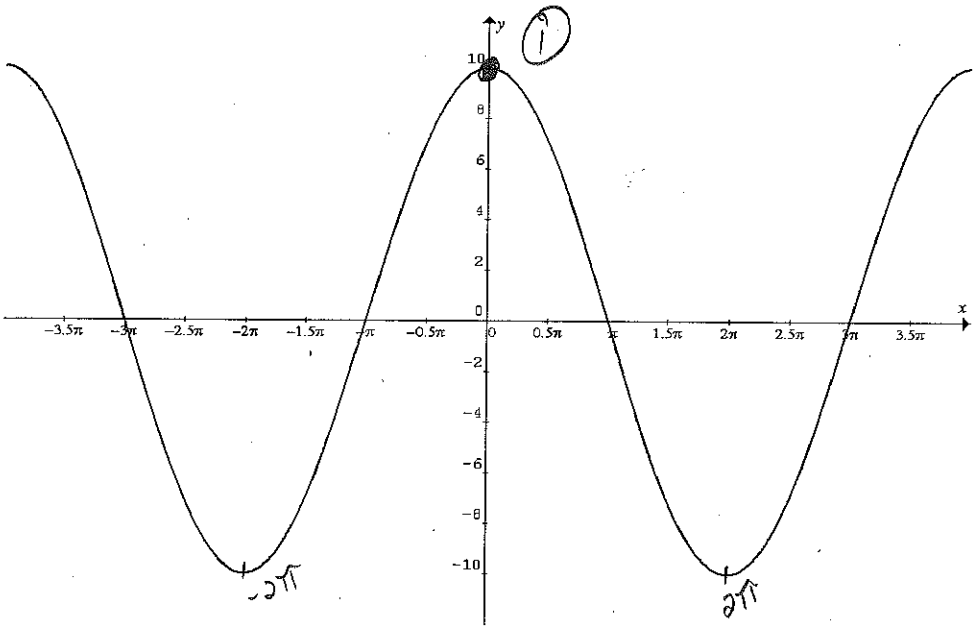
Trig Graphs Worksheet

State the equations for the following graphs.



(1)

