Key to Study Guide:

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

$$\sec 150^\circ = -\frac{2\sqrt{3}}{3}$$

$$\csc\left(-\frac{4\pi}{3}\right) = -\csc\frac{4\pi}{3} = -\left(-\frac{2\sqrt{3}}{3}\right) = \frac{2\sqrt{3}}{3}$$

$$\tan\frac{5\pi}{3} = -\sqrt{3}$$

$$\cot 765^\circ = \cot 45^\circ = 1$$

$$\begin{array}{r} -360 \\ \hline 405 \\ -360 \\ \hline 45 \end{array}$$

$$\cos\left(-\frac{9\pi}{2}\right) = \cos\frac{9\pi}{2} = \cos\frac{\pi}{2} = 0$$

$$\frac{9\pi}{2} - \frac{4\pi}{2} = \frac{5\pi}{2} - \frac{4\pi}{2} = \frac{\pi}{2}$$

ODD: $\sin(-\theta) = -\sin\theta$

$\csc(-\theta) = -\csc\theta$

$\tan(-\theta) = -\tan\theta$

$\cot(-\theta) = -\cot\theta$

EVEN: $\cos(-\theta) = \cos\theta$

$\sec(-\theta) = \sec\theta$

$$\sin\frac{25\pi}{3} = \sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\frac{25\pi}{3} - \frac{6\pi}{3} = \frac{19\pi}{3} - \frac{6\pi}{3} =$$

$$\frac{13\pi}{3} - \frac{6\pi}{3} = \frac{7\pi}{3} - \frac{6\pi}{3} = \frac{\pi}{3}$$

$$\sec 45^\circ - \sin 30^\circ$$

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

$$5\tan\frac{\pi}{6} = 5\cdot\frac{\sqrt{3}}{3} = \frac{5\sqrt{3}}{3}$$

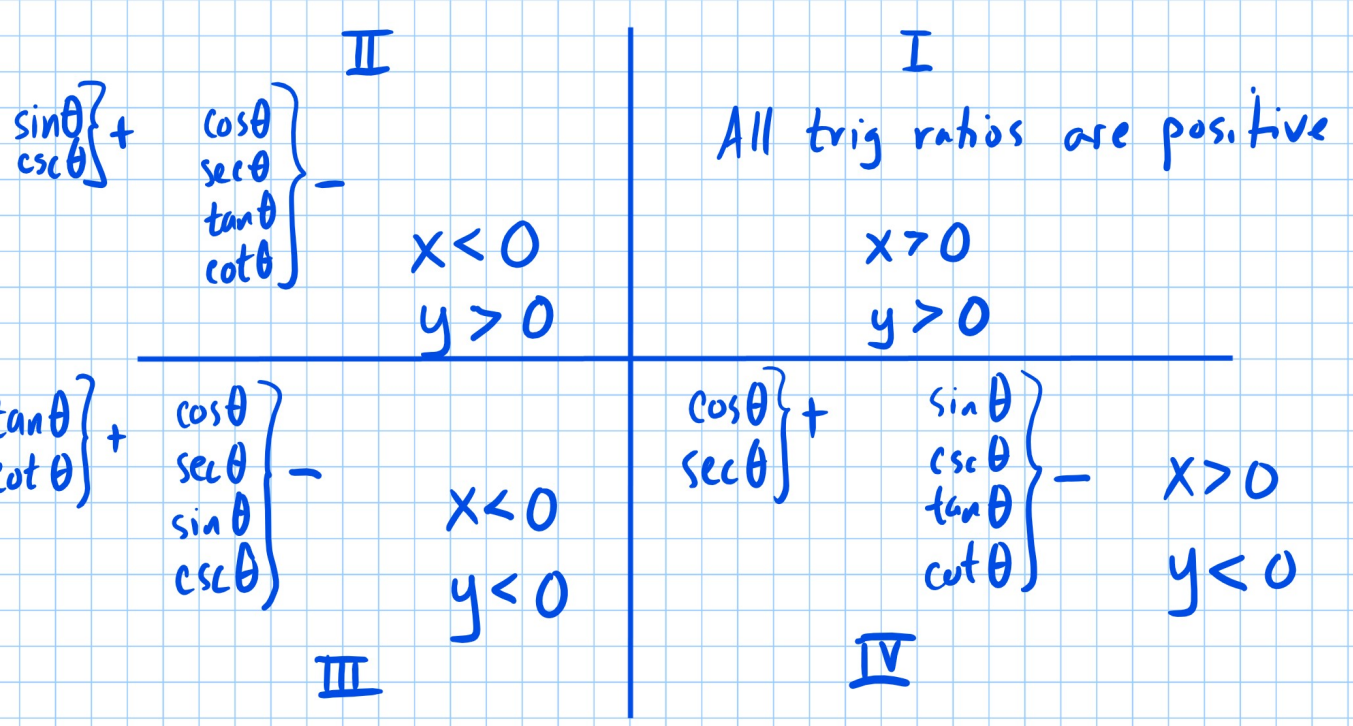
$\sin\theta = \frac{y}{r}$ $\quad \csc\theta = \frac{r}{y}$

