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. $\sin 240° = \frac{-\sqrt{3}}{2}$

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

c. $\sec 60° = 2$

d. $\csc\left(-\frac{3\pi}{4}\right) = -\sqrt{2}$ ← $-\frac{3\pi}{4}\cdot\frac{180}{\pi} = -135° + 360°$, $\csc(225°)$

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

f. $\cot 600° = \frac{\sqrt{3}}{3}$ ← $600 - 360 = 240$, $\cot(240°)$

g. $\sin\frac{23\pi}{4} = \frac{-\sqrt{2}}{2}$ ← $\frac{23\pi}{4}\cdot\frac{180}{\pi} = 1035° - 360 - 360 = 315°$, $\sin 315°$

h. $\cos\left(-\frac{7\pi}{2}\right) = 0$ ← $-\frac{7\pi}{2}\cdot\frac{180}{\pi} = -630° + 360° + 360° = 90°$, $\cos 90°$

i. $\sec 60° - \sin 45° = 2 - \frac{\sqrt{2}}{2}$

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

PPP

$\cos 240° =$ ____

$\sin\frac{7\pi}{4} =$ ____

$\csc 60° =$ ____

$\sec\left(-\frac{5\pi}{4}\right) =$ ____

$\cot\left(\frac{11\pi}{6}\right) =$ ____

$\sec\frac{7\pi}{4} =$ ____

$\tan 390° =$ ____

$\cos\frac{23\pi}{6} =$ ____

$\sin(-13\pi) =$ ____

$\csc 45° - \cos 60° =$ ____

$-3\sin\frac{5\pi}{6} =$ ____

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

$x = 7$, $y = -24$, $r = 25$

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

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

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

2) PPP $(-4,-3)$

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

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

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

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

$x = -9$, $r = 41$

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

$81 + y^2 = 1681$

$y^2 = 1600$

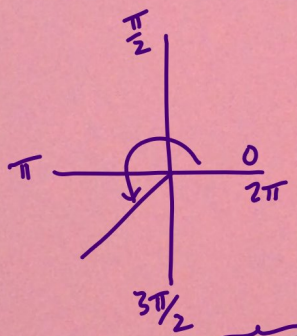
$y = -40$ (Q III)

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

$\cos\theta = \frac{-9}{41}$ $\quad \cot\theta = \frac{9}{40}$

$\tan\theta = \frac{40}{9}$ $\quad \sec\theta = \frac{-41}{9}$

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:

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

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

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

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

4) If $\csc\theta = \frac{-41}{40}$ and $\cos\theta > 0$, find the rest

5. Graph each of the following:

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

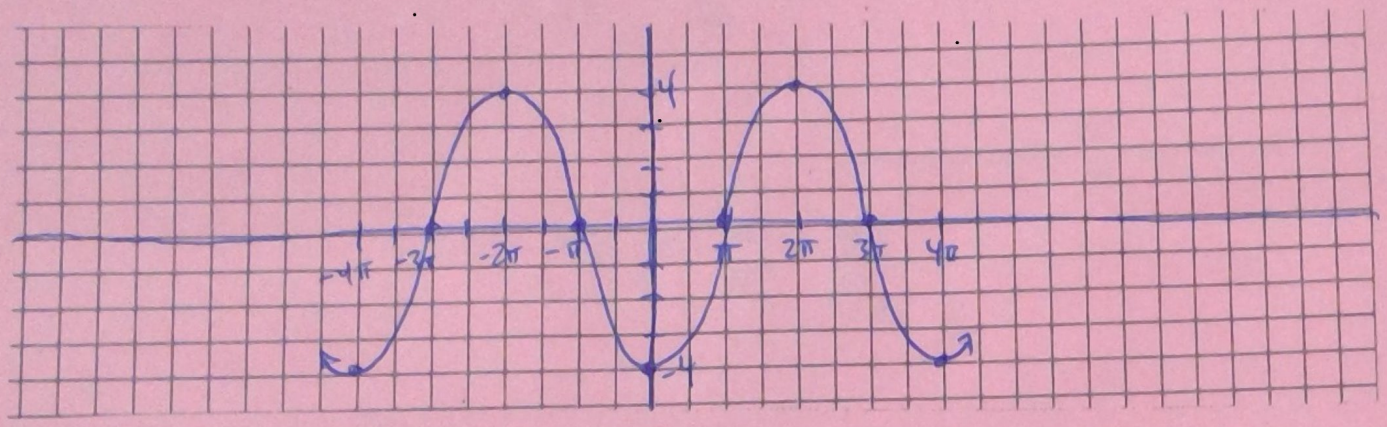
$a = -4$ $\quad$ Amp $= 4$

$\omega = \frac{1}{2}$ $\quad$ Period $= \frac{2\pi}{1/2} = 4\pi$ $\quad \hookrightarrow \frac{2\pi}{1} \cdot \frac{2}{1} = 4\pi$