$Pb = 2\pi$

$\frac{4\pi b}{4\pi} = \frac{2\pi}{4\pi}$

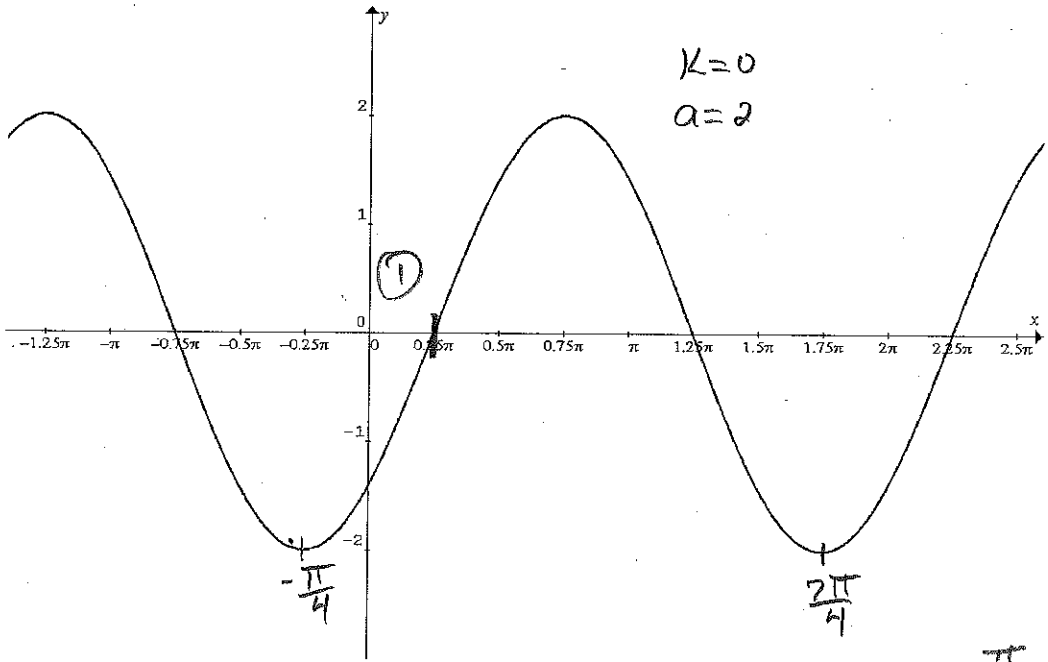
$b = \frac{1}{2}$

$h = 0$

$k = 0$

Amplitude = 10 Period = 4π Phase Shift = 0

Equation (1) = $y = 10\cos\left(\frac{1}{2}x\right)$ (in terms of the **cosine** function)



(1)

$k = 0$

$a = 2$

$Pb = 2\pi$

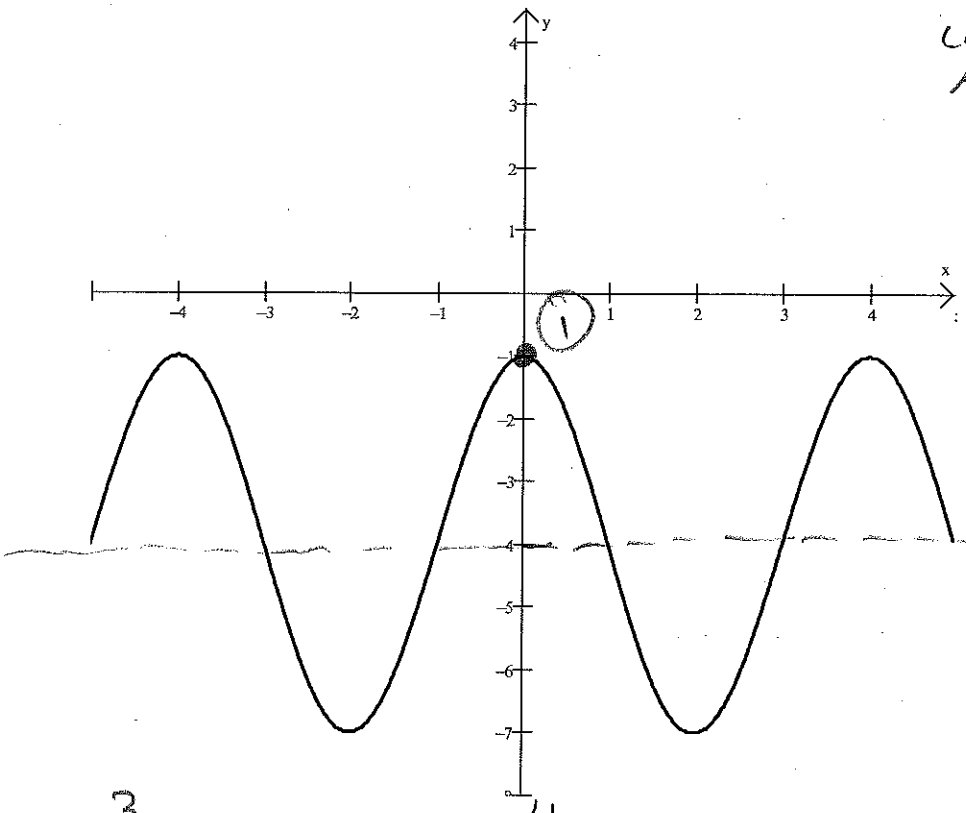
$\frac{2\pi b}{2\pi} = \frac{2\pi}{2\pi}$

$b = 1$

Amplitude = 2 Period = 2π Phase Shift = $-\frac{\pi}{4}$

Equation (2) = $y = 2\sin\left(x - \frac{\pi}{4}\right)$ (in terms of the **sine** function)

