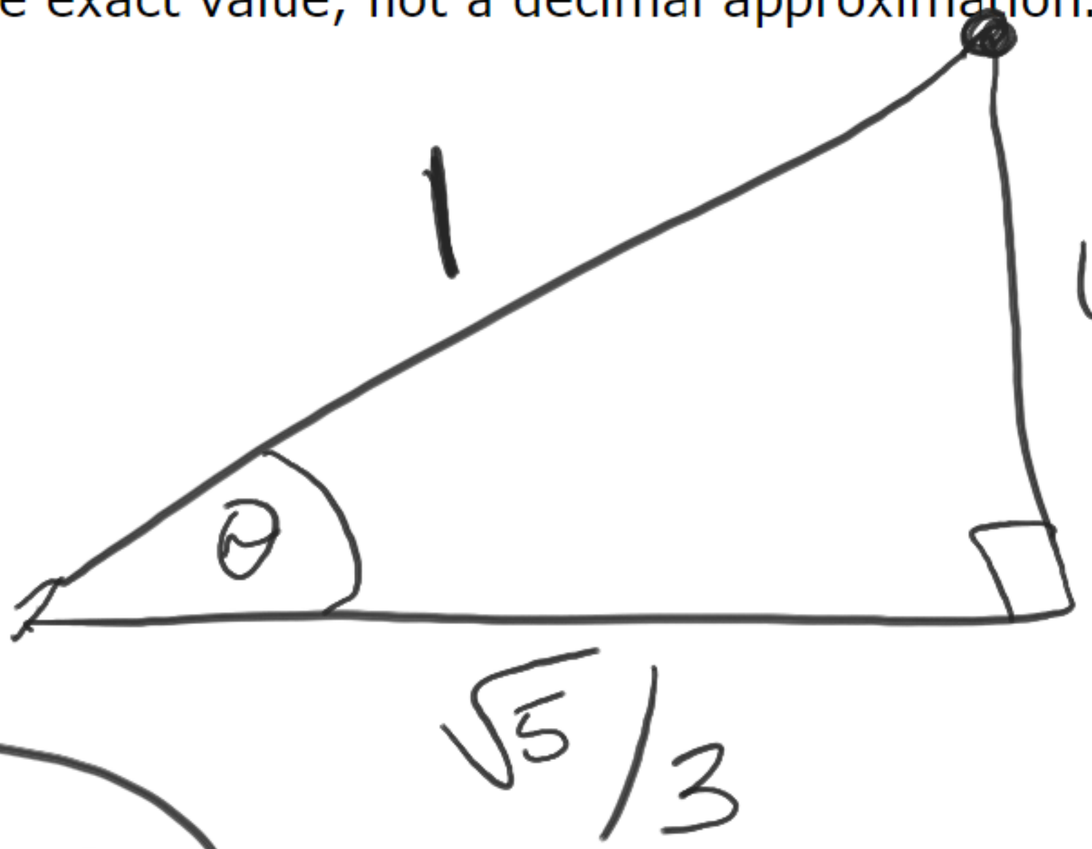
Suppose that $\left(\frac{\sqrt{5}}{3}, y\right)$ is a point in Quadrant IV lying on the unit circle.

Find y. Write the exact value, not a decimal approximation.



