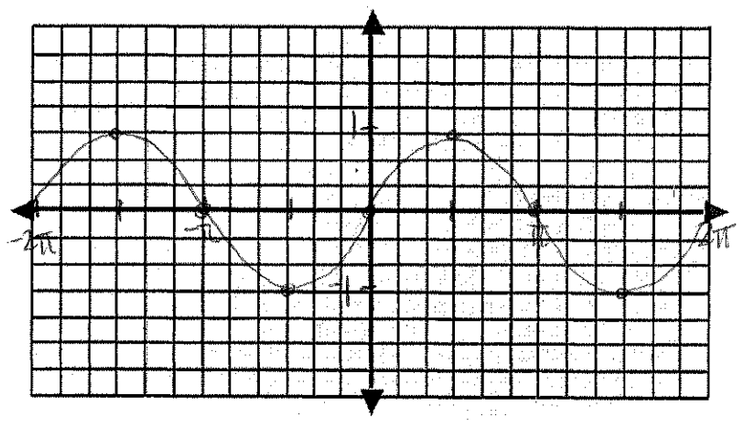
Pre-Calculus 12
Ch. 8 (Part II) Review

Name: _____

A. Graph $y = \sin x$ for $-2\pi \le x \le 2\pi$.



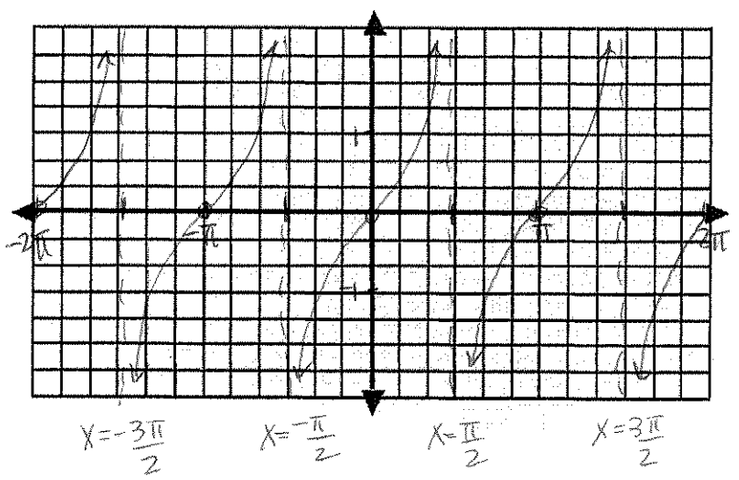
B.

General equation of x-intercepts: $n\pi \ (n \in \mathbb{Z})$

Period: 2π

Range: $-1 \le y \le 1$

A. Graph $y = \tan x$ for $-2\pi \le x \le 2\pi$.



B.

Domain: $x \ne \frac{\pi}{2} + n\pi \ (n \in \mathbb{Z})$

Period: π

Range: $y \in \mathbb{R}$

General equation of asymptotes: $x = \frac{\pi}{2} + n\pi \ (n \in \mathbb{Z})$

D/E. Graph 2 complete cycles of $y = -\cos 4\left(x + \frac{\pi}{3}\right) + 2$. Label axis and scale

★ reflection!

Amplitude: 1

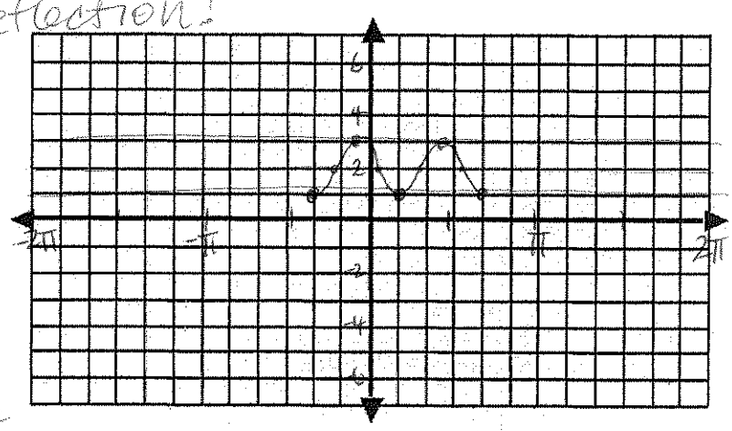
Centre line: 2

Maximum: 3

Minimum: 1

Period: $2\pi\left(\frac{1}{4}\right) = \frac{\pi}{2} = \frac{3\pi}{6}$

Phase Shift: $\frac{-\pi}{3}$ $\left(\frac{\pi}{3} \text{ left}\right) = \frac{2\pi}{6}$ left



E. List the following characteristics below for $y = -2\sin\left(2x + \frac{\pi}{3}\right) - 4 \Rightarrow -2\sin 2\left(x + \frac{\pi}{6}\right) - 4$