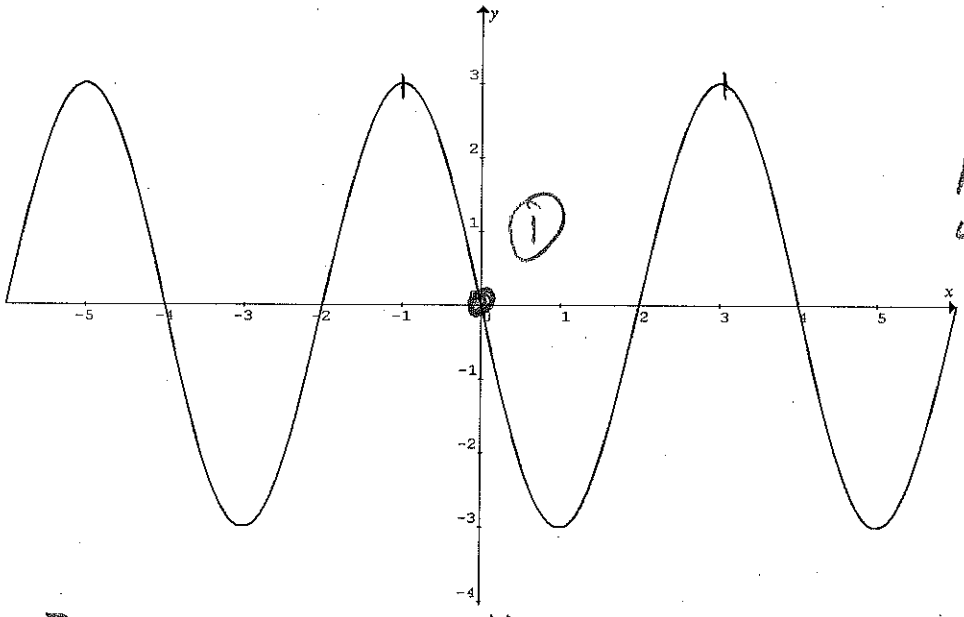
High = −1
Low = −7
Avg = $\frac{-7+(-1)}{2} = \frac{-8}{2} = -4$
$k = -4$
$\therefore a = 3$



Period = 4
$Pb = 2\pi$
$\frac{4b}{4} = \frac{2\pi}{4}$
$b = \frac{\pi}{2}$

Amplitude = 3 Period = 4 Phase Shift = 0

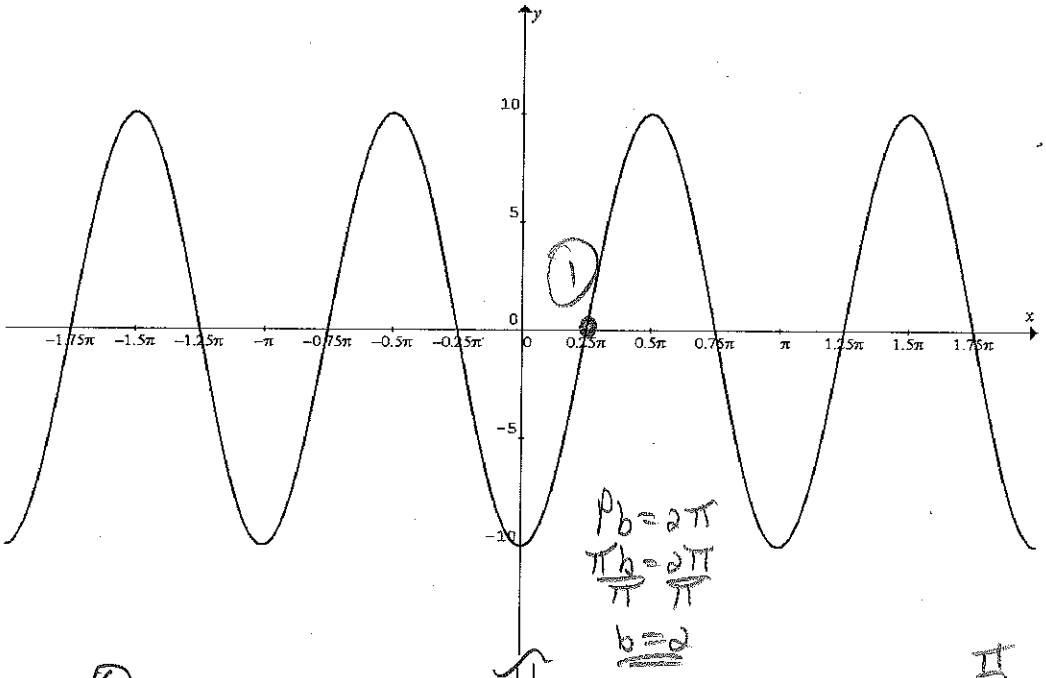
Equation (5) = $y = 3\cos\left(\frac{\pi}{2}x\right) - 4$ (in terms of the **cosine** function)