$a^2+b^2=c^2$

$y\left(\frac{\sqrt{5}}{3}\right)^2+y^2=1^2$

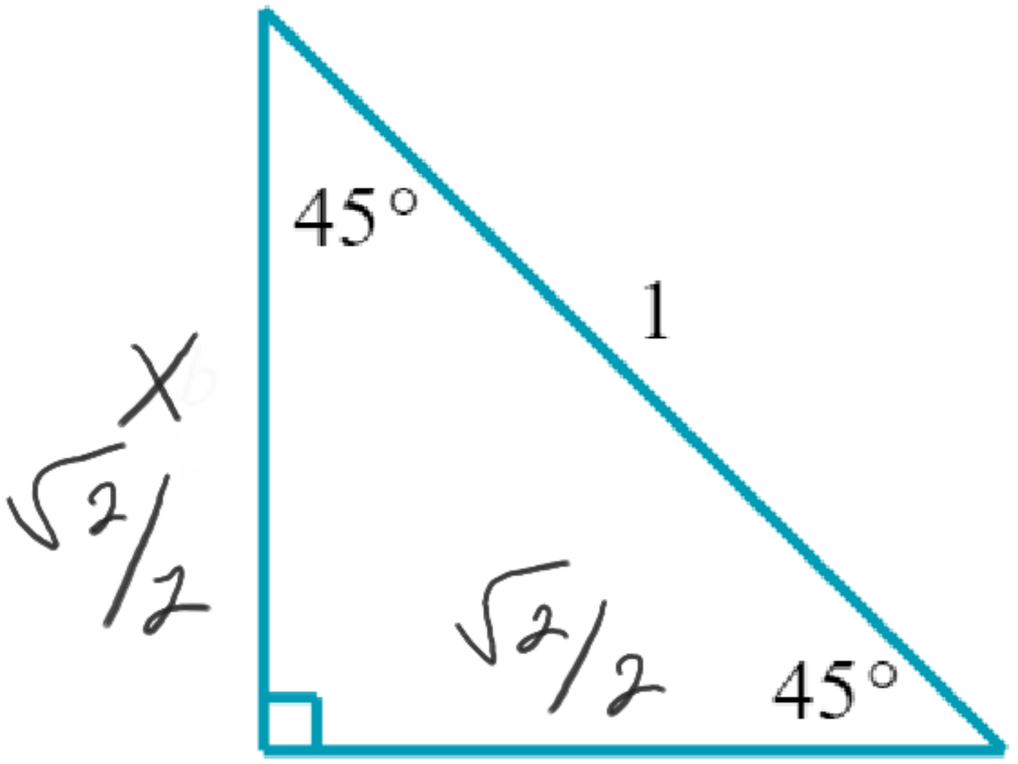
$\frac{5}{9}+y^2=1$

$-\frac{5}{9}$ $-\frac{5}{9}$

$\sqrt{y^2}=\sqrt{\frac{4}{9}}$

$y=\pm 2/3$

$y=-\frac{2}{3}$



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

$2x^2 = 1$

$\sqrt{x^2} = \sqrt{\frac{1}{2}}$

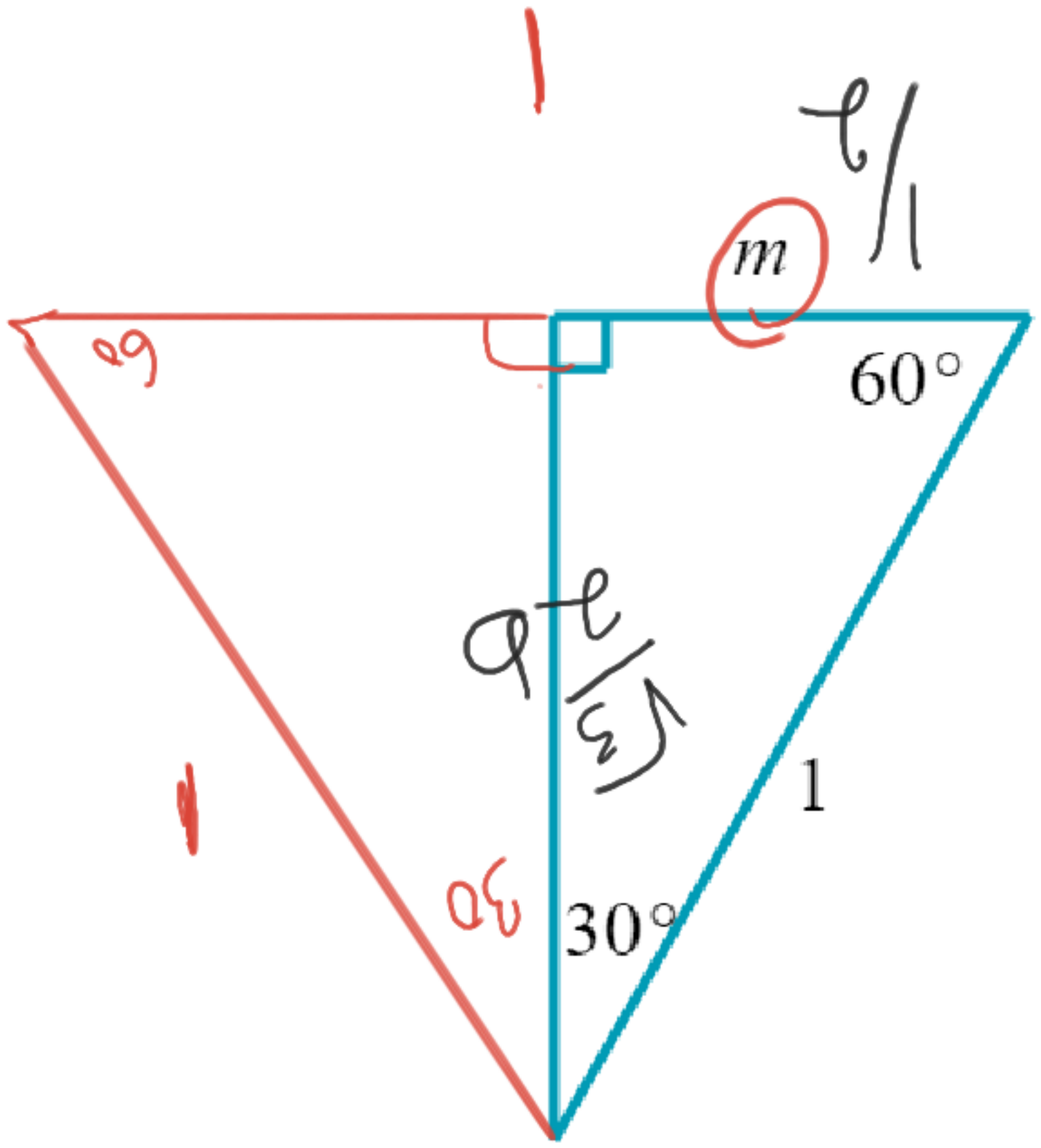
$x = \pm\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$$\frac{e}{\varepsilon_0} = q$$

