

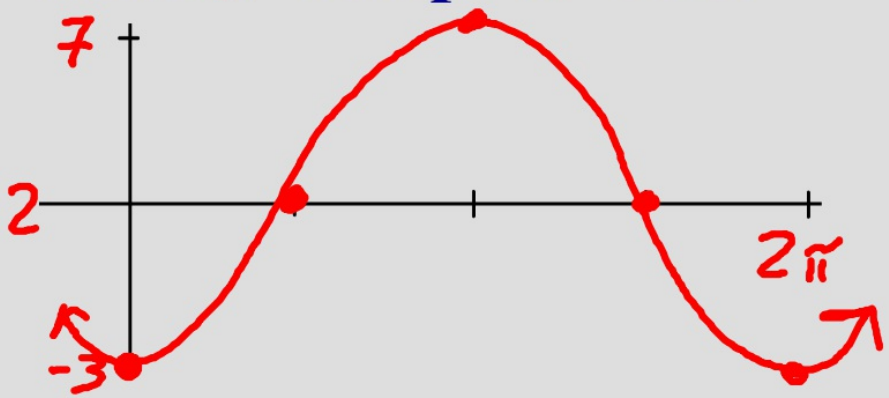
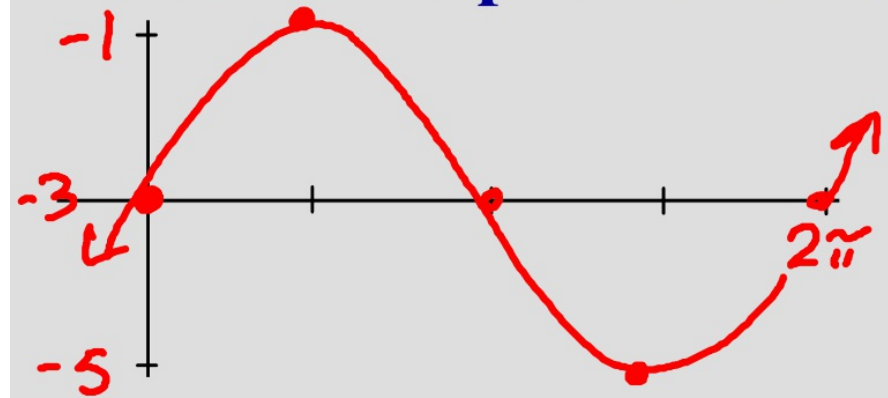
Identify the amplitude, midline shift and if there is a reflection for each. Then graph each equation.