$k = 0$
$a = 3$
$Pb = 2\pi$
$\frac{4b}{4} = \frac{2\pi}{4}$
$b = \frac{\pi}{2}$

Amplitude = 3 Period = 4 Phase Shift = 0

Equation (6) = $y = -3\sin\left(\frac{\pi}{2}x\right)$ (in terms of the **sine** function)



(1)

$k = 0$

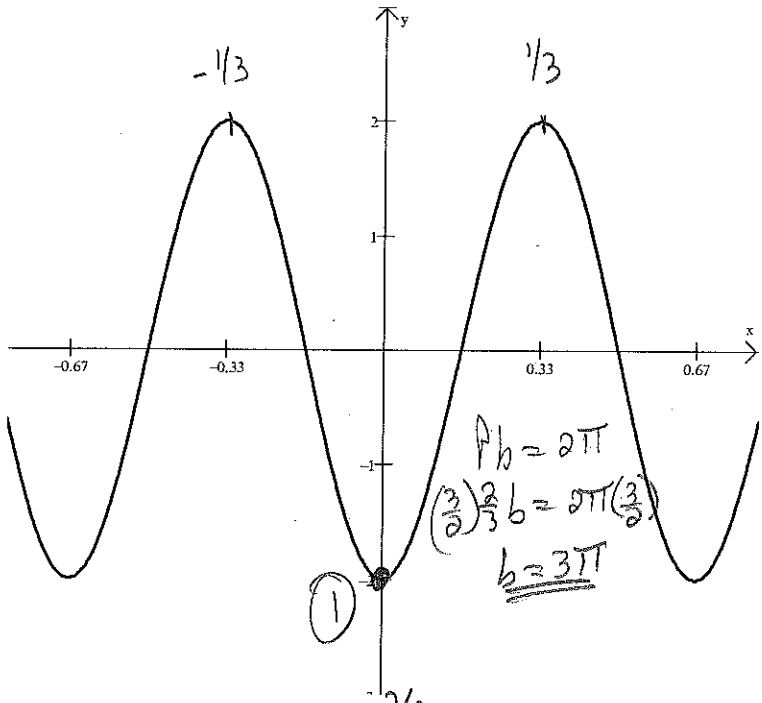
$P_h = 2\pi$

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

$b = 2$

Amplitude = 10 Period = π Phase Shift = $-\frac{\pi}{4}$

Equation (3) = $y = 10 \sin(2(x - \frac{\pi}{4}))$ (in terms of the **sine** function)



$-1/3$ $1/3$

(1)

$k = 0$

$P_h = 2\pi$

$(\frac{3}{2})\frac{2}{3} b = 2\pi(\frac{3}{2})$

$b = 3\pi$

Amplitude = 2 Period = $2/3$ Phase Shift = 0

Equation (4) = $y = -2\cos(3\pi x)$ (in terms of the **cosine** function)

Pre-Calculus
Sec 6.2.1

Name: _____

Graph the following equations.

1. $y = 2\cos\left(2\pi(x+4)\right) - 3$

① $\frac{2\pi(x+4)}{2\pi} = \frac{0}{2\pi}$ ② $\frac{2\pi(x+4)}{2\pi} = \frac{2\pi}{2\pi}$

$x+4=0$ $x+4=1$

$x=-4$ $x=-3$

2. $y = -\frac{3}{4}\sin\left(\frac{1}{3}\left(x-\frac{2\pi}{3}\right)\right) - 2$

① $\frac{1}{3}\left(x-\frac{2\pi}{3}\right)=0(3)$ ② $\frac{1}{3}\left(x-\frac{2\pi}{3}\right)=2\pi(3)$