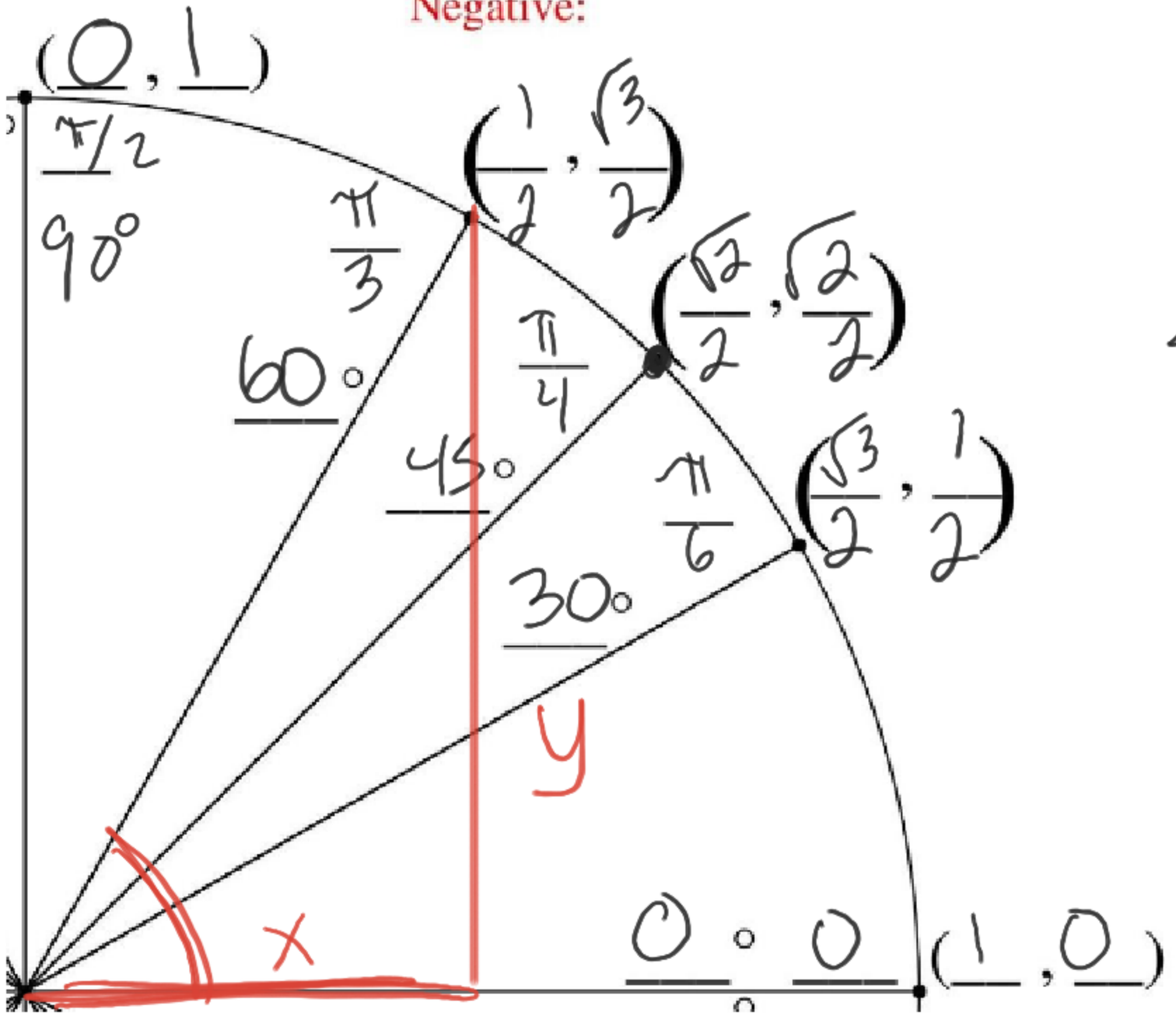
$$\frac{h}{\varepsilon_0} = 2q$$

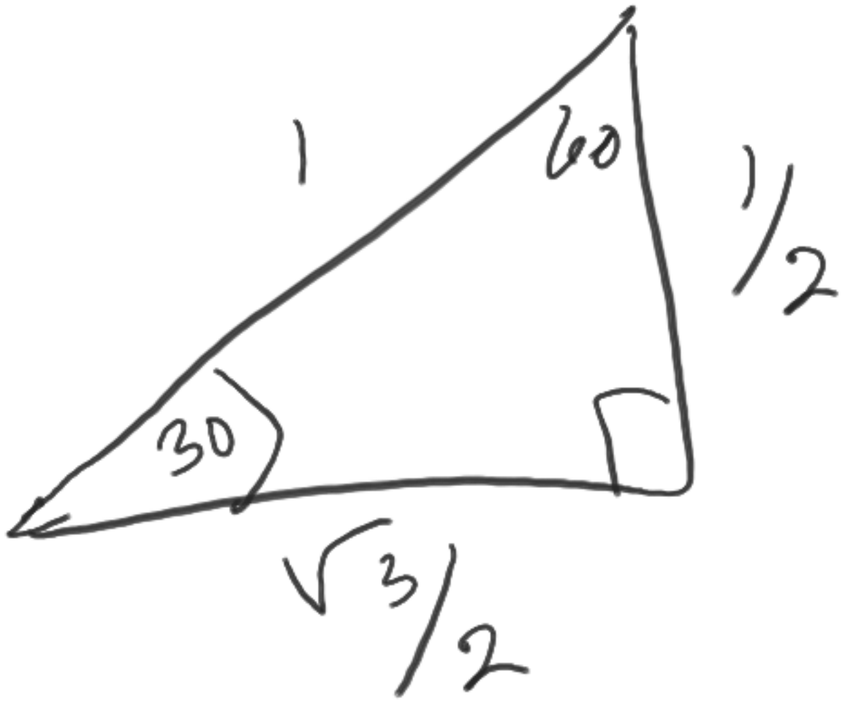
$$1 = 2q + \frac{h}{1}$$

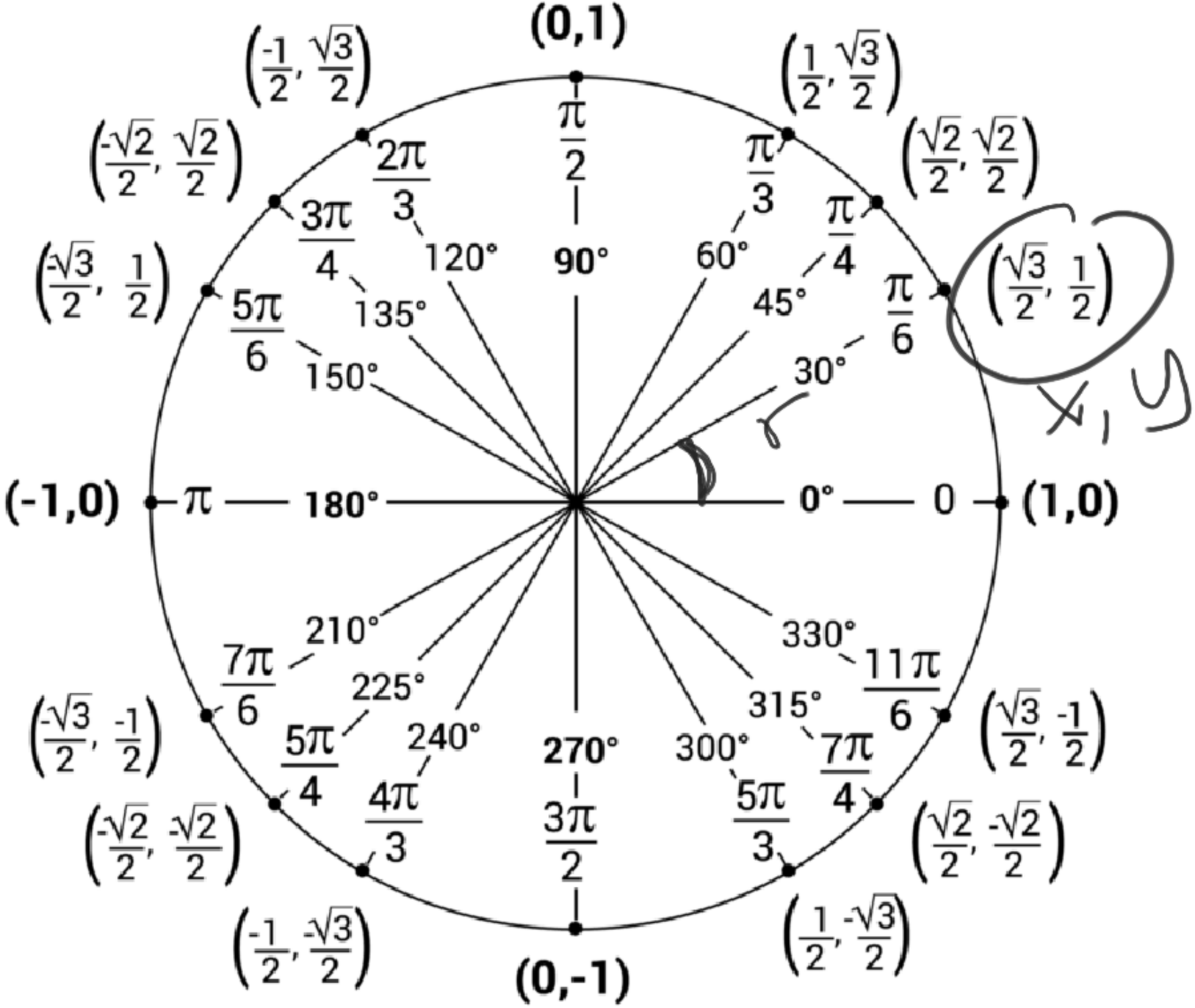
$$2 - 1 = 2q + 2\left(\frac{e}{1}\right)$$



