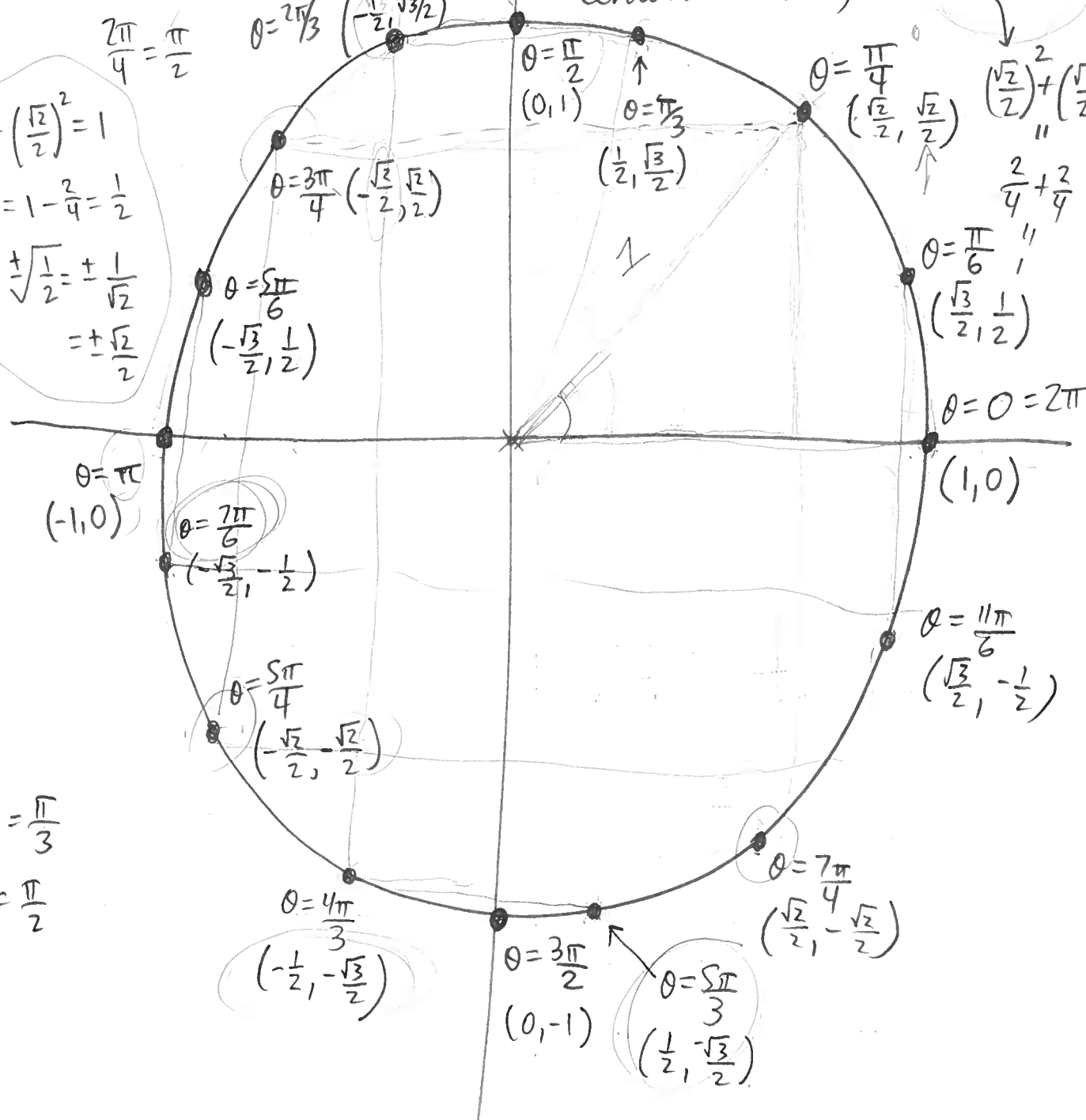
$$60^\circ = (60^\circ) \left( \frac{2\pi}{360^\circ} \right) = \frac{120\pi}{360} = \frac{\pi}{3}$$

Unit circle - circle of radius 1 centered at (0,0) -  $x^2 + y^2 = 1$  (2)