$x-\frac{2\pi}{3}=0$ $x-\frac{2\pi}{3}=6\pi=\frac{18\pi}{3}$

$x=\frac{2\pi}{3}$ $+\frac{2\pi}{3}+\frac{2\pi}{3}$

$x=\frac{20\pi}{3}$

3. $y = -\frac{5}{3}\cos\left(\frac{\pi}{4}(x-3)\right) + 2$

① $\frac{\pi}{4}(x-3)=0\left(\frac{4}{\pi}\right)$ ② $\frac{\pi}{4}(x-3)=2\pi\left(\frac{4}{\pi}\right)$

$x-3=0$ $x-3=8$

$x=3$ $x=11$

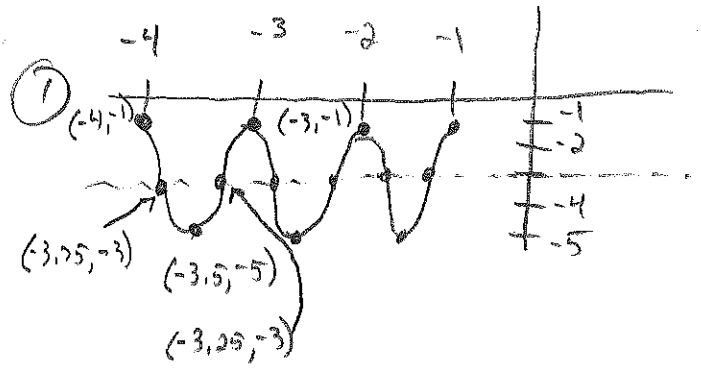
4. $y = 2\sin\left(3\left(x+\frac{\pi}{4}\right)\right) - 1$

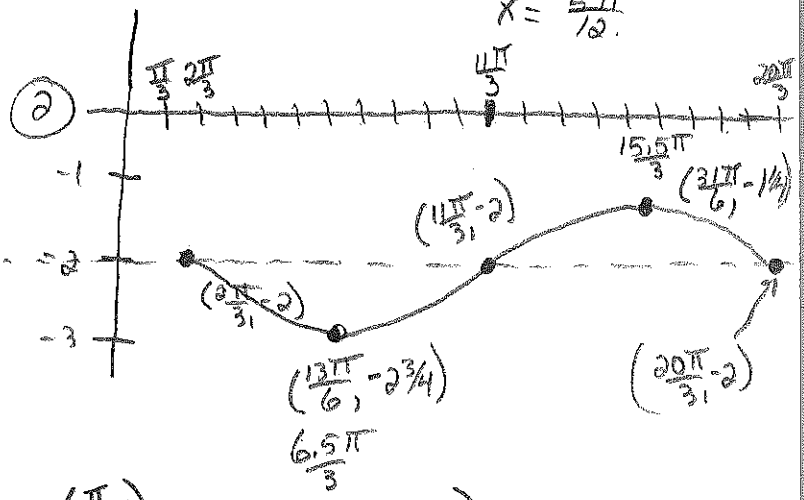
① $\frac{3(x+\frac{\pi}{4})}{3}=0$ ② $\frac{3(x+\frac{\pi}{4})}{3}=\frac{2\pi}{3}$

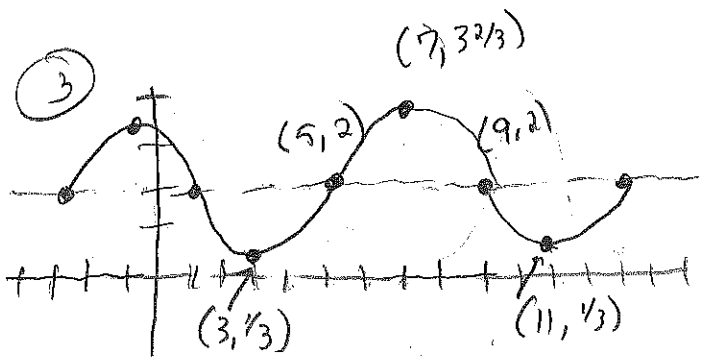
$x+\frac{\pi}{4}=0$ $x+\frac{\pi}{4}=\frac{2\pi}{3}\left(\frac{4}{4}\right)=\frac{8\pi}{12}$