Positive:
Negative:






(0,1)
$\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
(-1,0)
(1,0)
$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$
(0,-1)
$\frac{\pi}{2}$
$\frac{2\pi}{3}$
$\frac{\pi}{3}$
$\frac{3\pi}{4}$
$\frac{\pi}{4}$
$\frac{5\pi}{6}$
$\frac{\pi}{6}$
π
0
$\frac{7\pi}{6}$
$\frac{11\pi}{6}$
$\frac{5\pi}{4}$
$\frac{7\pi}{4}$
$\frac{4\pi}{3}$
$\frac{5\pi}{3}$
$\frac{3\pi}{2}$
90°
120°
60°
135°
45°
150°
30°
180°
0°
210°
330°
225°
315°
240°
300°
270°

$$\sin\theta = \frac{O}{H} = \frac{y}{1} = y$$

$$\cos\theta = \frac{A}{H} = \frac{x}{1} = x$$

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

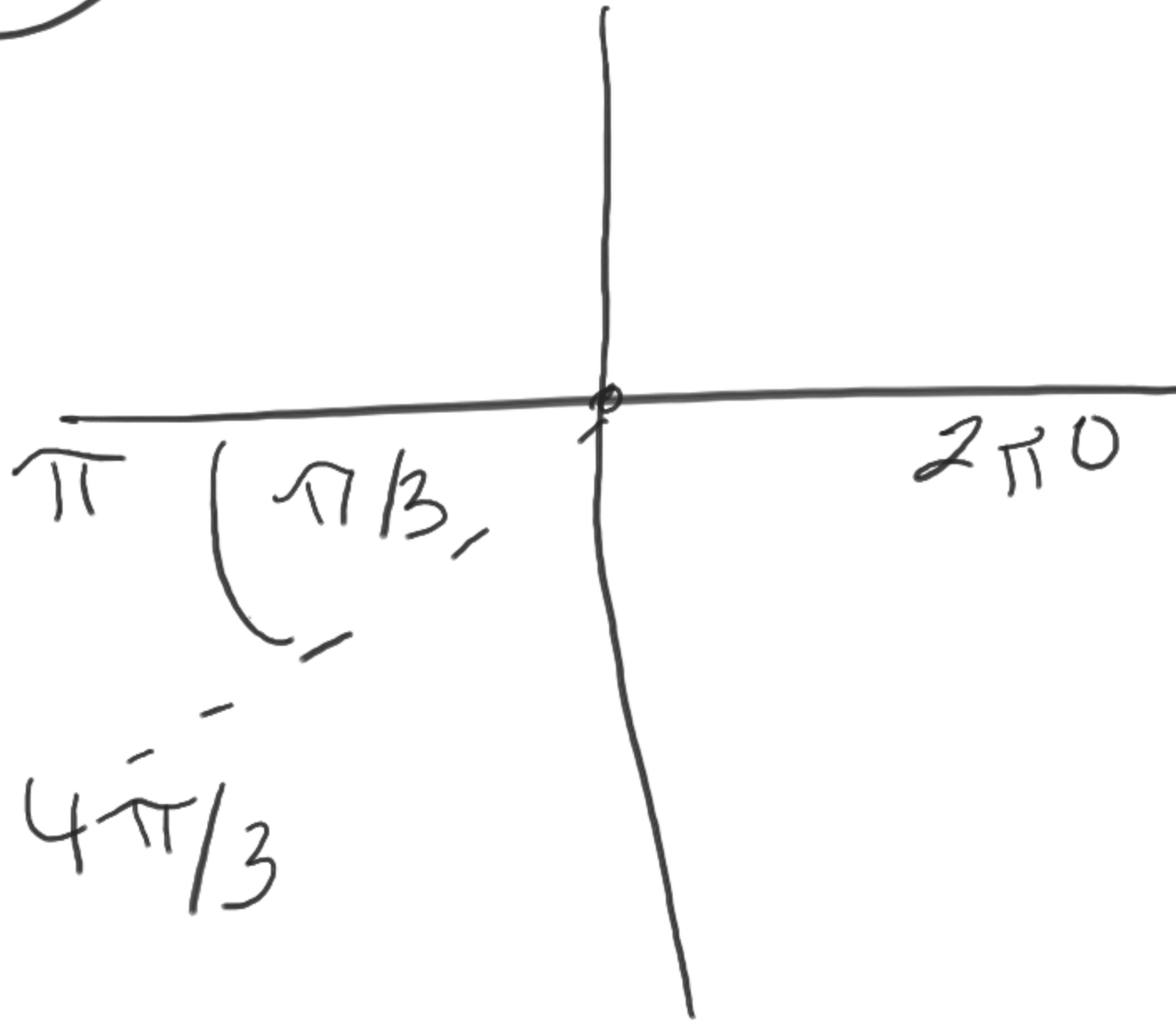
SOH CAH TOA

Find the exact value of $\cos\left(-\frac{2\pi}{3}\right)$.