$$f(x) = 2\sin x - 3$$

MS: -3 Amp: 2 Ref: *No*

$$f(x) = -5\cos x + 2$$

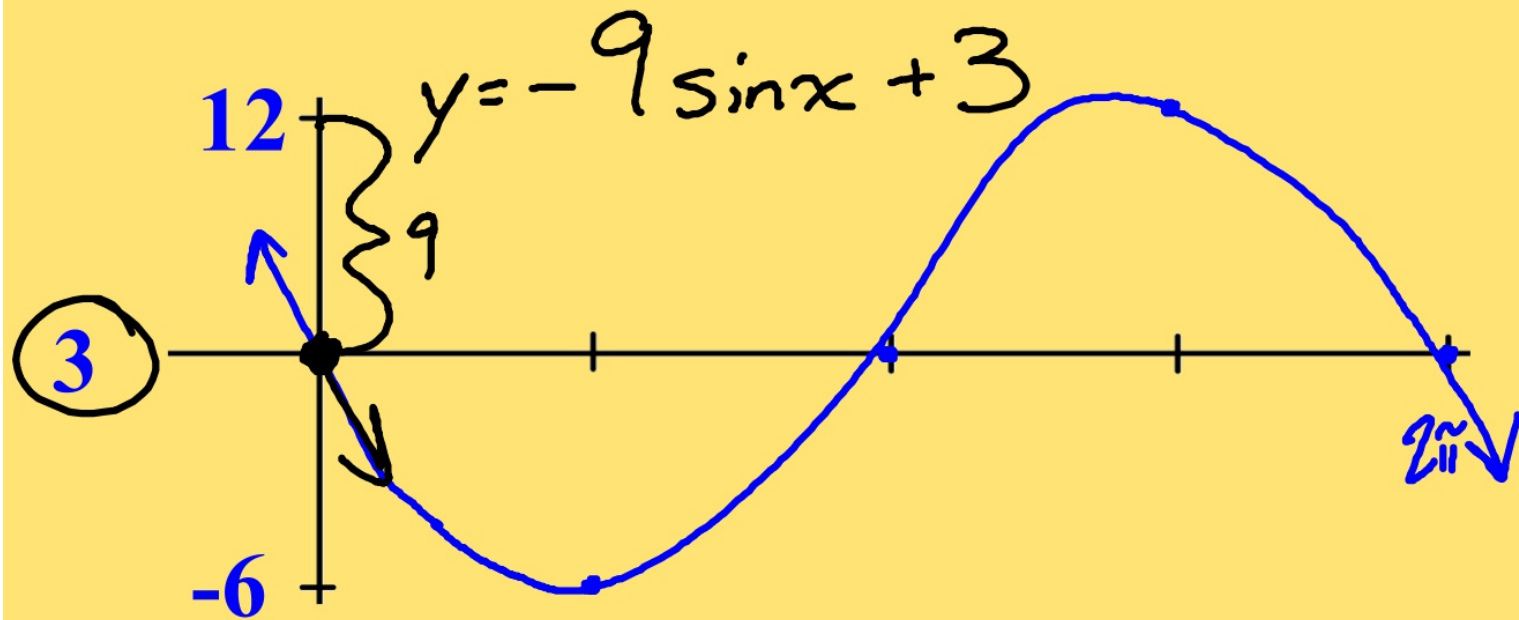
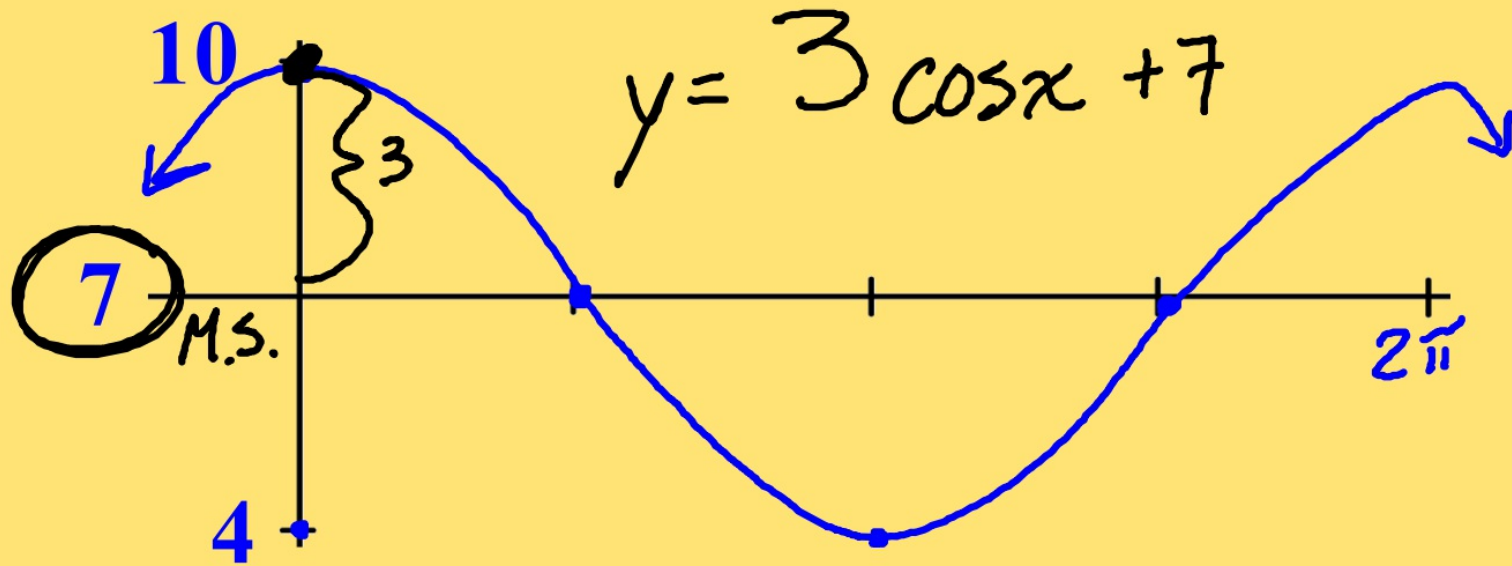
MS: 2 Amp: 5 Ref: *Yes*



3) Pam is looking out a window at a billboard. The angle of elevation to the top is 24° and the angle of depression to the bottom is 38° . The billboard is 175 feet away. How tall is the billboard?