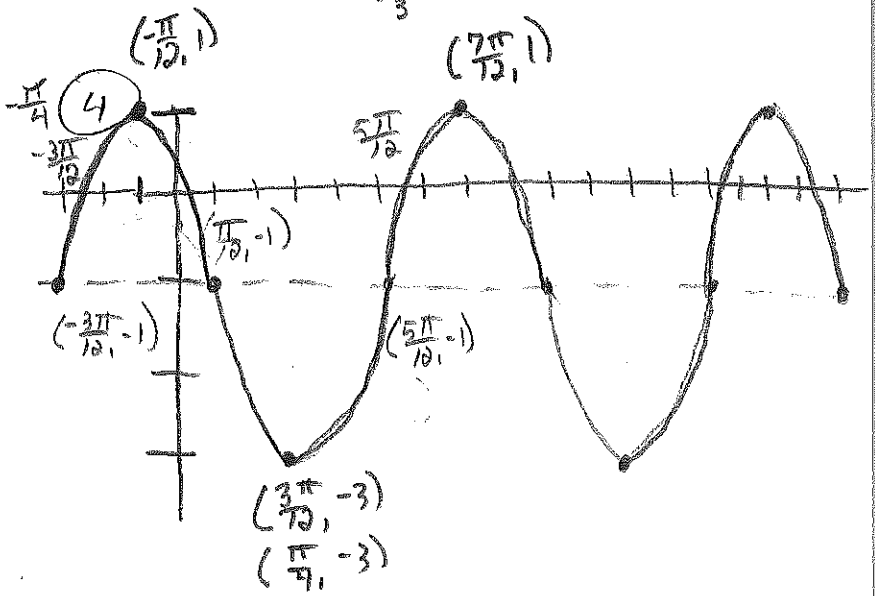
$x=-\frac{\pi}{4}$ $-\frac{\pi}{4}-\frac{\pi}{4}\left(\frac{3}{3}\right)=-\frac{3\pi}{12}$

$x=\frac{5\pi}{12}$









Trig/Analyt
Chapter 6 Checkpoints

Name_____

Double-Angle Formulas for Sine and Cosine

$\sin 2\alpha = 2\sin\alpha\cos\alpha$

$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$
OR $= 2\cos^2\alpha - 1$
OR $= 1 - 2\sin^2\alpha$

Half-Angle Formulas for Sine and Cosine

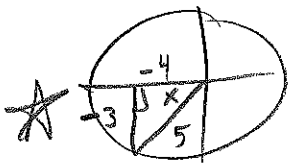
$\sin\left(\frac{\theta}{2}\right) = \pm\sqrt{\frac{1-\cos\theta}{2}}$ $\quad$ $\cos\left(\frac{\theta}{2}\right) = \pm\sqrt{\frac{1+\cos\theta}{2}}$

6-96. If $\cos x = -\frac{4}{5}$, $x \in [\pi, \frac{3\pi}{2}]$ ($x \in [\pi, \frac{3\pi}{2}]$, means x is an "element" of the set of all x's in the interval $[\pi, \frac{3\pi}{2}]$), find exact values for the five other trigonometric functions without finding x.

$\sin x =$ $-\frac{3}{5}$ $\quad$ $\csc x =$ $-\frac{5}{3}$

$\sec x =$ $-\frac{5}{4}$

$\tan x =$ $\frac{3}{4}$ $\quad$ $\cot x =$ $\frac{4}{3}$



$y^2 + (-4)^2 = 5^2$
$y = \sqrt{25-16}$
$y = \sqrt{9}$
$y = 3$

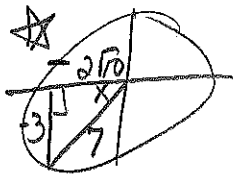
6-99. Solve the equation $\frac{4\cos^2 x = 3}{4}$ for $-\infty < x < \infty$.