2π

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

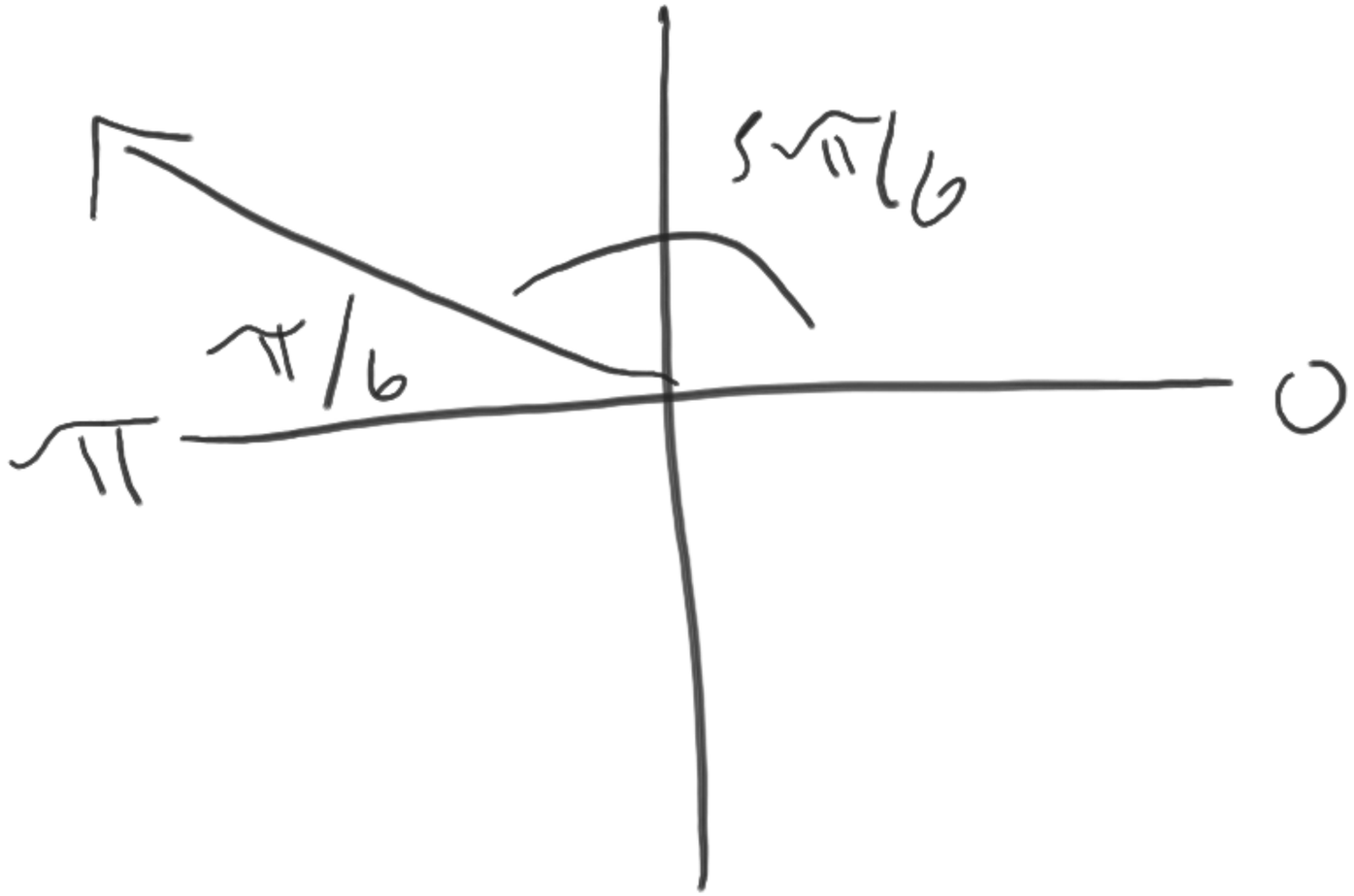
$\cos\theta = x$



$x=\frac{1}{2}$

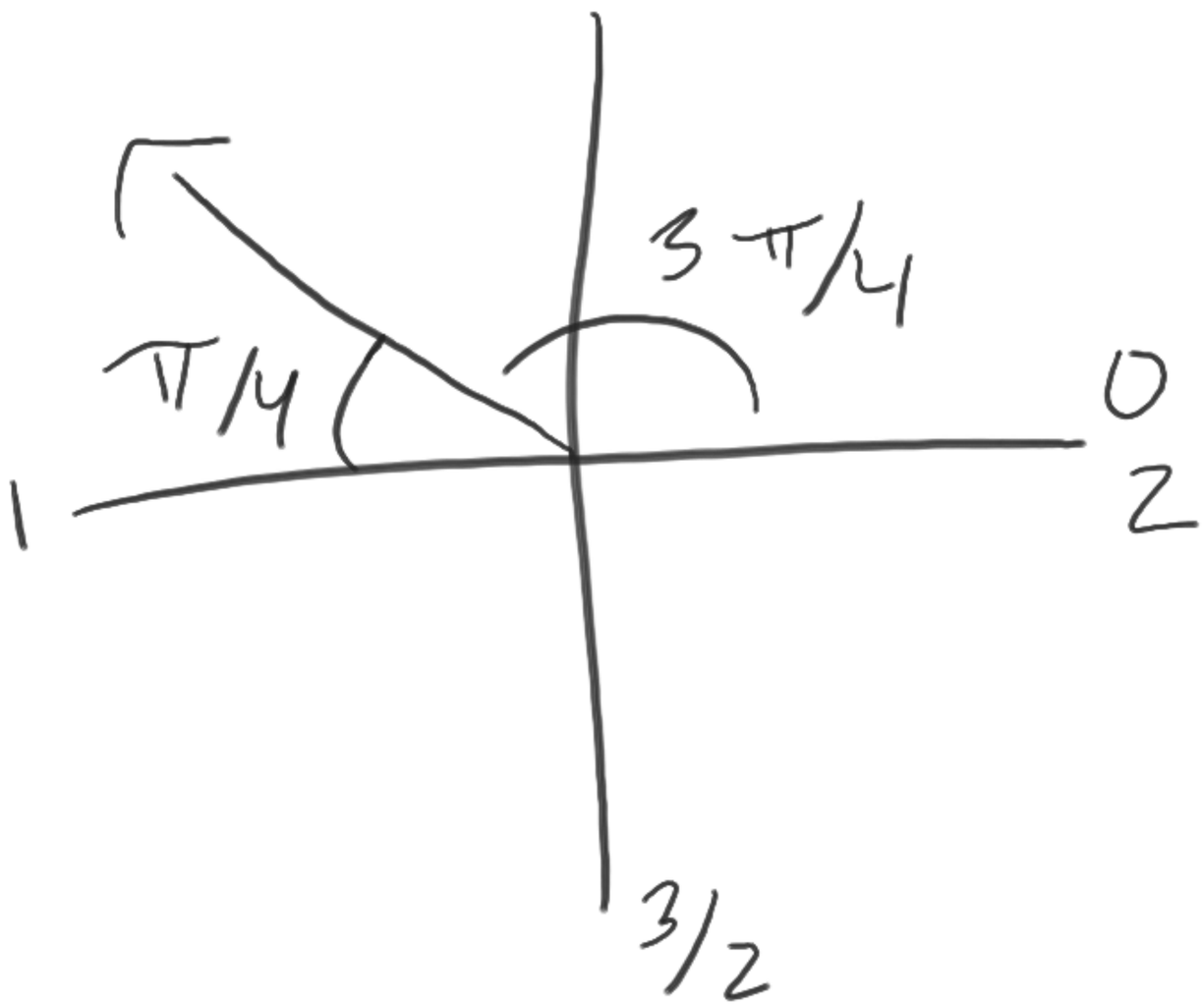
$\cos\left(\frac{-2\pi}{3}\right)=\frac{-1}{2}$

