

Unit Circle Chart Note Sheet

Trigonometry Test Chapter 5 V3

Name: Key

Complete each of the following problems. Show all necessary work.

1. Use the unit circle to find the exact values of each of the following:

a. $\sin 240^\circ = \underline{-\frac{\sqrt{3}}{2}}$

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

c. $\sec 60^\circ = \underline{2}$

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

e. $\tan \frac{7\pi}{6} = \underline{\frac{\sqrt{3}}{3}}$

f. $\cot 600^\circ = \underline{\frac{\sqrt{3}}{3}}$

g. $\sin \frac{23\pi}{4} = \underline{-\frac{\sqrt{2}}{2}}$

h. $\cos\left(-\frac{7\pi}{2}\right) = \underline{0}$

i. $\underline{\sec 60^\circ} - \underline{\sin 45^\circ} = \underline{2 - \frac{\sqrt{2}}{2}}$

j. $4 \tan \frac{\pi}{3} = \underline{4\sqrt{3}}$

$\left\{ \begin{array}{l} -\frac{3\pi}{4} \cdot \frac{180}{\pi} = -135^\circ + 360^\circ \\ \csc(225^\circ) \end{array} \right.$

$\left\{ \begin{array}{l} \frac{600}{-360} \\ \cot(240^\circ) \end{array} \right.$

$\left\{ \begin{array}{l} \frac{23\pi}{\pi} \cdot \frac{180}{\pi} = 1035^\circ - 360^\circ - 360^\circ = 315^\circ \\ \sin 315^\circ \end{array} \right.$

$\left\{ \begin{array}{l} -\frac{7\pi}{2} \cdot \frac{180}{\pi} = -630^\circ + 360^\circ + 360^\circ = 90^\circ \\ \cos 90^\circ \end{array} \right.$

PPP

$\cos 240^\circ = \underline{\hspace{2cm}}$

$\sin \frac{7\pi}{4} = \underline{\hspace{2cm}}$

$\csc 60^\circ = \underline{\hspace{2cm}}$

$\sec\left(-\frac{5\pi}{4}\right) = \underline{\hspace{2cm}}$

$\cot\left(\frac{11\pi}{6}\right) = \underline{\hspace{2cm}}$

$\sec \frac{7\pi}{4} = \underline{\hspace{2cm}}$

$\tan 390^\circ = \underline{\hspace{2cm}}$

$\cos \frac{23\pi}{6} = \underline{\hspace{2cm}}$

$\sin(-13\pi) = \underline{\hspace{2cm}}$

$\csc 45^\circ - \cos 60^\circ = \underline{\hspace{2cm}}$

$-3 \sin \frac{5\pi}{6} = \underline{\hspace{2cm}}$

2. If (7, -24) is on the terminal side of θ , find the six trig function values:

$$\sin \theta = \frac{-24}{25}$$

$$\csc \theta = \frac{-25}{24}$$

$$\cos \theta = \frac{7}{25}$$

$$\sec \theta = \frac{25}{7}$$

$$\tan \theta = \frac{-24}{7}$$

$$\cot \theta = \frac{-7}{24}$$

$$x = 7$$

$$y = -24$$

$$r = 25$$

$$z) \text{ PPP } (-4, -3)$$

$$\begin{aligned} \sin \theta &= \frac{y}{r} & \csc \theta &= \frac{r}{y} \\ \cos \theta &= \frac{x}{r} & \sec \theta &= \frac{r}{x} \\ \tan \theta &= \frac{y}{x} & \cot \theta &= \frac{x}{y} \end{aligned}$$

3. If $\cos \theta = -\frac{9}{41}$ and $\pi < \theta < \frac{3\pi}{2}$, find:

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

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

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

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

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

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

$$x^2 - 9 = 41^2$$

$$(-9)^2 + y^2 = 41^2$$

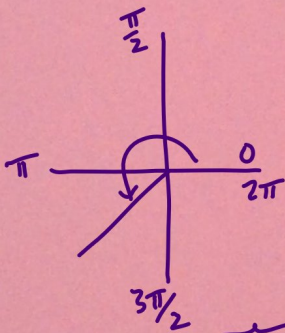
$$81 + y^2 = 1681$$

$$y^2 = 1600$$

$$y = -40$$

Q III

3) If $\sec \theta = \frac{25}{7}$ and $\frac{3\pi}{2} < \theta < 2\pi$, find others