Period: $2\pi\left(\frac{1}{2}\right) = \pi$

Amplitude: 2

Domain: $x \in \mathbb{R}$

Centre Line: -4

Range: $-6 \le y \le -2$

Maximum: -2

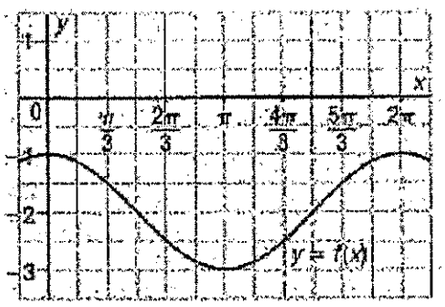
Phase Shift: $-\pi/6$ ($\pi/6$ left)

Minimum: -6

F. Determine a **sine** equation for the functions graphed below.

a)

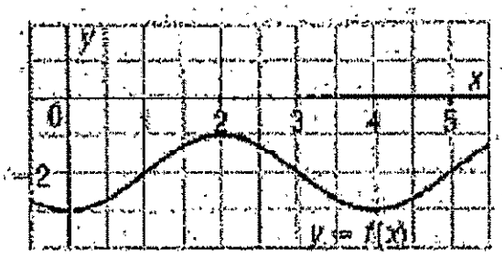
amp = 1
centre = -2
per = 2π
p.s = $\frac{4\pi}{6} = \frac{3\pi}{2}$



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

b)

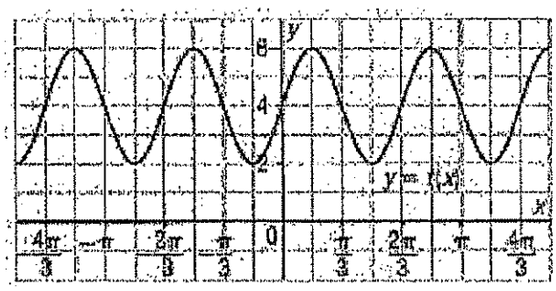
amp = 1
centre = -2
per = 4
p.s = 1



b) $y = \sin\frac{2\pi}{4}(x-1) - 2$

or $\left[y = \sin\frac{\pi}{2}(x-1) - 2\right]$

F. Determine a **cosine** equation for the functions graphed below.



amp = 2
centre = 4
per = $\frac{2\pi}{3} = \frac{4\pi}{6}$ $\quad \frac{2\pi}{b} \Rightarrow b = 3$
p.s = $\frac{\pi}{6}$ right

$y = 2\cos 3\left(x - \frac{\pi}{6}\right) + 4$

D/E. Graph 2 complete cycles of $y = 4\sin\frac{\pi}{4}(x+3)+1$. Label axis and scale

Amplitude: 4

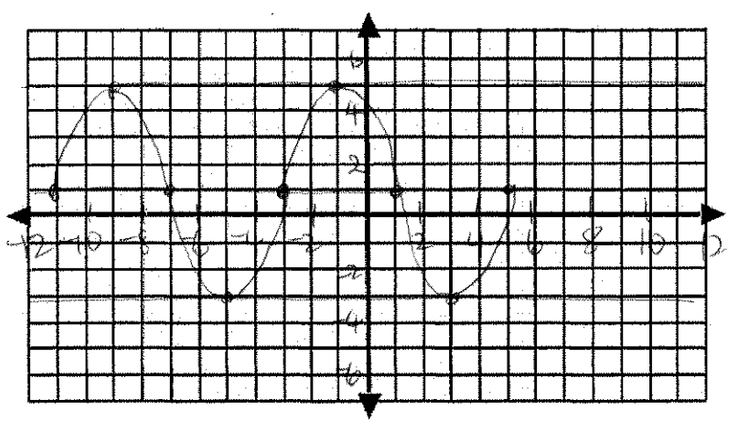
Centre line: 1

Maximum: 5

Minimum: -3

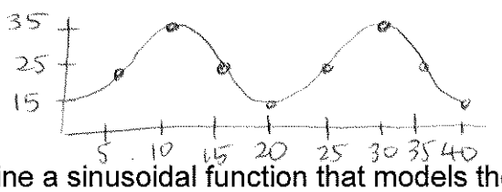
Period : $\frac{2\pi}{\left(\frac{\pi}{4}\right)} = 8$

Phase Shift : -3 (left 3)



G. A piston moves vertically in a cylinder starting from its maximum height. Every 20 seconds, the piston repeats its cycle from a minimum height of 15cm to a maximum height of 35cm back to a minimum height of 15cm.

a) Sketch a graph to model this situation.



amp = 10
centre = 25
per = 20
p.s = 5 (sin) or 0 (-cos)
10 (cos)

b) Determine a sinusoidal function that models the height, h centimeters, of the piston at time t seconds after it begins moving.

$h = -10\cos\frac{2\pi}{20}(t) + 25$

$h = 10\sin\frac{2\pi}{20}(t-5) + 25$

$h = 10\cos\frac{2\pi}{20}(t-10) + 25$

H. Determine the height of the piston 26 seconds after it begins moving. Give answer to the nearest centimeter.

substitute $t = 26$ into your equation (in radians!)

$h = -10\cos\left(\frac{2\pi}{20}(26)\right) + 25 = \boxed{28\text{ cm}}$