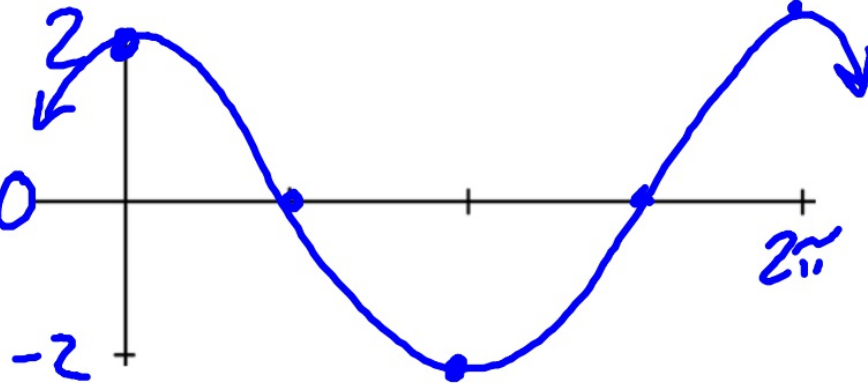
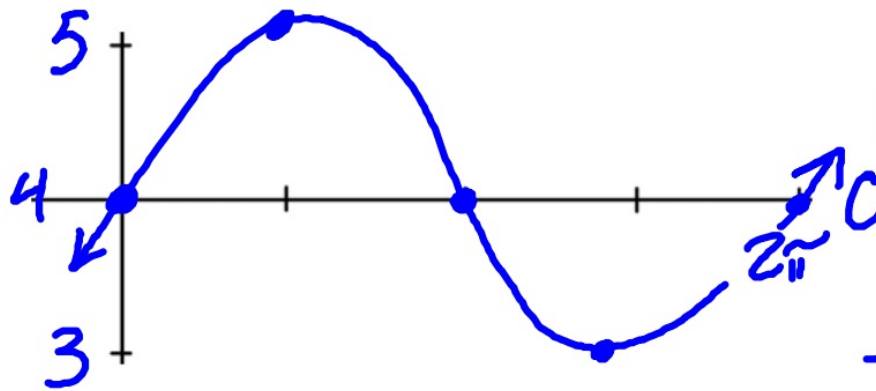
$$175 \tan 24 + 175 \tan 38$$

214.6 feet



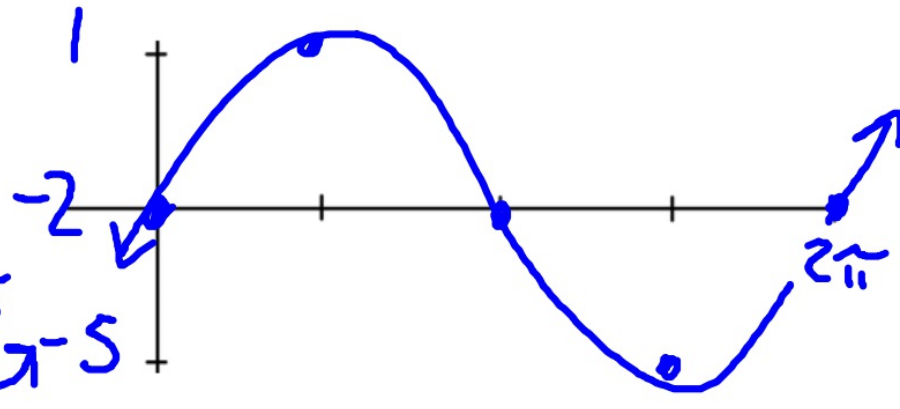
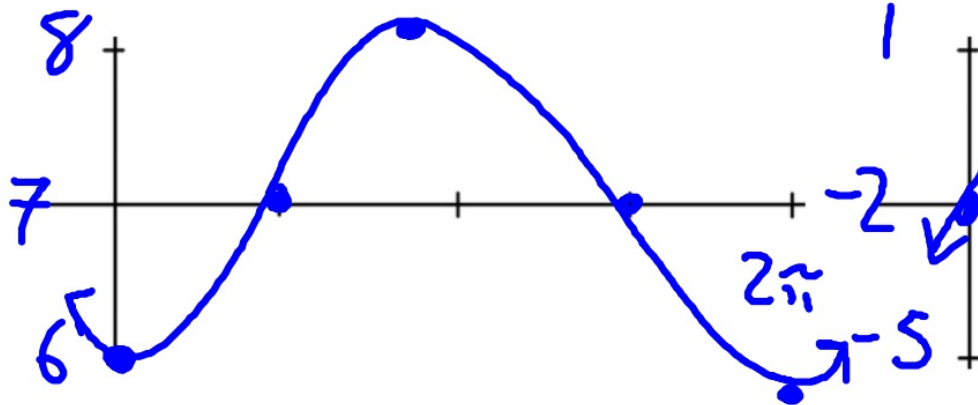
1. $f(x) = \sin x + 4$ Amp: $\frac{1}{4}$
M.S.: $\underline{4}$