4. If $\tan \theta = \frac{12}{5}$ and $\sin \theta > 0$, find:

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

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

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

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

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

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

$$y = 12, x = 5, r = 13$$

4) If $\csc \theta = \frac{-41}{40}$

and $\cos \theta > 0$

find the rest

5. Graph each of the following:

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

$a = -4$

Amp = 4

PPP
5a) $y = 3 \sin\left(\frac{1}{3}x\right)$

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

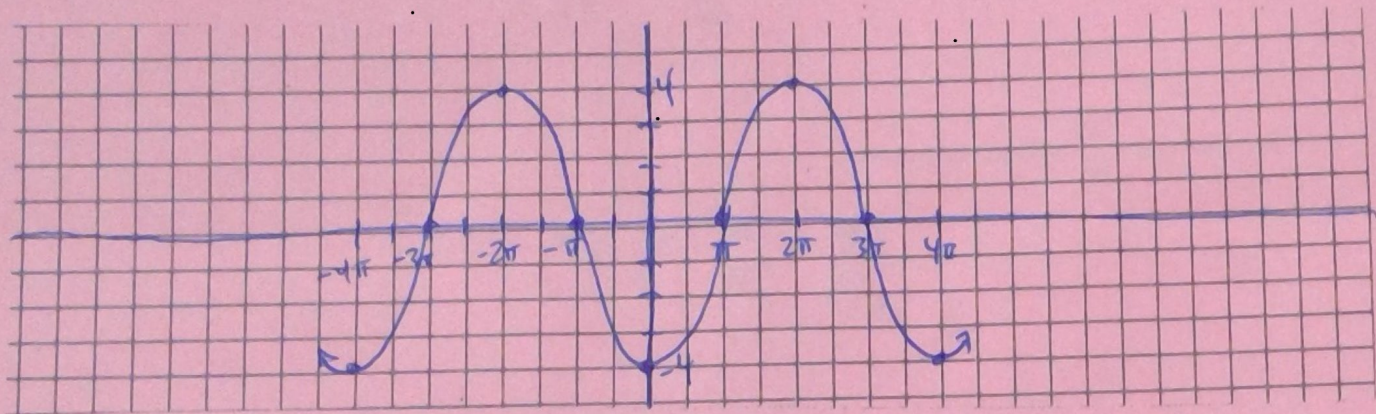
Period = $\frac{2\pi}{\frac{1}{2}} = 4\pi$

$\phi = 0$

P.S. = 0

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

$\begin{matrix} \text{P.S.} \\ \downarrow \\ 0 \end{matrix} (0, -4) \begin{matrix} a \\ \downarrow \\ -4 \end{matrix} (\pi, 0) \begin{matrix} 0 \\ \downarrow \\ 0 \end{matrix} (2\pi, 4) \begin{matrix} -a \\ \downarrow \\ -4 \end{matrix} (3\pi, 0) \begin{matrix} \text{P.S.} + \text{period} \\ \downarrow \\ 4\pi \end{matrix} (4\pi, -4)$