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

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

$x^2 + y^2 = r^2$

r is always positive



PYTHAGOREAN TRIPLES

3, 4, 5

5, 12, 13

7, 24, 25

8, 15, 17

9, 40, 41

2) $(-9, -40)$

x, y

$x = -9$

$y = -40$

$r = 41$

$\sin\theta = \frac{-40}{41}$ $\quad \csc\theta = -\frac{41}{40}$

$\cos\theta = \frac{-9}{41}$ $\quad \sec\theta = -\frac{41}{9}$

$\tan\theta = \frac{40}{9}$ $\quad \cot\theta = \frac{9}{40}$

3) $\sin\theta = -\frac{7}{25} = \frac{y}{r}$ $\quad \pi < \theta < \frac{3\pi}{2}$

QIII

$x < 0$

$y < 0$

$x = -24$

$y = -7$

$r = 25$

$\sin\theta = -\frac{7}{25}$ $\quad \csc\theta = -\frac{25}{7}$

$\cos\theta = \frac{-24}{25}$ $\quad \sec\theta = -\frac{25}{24}$

$\tan\theta = \frac{7}{24}$ $\quad \cot\theta = \frac{24}{7}$

ex: $\tan\theta = \frac{8}{15}$ $\sin\theta > 0$

QI

$x = 15$

$y = 8$

$r = 17$

$\sin\theta = \frac{8}{17}$ $\csc\theta = \frac{17}{8}$

$\cos\theta = \frac{15}{17}$ $\sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\cot\theta = \frac{15}{8}$

Graphing: $y = a\sin(\omega x - \phi)$ $y = a\cos(\omega x - \phi)$

Amp $= |a|$

Period $= \frac{2\pi}{\omega}$

P.S. $= \frac{\phi}{\omega}$

SINE: (, 0)(, a)(, 0)(, -a)(, 0)

COSINE: (, a)(, 0)(, -a)(, 0)(, a)