$\phi = 0$ $\quad$ P.S. $= 0$

P.S. (a) (0) (P.S. + period) (a)

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



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

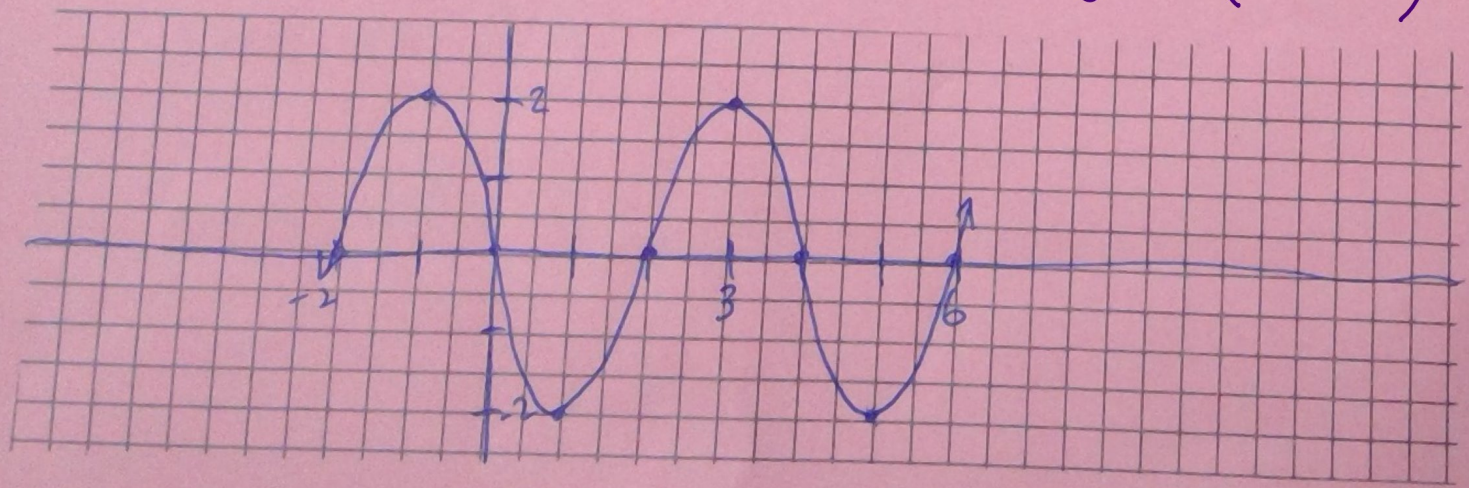
$\omega = \frac{\pi}{2}$ $\quad$ Period $= \frac{2\pi}{\frac{\pi}{2}} = 2\pi \cdot \frac{2}{\pi} = 4$

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

0 (a) 0 (-a) 0

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

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



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

Pythagorean Triples

3, 4, 5
5, 12, 13
7, 24, 25
8, 15, 17
9, 40, 41

r is ALWAYS positive

Quadrants

II $x<0, y>0$
$\cos\theta, \sec\theta, \tan\theta, \cot\theta$ <0
$\sin\theta, \csc\theta$ >0

I $x>0, y>0$
All trig functions are +

III $x<0, y<0$
$\sin\theta, \csc\theta, \cos\theta, \sec\theta$ <0
$\tan\theta, \cot\theta$ >0

IV $x>0, y<0$
$\sin\theta, \csc\theta, \tan\theta, \cot\theta$ <0
$\cos\theta, \sec\theta$ >0

For graphs:

	P.S.				P.S. + period
$y = a\sin(wx-\phi)$	$(\ ,0)$	$(\ ,a)$	$(\ ,0)$	$(\ ,-a)$	$(\ ,0)$
$y = a\cos(wx-\phi)$	$(\ ,a)$	$(\ ,0)$	$(\ ,-a)$	$(\ ,0)$	$(\ ,a)$

$\text{Amp} = |a|$

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

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