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



$$\tan\left(3\pi/4\right) = \frac{y}{x}$$

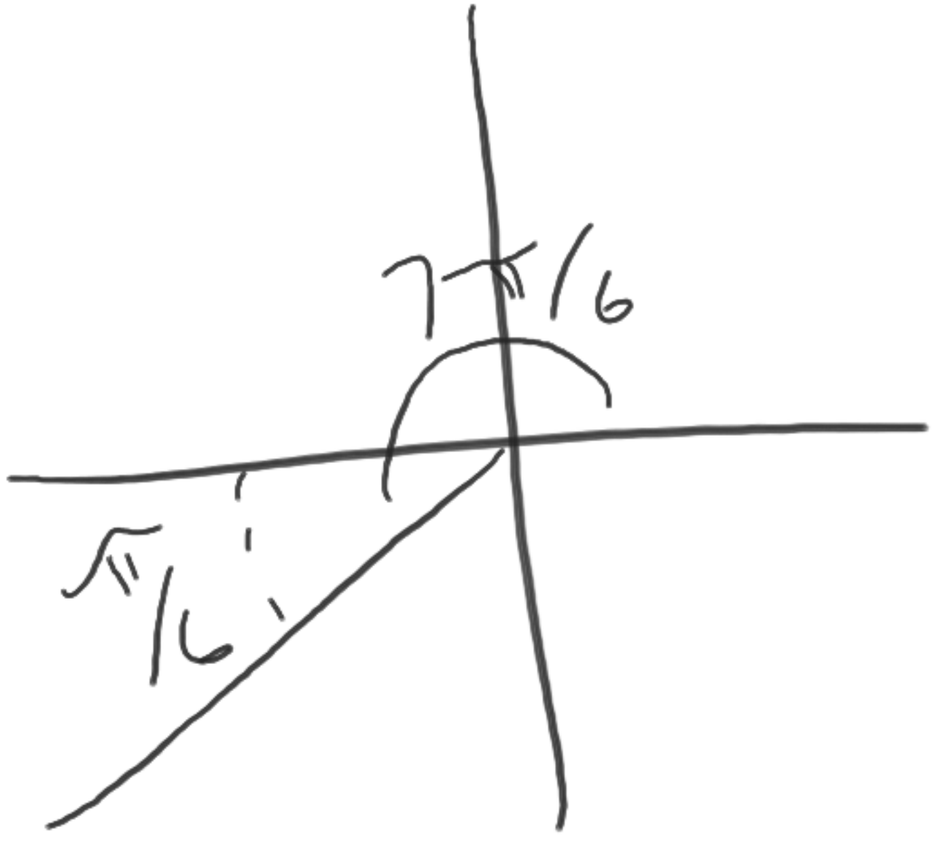
$$= \frac{\sqrt{2}/2}{-\sqrt{2}/2} = -1$$



$$\tan\left(7\pi/6\right) = \frac{y}{x} = \frac{\sqrt{3}}{3}$$

$$\frac{y}{x} = \frac{-1/2}{-\sqrt{3}/2}$$

$$\frac{1}{2} \times \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$



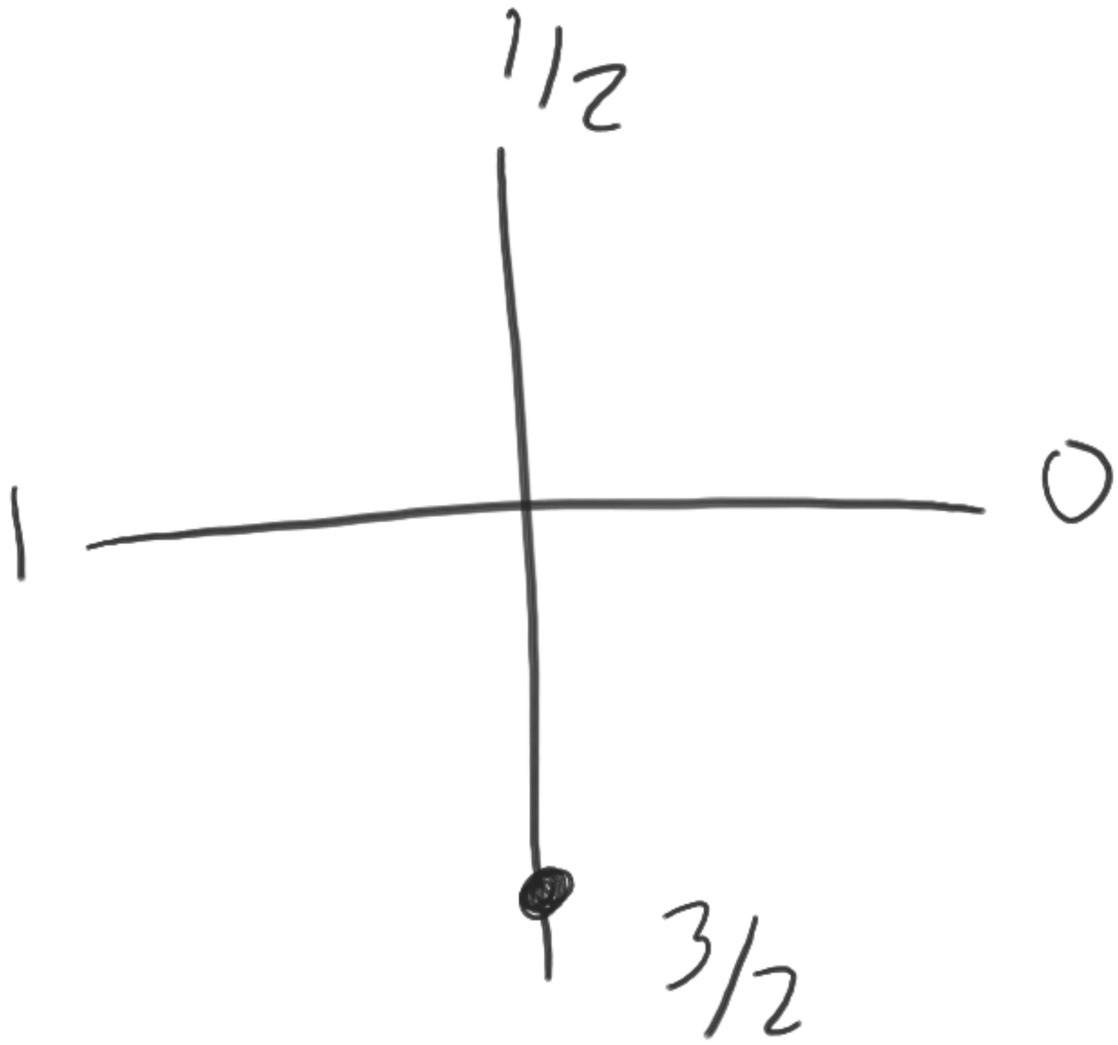
$$\sin\theta = \frac{y}{r} \longrightarrow \csc\theta = \frac{r}{y}$$