2. $f(x) = 2\cos x$ Amp: $\frac{2}{0}$
M.S.: $\underline{0}$



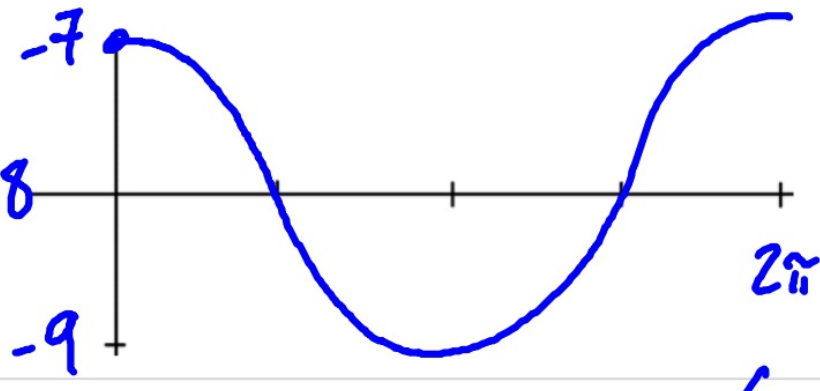
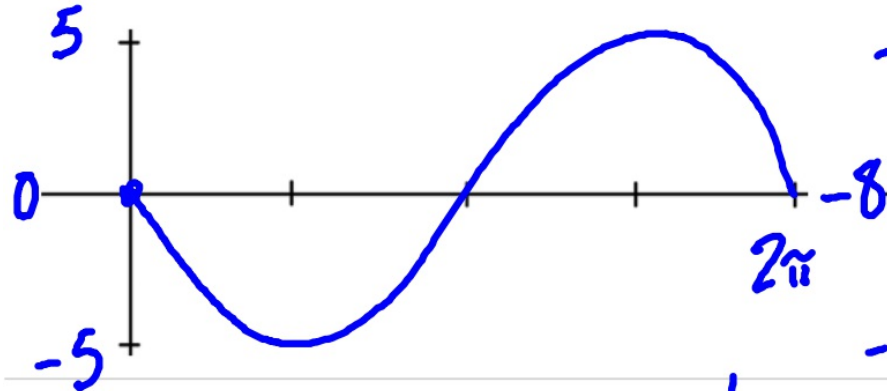
3. $f(x) = -\cos x + 7$ Amp: $\frac{1}{7}$
M.S.: $\underline{7}$

4. $f(x) = 3\sin x - 2$ Amp: $\frac{3}{-2}$
M.S.: $\underline{-2}$



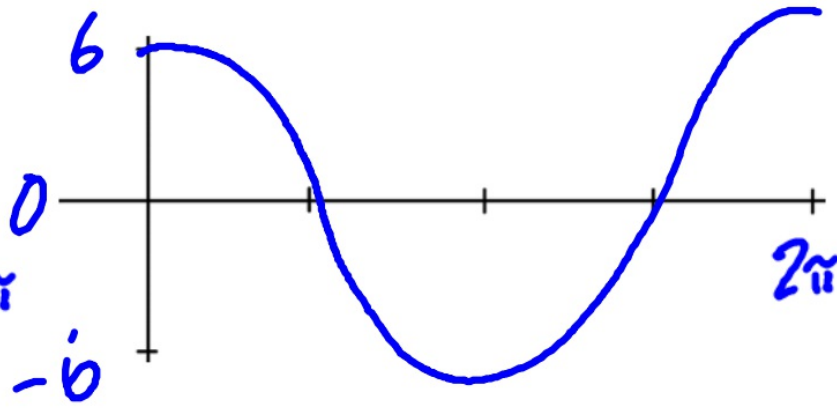
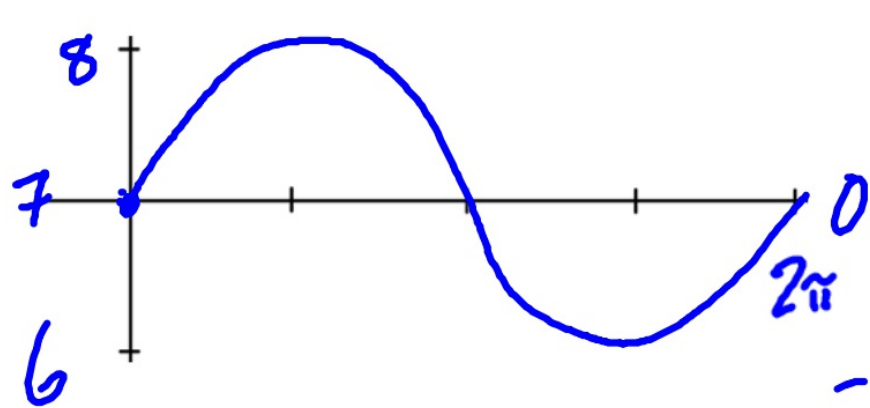
5. $f(x) = -5\sin x$ Amp: 5
M.S.: 0

