1. State the amplitude, period, phase shift, and vertical shift.

$$y = 3 + 2\sin\left(2\theta - \frac{\pi}{2}\right)$$

$A = 2$ $\quad K = 2$

$h = 3$ $\quad C = \frac{\pi}{2}$

Ampl $= 2$

V.S. $= 3$

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

P.S. $= \frac{\pi/2}{2/1} = \frac{\pi}{2} \cdot \frac{1}{2} = \frac{\pi}{4}$

3. Write an equation of a sine function with the given values.

Ampl $= 5$ $\quad$ Per $= \frac{\pi}{6}$ $\quad$ V.S. $= 3$ $\quad$ P.S. $= \frac{\pi}{3}$

$y = A\sin(K\theta - C) + h$

$y = \pm 5\sin(12\theta - 4\pi) + 3$

Per $= \frac{\pi}{6} = \frac{2\pi}{K}$

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

$K = \frac{2\pi}{\pi/6} = \frac{2\pi}{1} \cdot \frac{6}{\pi} = 12$

P.S. $= (12)\frac{\pi}{3} = \frac{C}{12}(12)$

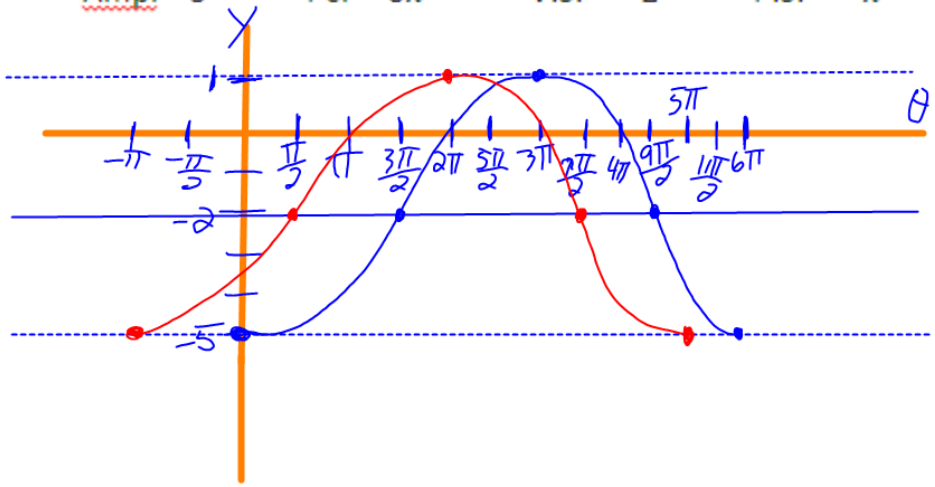
$\frac{12\pi}{3} = C$

$4\pi = C$

2. Draw a graph of the given equation with the values below.

$$y = -3\cos\left(\frac{\theta}{3} + \frac{\pi}{3}\right) - 2$$

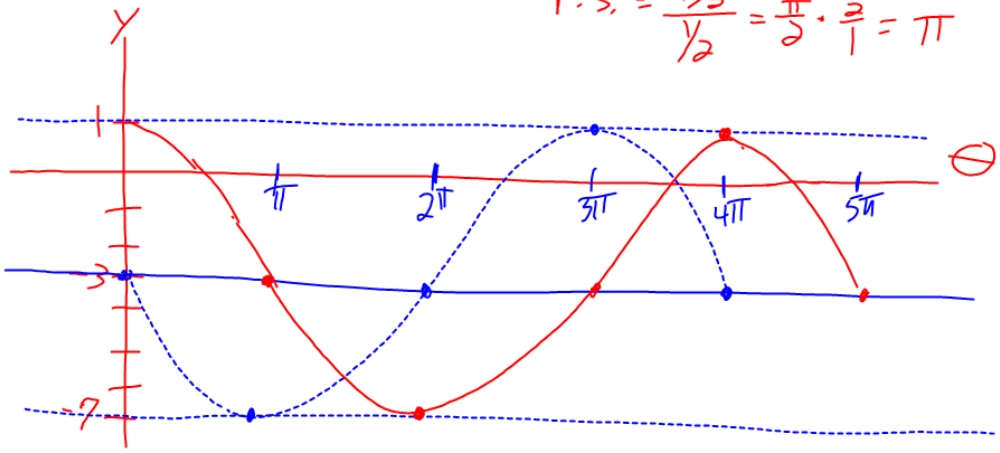
Ampl = 3 Per = 6π V.S. = -2 P.S. = $-\pi$



$$y = -4\sin\left(\frac{\theta}{2} - \frac{\pi}{2}\right) - 3$$

Ampl = 4 V.S. = -3 Period = $\frac{2\pi}{1/2} = 2\pi \cdot \frac{2}{1} = 4\pi$

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



2. The average monthly temperatures for the city of Seattle, Washington are given below.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
41	44	47	50	56	61	65	66	61	54	46	41

min max

a. Find the amplitude of a sinusoidal function that models the monthly temperatures.

$Ampl = \frac{66-41}{2}$

$= 12.5$

b. Find the vertical shift of a sinusoidal function that models the monthly temperatures.

$V.S. = \frac{66+41}{2}$

$= 53.5$

c. Find the period of a sinusoidal function that models the monthly temperatures.

12 mnths

d. Write a sinusoidal function that models the monthly temperatures, using t=1 to represent January.

$y = \pm 12.5 \sin/\cos\left(\frac{\pi}{6}(t) - c\right) + 53.5$

$12 = \frac{2\pi}{K}$

$K = \frac{2\pi}{12}$

$K = \frac{\pi}{6}$

$\frac{y-53.5}{\pm 12.5} = \frac{\pm 12.5 \sin/\cos\left(\frac{\pi}{6}t - c\right)}{\pm 12.5}$

$\frac{y-53.5}{\pm 12.5} = \sin/\cos\left(\frac{\pi}{6}t - c\right)$

$\sin^{-1}/\cos^{-1}\left(\frac{y-53.5}{\pm 12.5}\right) = \frac{\pi}{6}t - c$

$-\frac{\pi}{6}t$

$\sin A = \frac{7}{8}$

$A = \sin^{-1}\left(\frac{7}{8}\right)$

$\frac{\sin^{-1}/\cos^{-1}\left(\frac{y-53.5}{\pm 12.5}\right) - \frac{\pi}{6}t}{-1} = \frac{-c}{-1}$

$= c$

$y =$