$$\cos\theta = \frac{x}{r} \longrightarrow \sec\theta = \frac{r}{x}$$

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

$$\csc\left(\frac{3\pi}{2}\right) = \frac{r}{y} = \frac{1}{-1}$$

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



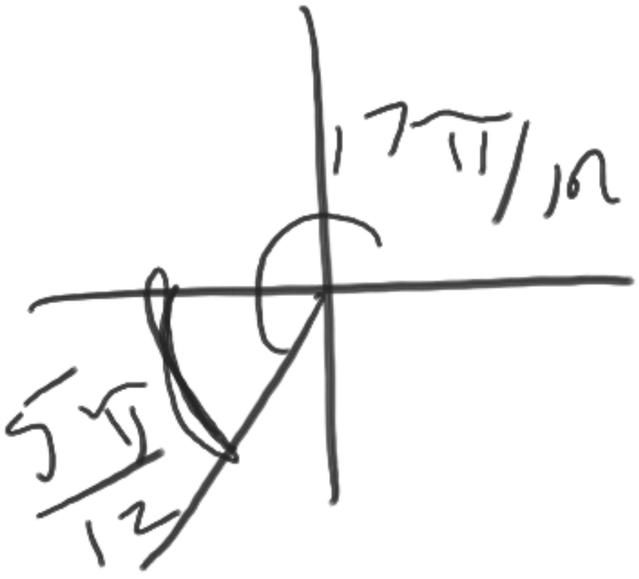
$$\sec\left(\frac{\pi}{3}\right) = \frac{r}{x} = \frac{1}{1/2} = 2$$

refrence angles

$$\theta = \frac{12\pi}{5} - \frac{10\pi}{5} = \frac{2\pi}{5}$$

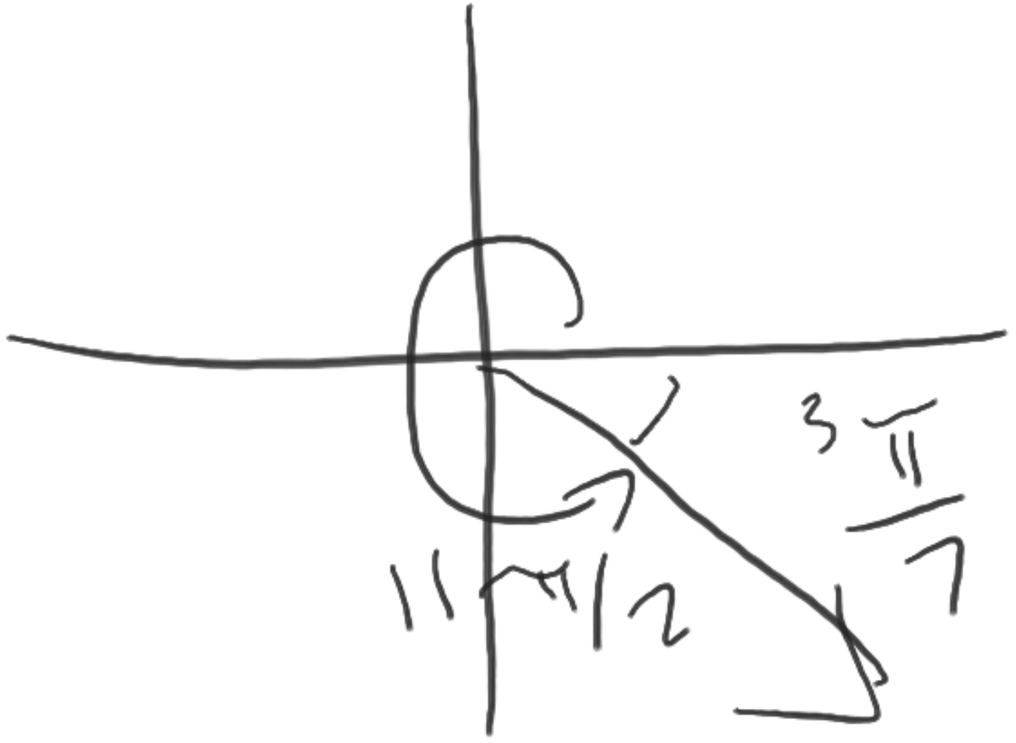
$$\theta = \frac{17\pi}{12} \longrightarrow \frac{5\pi}{12}$$