6. $f(x) = \cos x - 8$ Amp: 1
M.S.: -8



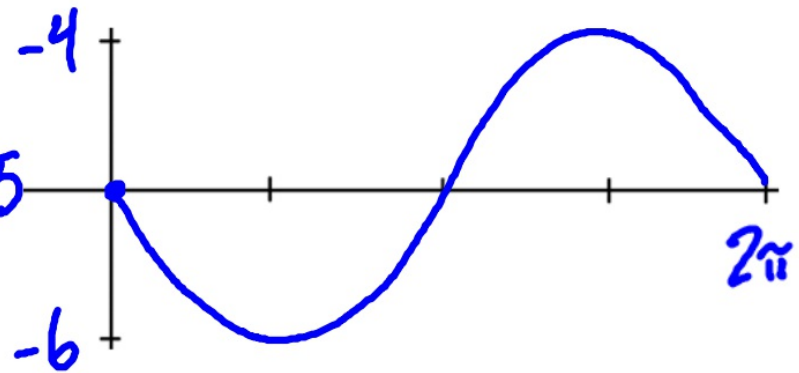
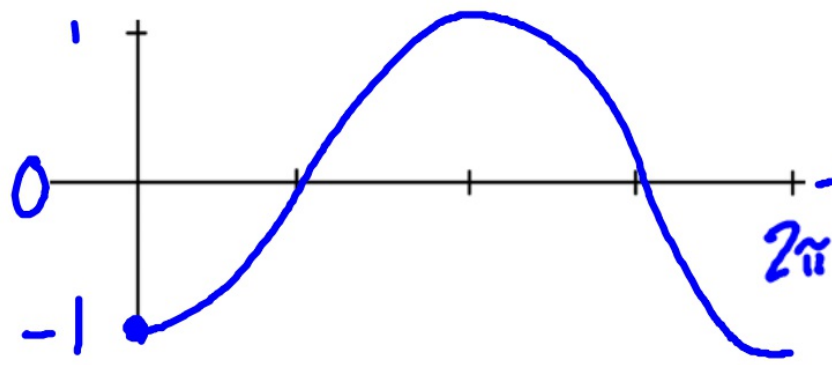
7. $f(x) = \sin x + 7$ Amp: 1
M.S.: 7

8. $f(x) = 6\cos x$ Amp: 6
M.S.: 0



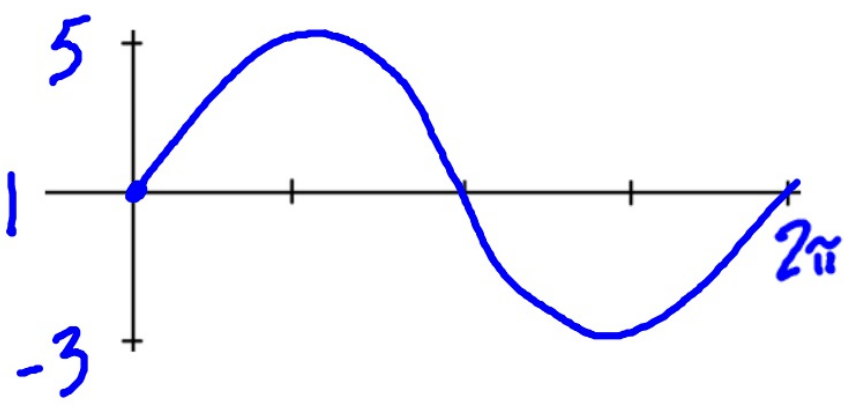
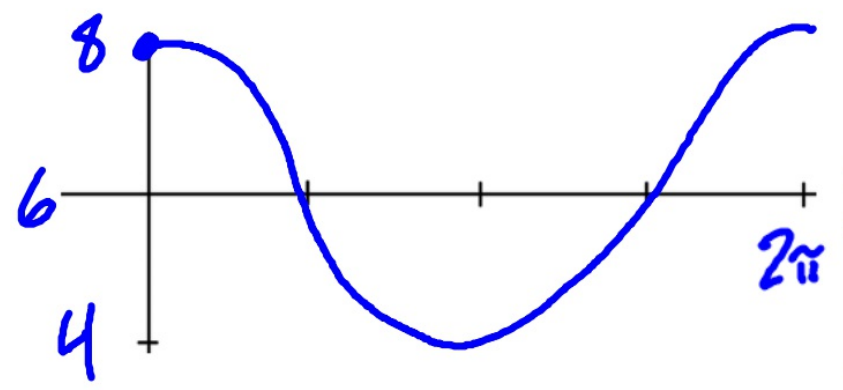
9. $f(x) = -\cos x$ Amp: $\frac{1}{0}$
M.S.: $\underline{0}$

10. $f(x) = -\sin x - 5$ Amp: $\frac{1}{-5}$
M.S.: $\underline{-5}$



11. $f(x) = 2\cos x + 6$ Amp: $\frac{2}{6}$
M.S.: $\underline{6}$

12. $f(x) = 4\sin x + 1$ Amp: $\frac{4}{1}$
M.S.: $\underline{1}$



Unit 4: Trig. Part II

Sinusoidal Functions

Right Triangle Trig.