$\cos^2 x = \frac{3}{4}$
$\sqrt{\cos^2 x} = \sqrt{\frac{3}{4}}$
$\cos x = -\frac{+\sqrt{3}}{\sqrt{4}}$
$\cos x = -\frac{+\sqrt{3}}{2}$

$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

x= $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6} + 2\pi n$

6-130. If $\sin x = -\frac{3}{7}$, $x \in [\pi, \frac{3\pi}{2}]$, find exact values for $\sin 2x$ and $\cos 2x$.



$a^2 + (-3)^2 = 7^2$
$a = \sqrt{49-9}$
$a = \sqrt{40}$
$a = \pm 2\sqrt{10}$

$\sqrt{40}$
$\sqrt{4(10)}$
$2\sqrt{10}$

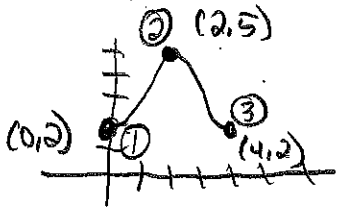
$\sin 2x = 2\sin x\cos x$
$= 2\left(\frac{-3}{7}\right)\left(\frac{2\sqrt{10}}{7}\right)$
$= \frac{-12\sqrt{10}}{49}$

$\cos 2x = \cos^2 x - \sin^2 x$
$= \left(\frac{2\sqrt{10}}{7}\right)^2 - \left(\frac{-3}{7}\right)^2$
$= \frac{40}{49} - \frac{9}{49}$
$= \frac{31}{49}$

sin(2x)= $-\frac{12\sqrt{10}}{49}$

cos(2x)= $\frac{31}{49}$

6-141. Find a cosine function that has a maximum at (2, 5) and a minimum at (4, 2).



$a = \frac{5-2}{2}$ $\quad a = \frac{3}{2} = 1.5$ $\quad k = 2 + 1.5$ or $5 - 1.5 = 3.5$

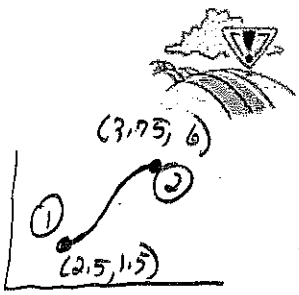
$P = 4$ $\quad P = \frac{2\pi}{b}$ $\quad \frac{4b}{4} = \frac{2\pi}{4}$ $\quad b = \frac{\pi}{2}$

① $y = -1.5\cos\left(\frac{\pi}{2}(x)\right) + 3.5$

Function: ② $y = 1.5\cos\left(\frac{\pi}{2}(x-2)\right) + 3.5$

③ $y = -1.5\cos\left(\frac{\pi}{2}(x-4)\right) + 3.5$

CL 6-171. A spring is hanging from the ceiling of a room. It is pulled and released so that the distance from the floor with respect to time is a sinusoidal motion. At $t = 2.5$ seconds, the spring is at a minimum from the floor, 1.5 feet. At $t = 3.75$ seconds, the spring is at a maximum, 6 feet. Find a trigonometric equation that models the motion of the spring as a function of time.



Tim

a. Find the height of the spring from the floor at $t = 3$ seconds.

b. Find the first two times when the spring is 2 feet from the floor.

$a = \frac{6-1.5}{2} = \frac{4.5}{2} = 2.25$

$k = 1.5 + 2.25 = 3.75$ or $6 - 2.25$

$3.75 - 2.5 = 1.25 \times 2 = P$

$P = 2.5$

$P = 2\pi$ $\quad \frac{2.5b}{2.5} = \frac{2\pi}{2.5}$ $\quad b = \frac{2\pi}{2.5} = \frac{4\pi}{5}$

Equation: ① $y = -2.25\cos\left(\frac{4\pi}{5}(x-2.5)\right) + 3.75$ or ② $y = 2.25\cos\left(\frac{4\pi}{5}(x-3.75)\right) + 3.75$

From Table @ $x = 3$ $\quad y1 = Eqn$ $\quad y2 = 2.$ Graph

b. Height when $t=3$:

3.05

a. Spring 2 feet from floor:

$t =$ .27 and $t =$ 2.23