(, a): ↑ P.S. ①

(, 0): ↑ avg. of 1st and 3rd ④

(, -a): ↑ avg. of 1st and 5th ③

(, 0): ↑ avg. of 3rd and 5th ⑤

(, a): ↑ P.S. + Period ②

4) ex: $y = -4\cos\left(\frac{1}{2}x\right)$

$a = -4$

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

$\phi = 0$

Amp $= 4$

Period $= \frac{2\pi}{\frac{1}{2}} = 2\pi \cdot \frac{2}{1} = 4\pi$

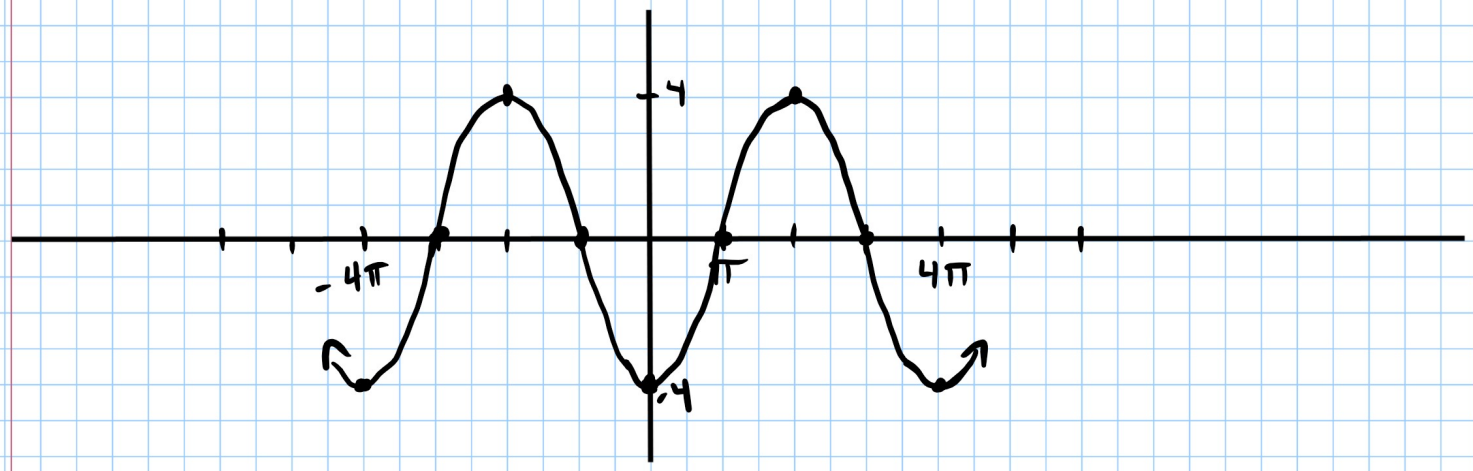
P.S. $= \frac{0}{1/2} = 0$

$(0,-4)(\pi,0)(2\pi,4)(3\pi,0)(4\pi,-4)$

$\frac{1}{2}(0+4\pi)$

$\frac{1}{2}\cdot 4\pi$

2π



4 ex 2 $y = 2\sin\left(\frac{\pi}{2}x - \pi\right)$

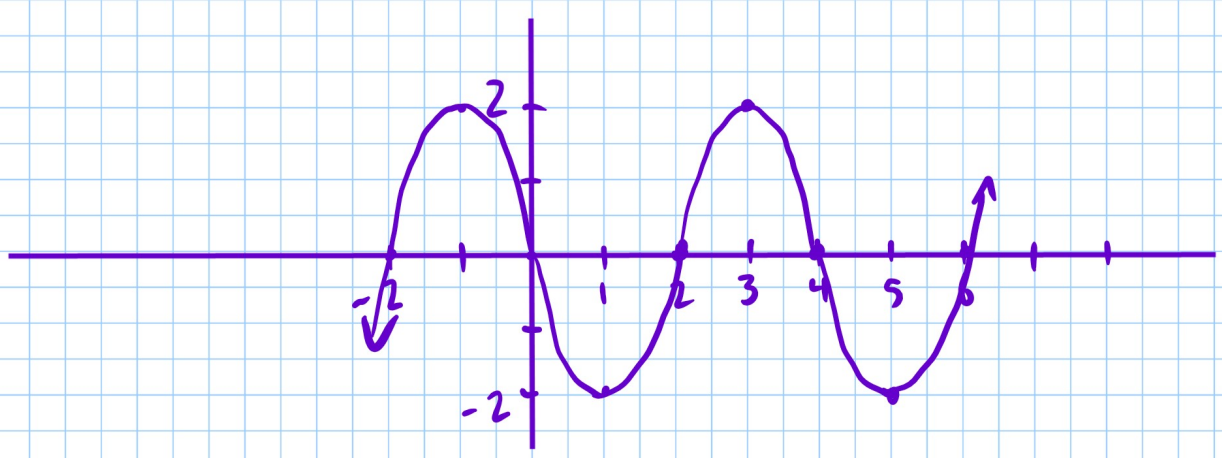
$a = 2$ Amp $= 2$

$\omega = \frac{\pi}{2}$ Period $= \frac{2\pi}{\frac{\pi}{2}} = 2\pi \cdot \frac{2}{\pi} = 4$

$\phi = \pi$ P.S. $= \frac{\pi}{\frac{\pi}{2}} = \pi \cdot \frac{2}{\pi} = 2$

$(2,0)(3,2)(4,0)(5,-2)(6,0)$

$\frac{1}{2}(2+4)$ $\frac{1}{2}(2+6)$ $\frac{1}{2}(4+6)$


2
-2
-2
1
2
3
4
5
6