Law of Sine

Law of Cosine

Amplitude

Vertical Shift

Sinusoidal Functions

There are 5 things we could be asked to find; Reflection, Vertical (or Midline) shift, Amplitude, Period and Phase Shift

Today we will add in the horizontal transformations

Sinusoidal Functions

$$y = a \sin (bx + c) + d$$

d is a vertical or midline shift

+ is up - is down

|a| is amplitude

(dist. from midline to max)

- a, causes a reflection

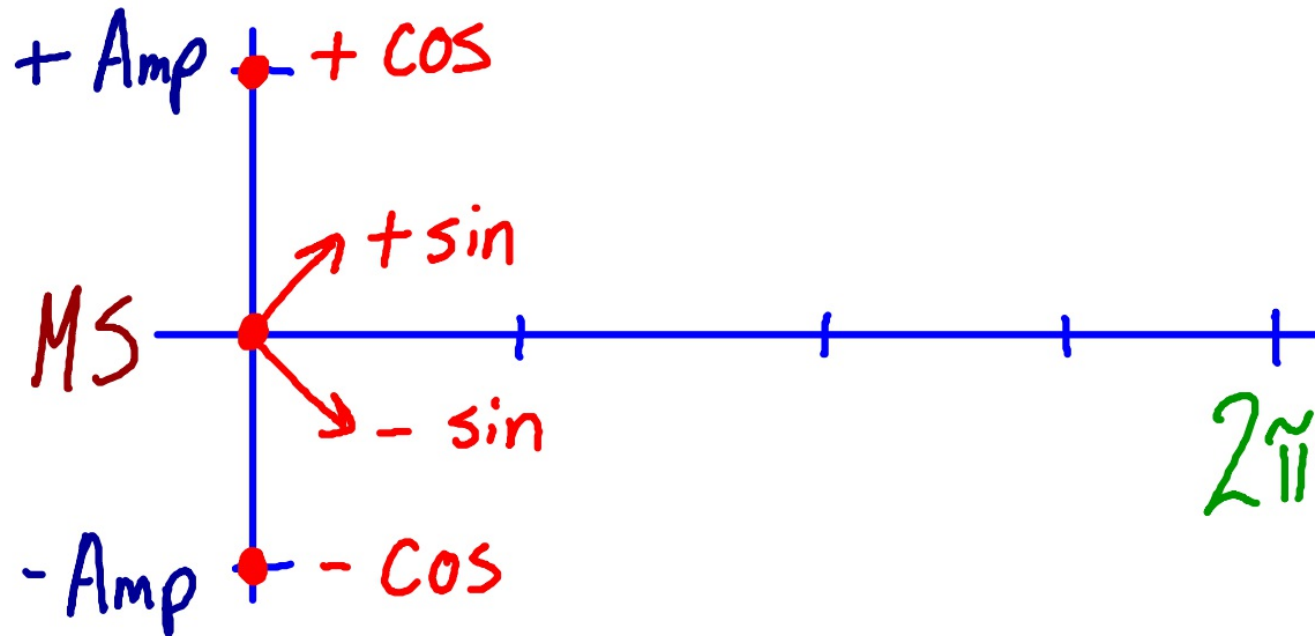
401 Summary

$$y = \underline{\quad} \sin x$$

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

+/-

Midline (Vertical)
Shift



Sinusoidal Functions

$$y = a \sin (\underline{bx + c}) + d$$

Period is how far before the cycle repeats itself (each complete "wave")

$$\text{Period} = 2\pi / b$$

Sinusoidal Functions

$$y = a \sin(\underline{bx + c}) + d$$

Phase Shift is a horizontal shift

$$\begin{array}{r} bx + c = 0 \\ -c \quad -c \\ \hline \frac{bx}{b} = \frac{-c}{b} \end{array}$$

$$\text{Phase Shift} = -c / b$$

You will only need to identify, not graph, phase shifts

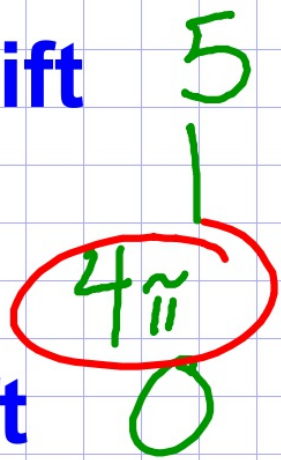
1) Graph: $y = \overset{a}{\cos} \overset{b}{\frac{x}{2}} + \overset{d}{5}$ $b = \frac{1}{2}$