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

$a = 2$

Amp = 2

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

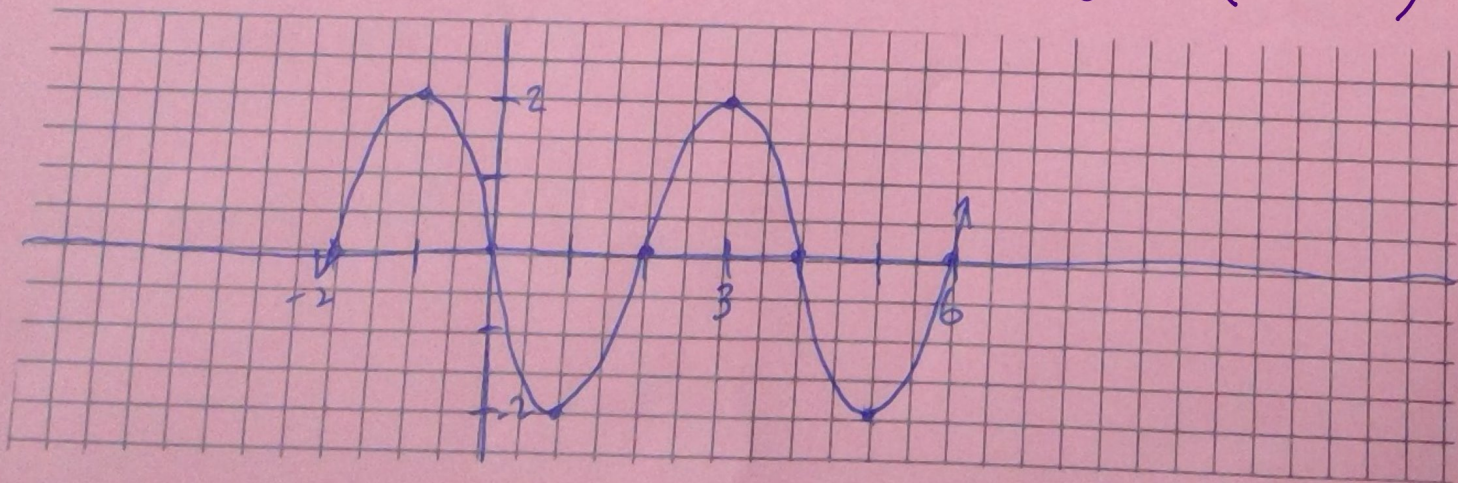
Period = $\frac{2\pi}{\frac{\pi}{2}} = 2\pi \cdot \frac{2}{\pi} = 4$

$\phi = \pi$

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

$\begin{matrix} 0 \\ \downarrow \\ 0 \end{matrix} (2, 0) \begin{matrix} a \\ \downarrow \\ 2 \end{matrix} (3, 2) \begin{matrix} 0 \\ \downarrow \\ 0 \end{matrix} (4, 0) \begin{matrix} -a \\ \downarrow \\ -2 \end{matrix} (5, -2) \begin{matrix} 0 \\ \downarrow \\ 0 \end{matrix} (6, 0)$

PPP: $y = 2 \cos\left(\frac{\pi}{4}x + \pi\right)$



Pythagorean Triples

3, 4, 5

5, 12, 13

7, 24, 25

8, 15, 17

9, 40, 41

r is ALWAYS positive

Quadrants

$\left. \begin{matrix} \cos\theta \\ \sec\theta \\ \tan\theta \\ \cot\theta \end{matrix} \right\} < 0$	<u>II</u> $x < 0, y > 0$ $\left. \begin{matrix} \sin\theta \\ \csc\theta \end{matrix} \right\} > 0$	<u>I</u> $x > 0, y > 0$ All trig functions are +
	<u>III</u> $x < 0, y < 0$ $\left. \begin{matrix} \sin\theta \\ \csc\theta \\ \cos\theta \\ \sec\theta \end{matrix} \right\} < 0$ $\left. \begin{matrix} \tan\theta \\ \cot\theta \end{matrix} \right\} > 0$	<u>IV</u> $x > 0, y < 0$ $\left. \begin{matrix} \sin\theta \\ \csc\theta \\ \tan\theta \\ \cot\theta \end{matrix} \right\} < 0$ $\left. \begin{matrix} \cos\theta \\ \sec\theta \end{matrix} \right\} > 0$

For graphs:

$$\begin{array}{l} y = a \sin(\omega x - \phi) \quad \left(\overset{\text{P.S.}}{\downarrow}, 0 \right), (, a), (, 0), (, -a), \left(\overset{\text{P.S.} + \text{period}}{\downarrow}, 0 \right) \\ \hline y = a \cos(\omega x - \phi) \quad (, a), (, 0), (, -a), (, 0), (, a) \end{array}$$

$$\text{Amp} = |a|$$

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

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