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

$x^2 + \left(\frac{\sqrt{2}}{2}\right)^2 = 1$   
 $x^2 = 1 - \frac{2}{4} = \frac{1}{2}$   
 $x = \pm\sqrt{\frac{1}{2}} = \pm\frac{1}{\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$

$\left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2$   
 $\frac{2}{4} + \frac{2}{4}$



$\frac{2\pi}{6} = \frac{\pi}{3}$   
 $\frac{3\pi}{6} = \frac{\pi}{2}$

$\frac{6\pi}{4} = \frac{3\pi}{2}$

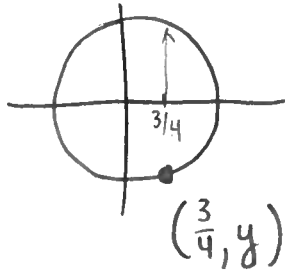
(can look up nice version on Wikipedia)

Ex! If  $(\frac{3}{4}, y)$  is on unit circle,  
and is in  $Q_{IV}$ , then find  $y$ .

$Q_{II}$	$Q_{I}$
$Q_{III}$	$Q_{IV}$

Soln: Recall  $x^2 + y^2 = 1$ .

We are given  $x = \frac{3}{4}$ .



$$\left(\frac{3}{4}\right)^2 + y^2 = 1$$

$$\frac{9}{16} + y^2 = 1$$

$$y^2 = 1 - \frac{9}{16}$$

$$= \frac{16}{16} - \frac{9}{16}$$

$$= \frac{7}{16}$$

$$y = \pm \sqrt{\frac{7}{16}} = \pm \frac{\sqrt{7}}{\sqrt{16}}$$

$$= \pm \frac{\sqrt{7}}{4}$$

Since we are in  $Q_{IV}$ ,  
must take negative soln

$$y = -\frac{\sqrt{7}}{4}$$

Ex: What quadrant is...

4

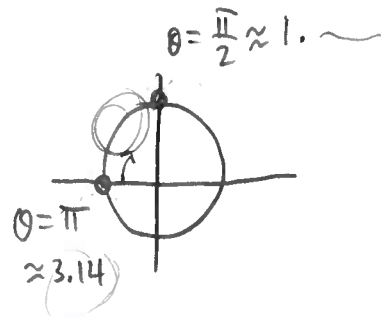
(a)  $\frac{3\pi}{4} \rightsquigarrow$  QII

(b)  $\frac{11\pi}{6} \rightsquigarrow$  QIV

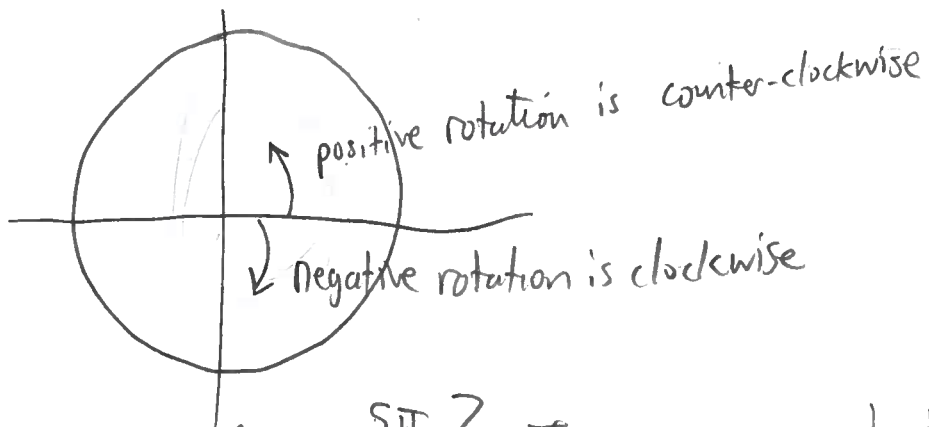
(c) 2  $\rightsquigarrow$  QII

in?

Soln:



### Negative angles



Where is angle  $-\frac{5\pi}{6}$ ? In QIII, & it is same as  $\theta = \frac{7\pi}{6}$ .

Where is angle  $-\frac{7\pi}{3}$ ? In QIV & it is same as  $\theta = \frac{5\pi}{3}$