1) vertical shift

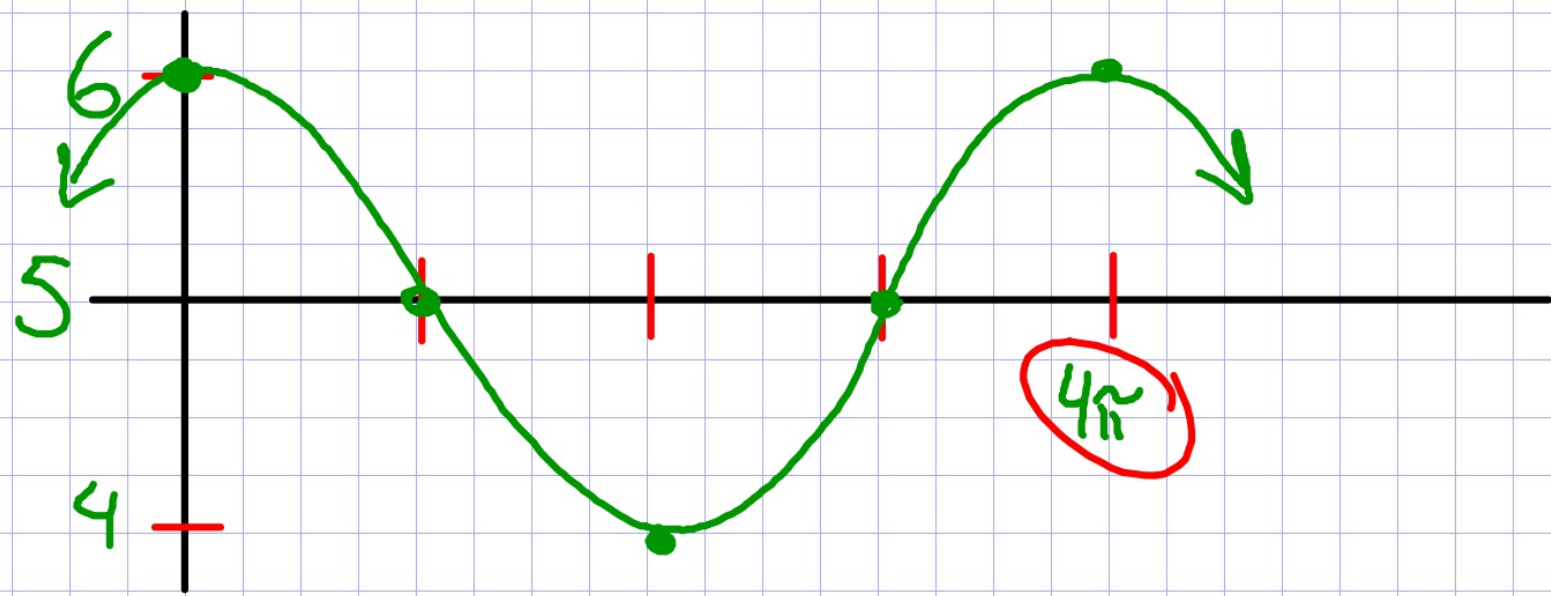
2) amplitude

3) period

4) phase shift



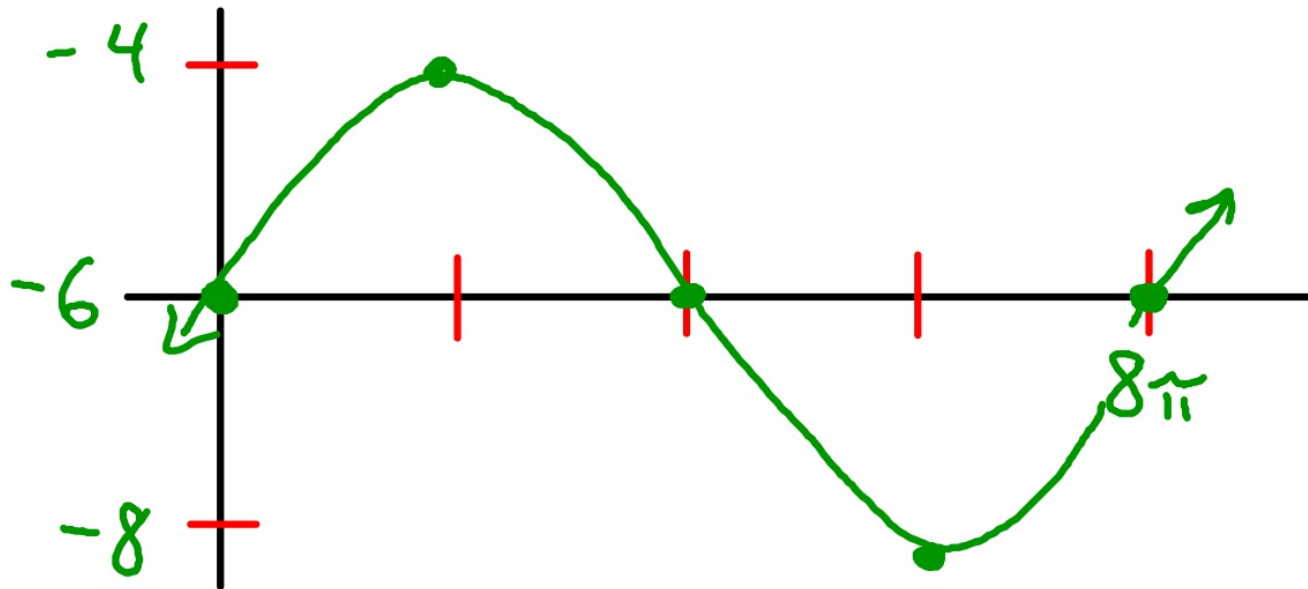
$$\frac{2\pi}{\frac{1}{2}} = 2 / (\frac{1}{2})$$