$\frac{12\pi}{12}$



$$\theta = -\frac{3\pi}{7}$$

$$R.A. = \frac{3\pi}{7}$$



$$\frac{11\pi}{7}$$

Point $\left(\frac{12}{13}, \frac{5}{13}\right)$

$a^2 + b^2 = c^2$

$\frac{144}{169} + \frac{25}{169} = \frac{169}{169} = 1$

$\sin\theta = \frac{5}{13}$

$\csc\theta = \frac{13}{5}$

$\cos\theta = \frac{12}{13}$

$\sec\theta = \frac{13}{12}$

$\tan\theta = \frac{5/13}{12/13} = \frac{5}{12}$

$\cot\theta = \frac{12}{5}$

point $(3, 4)$ $r = 5$ $\left(\frac{3}{5}, \frac{4}{5}\right)$

$\sin\theta = \frac{4}{5}$ $\csc\theta = \frac{5}{4}$

$\cos\theta = \frac{3}{5}$ $\sec\theta = \frac{5}{3}$

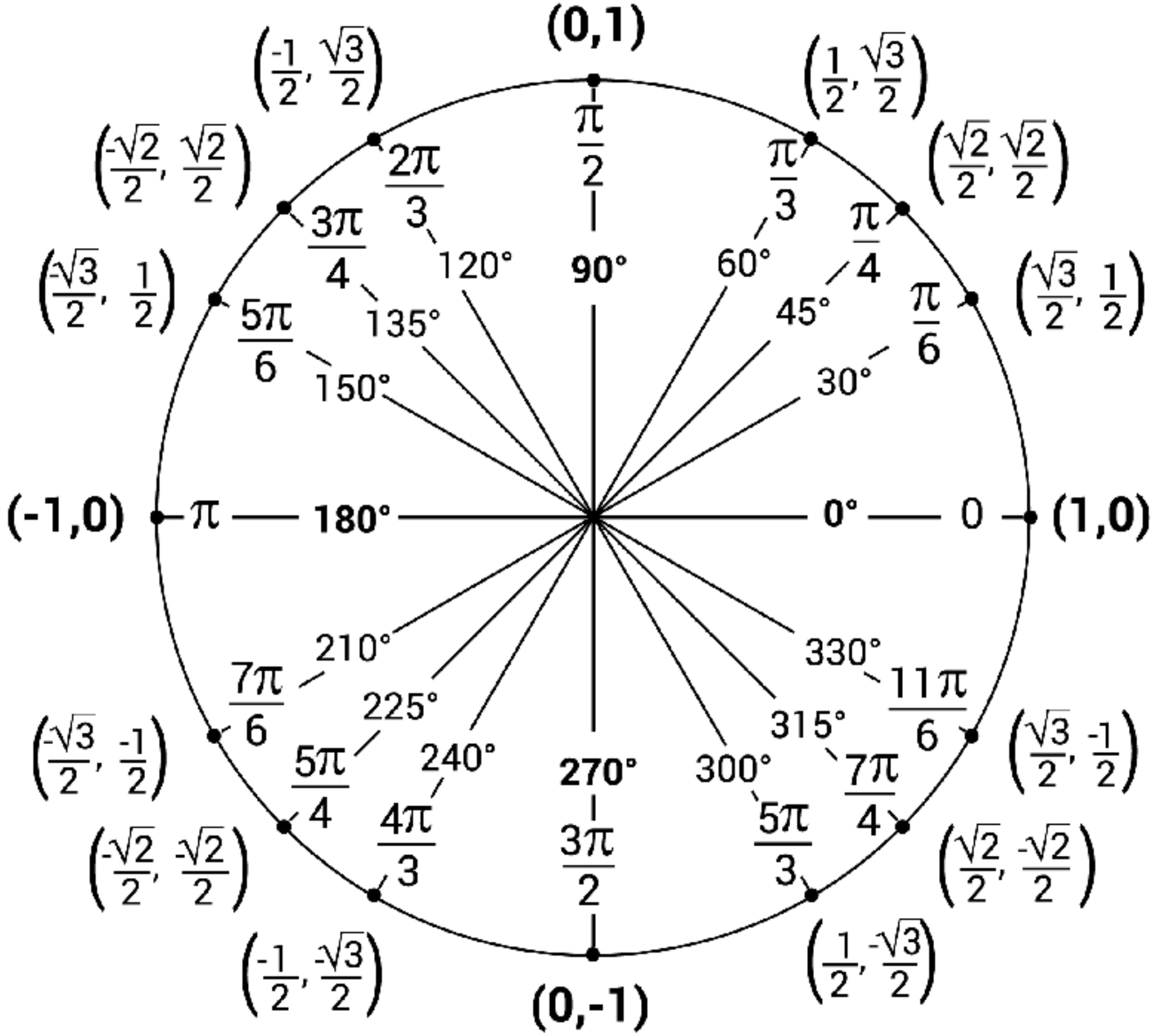
$\tan\theta = \frac{4}{3}$ $\cot\theta = \frac{3}{4}$

$\sin(x) = y$

Range $[-1, 1]$

Domain $(-\infty, \infty)$

x	y
0	0
$\frac{\pi}{4}$	$\sqrt{2}/2$
$\frac{\pi}{2}$	1
$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$
π	0
$\frac{5\pi}{4}$	$-\sqrt{2}/2$
$\frac{3\pi}{2}$	-1
$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$
2π	0


(0,1)
$\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
(-1,0)
(1,0)
$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$
(0,-1)
$\frac{\pi}{2}$
$\frac{2\pi}{3}$
$\frac{\pi}{3}$
$\frac{3\pi}{4}$
$\frac{\pi}{4}$
$\frac{5\pi}{6}$
$\frac{\pi}{6}$
120°
90°
60°
135°
45°
150°
30°
π
180°
0°
0
210°
330°
$\frac{7\pi}{6}$
$\frac{11\pi}{6}$
225°
315°
$\frac{5\pi}{4}$
$\frac{7\pi}{4}$
240°
270°
300°
$\frac{4\pi}{3}$
$\frac{3\pi}{2}$
$\frac{5\pi}{3}$

$\cos(x) = y$

Range $[-1, 1]$

Domain $(-\infty, \infty)$

$\tan(x) = y$ $\quad\quad$ $\tan\theta = \frac{y}{x}$

Range $\rightarrow (-\infty, \infty)$ $\quad\quad$ $x = 0$ $\quad$ $\theta = \frac{\pi}{2}, \frac{3\pi}{2}$

Domain $\Rightarrow$ $\theta \neq \frac{\pi}{2}, \frac{3\pi}{2}$

$\theta \neq \frac{\pi}{2} \pm 2k\pi, \frac{3\pi}{2} \pm 2k\pi$