2) Graph: $y = 2 \sin \frac{x}{4} - 6$

$\frac{2\pi}{b}$ $b = \frac{1}{4}$
 $2 / (1/4) = 8$

1) vertical shift -6
2) amplitude 2
3) period 8π
4) phase shift 0



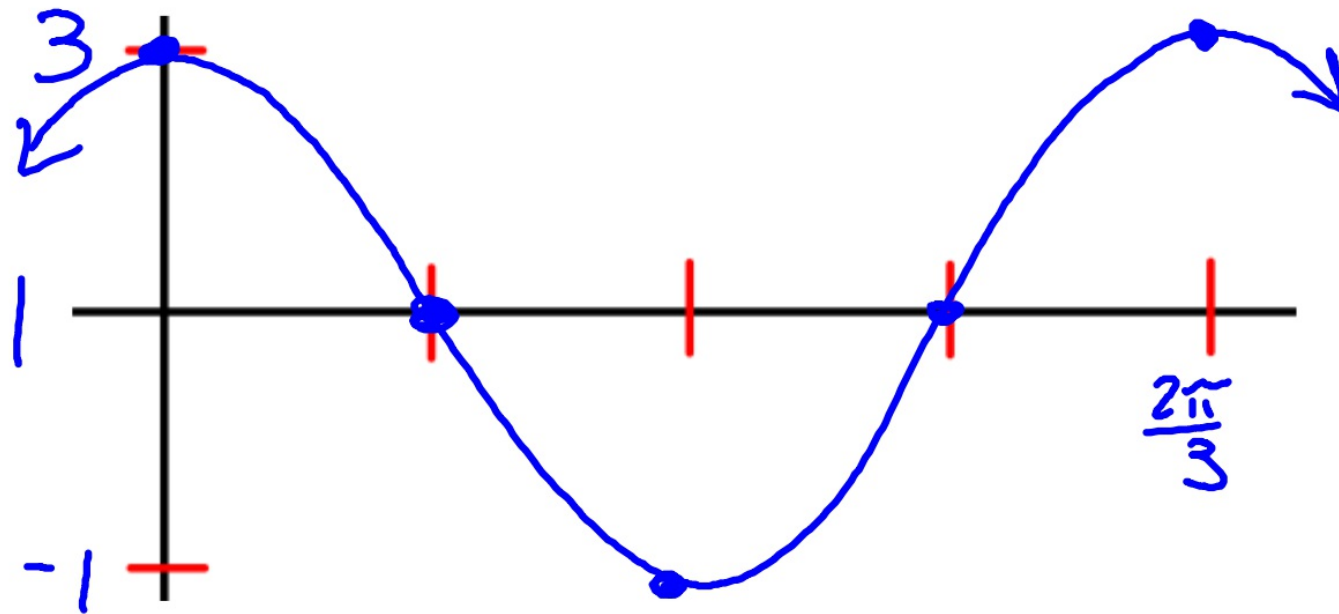
3) $y = 2\cos 3x + 1$

amplitude =

period =

phase shift =

vertical shift =



$$4) y = \underset{a}{\sin}(\underset{b}{5}x + \underset{c}{\pi}) - \underset{d}{1}$$

amplitude =

period = $\frac{2\pi}{b}$ $b=5$

phase shift = $-\frac{c}{b}$ $-\frac{\pi}{5}$

vertical shift =

$$5) y = 2\sin(3x + \frac{\pi}{4})$$

amplitude = $\boxed{2}$

vertical shift = $\boxed{0}$

$\frac{2\pi}{b}$ period = $\boxed{\frac{2\pi}{3}}$

phase shift = $\boxed{-\frac{\pi}{12}}$ $-\frac{c}{b}$ $\frac{-\frac{\pi}{4}}{3}$ $\frac{-\frac{\pi}{4}}{3}$

$$6) y = \frac{1}{2} \sin(x/4 - \pi/2) - 3$$

amplitude = $\boxed{\frac{1}{2}}$ vertical shift = $\boxed{-3}$

$2/(1/4)$ period = $\boxed{8\pi}$ phase shift = $\boxed{2\pi}$

WB 402

"Defaults"

If there is no...

$$a \rightarrow \text{Amp} = 1$$

$$b \rightarrow \text{Per} = 2\pi$$

$$c \rightarrow \text{P.S.} = 0$$

$$d \rightarrow \text{V.S.} = 0$$

(M.S.)