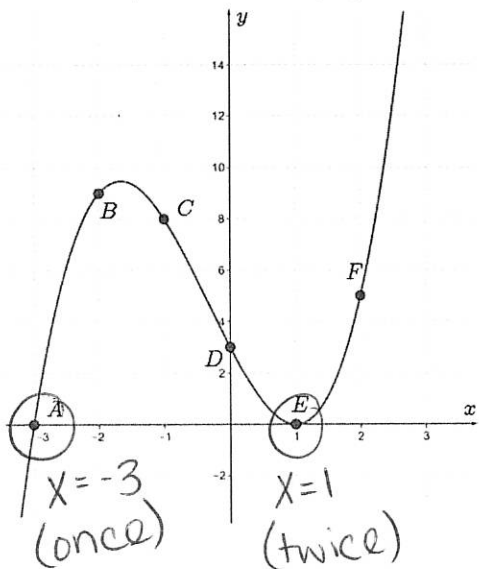


Key

A2 Unit 7 Review Sheet #1

1. Write an equation for the graph shown. Show all work that leads to your answers.



$$f(x) = (x+3)(x-1)^2$$

$$f(x) = (x+3)(x^2 - 2x + 1)$$

$$f(x) = x^3 + x^2 - 5x + 3$$

2. Solve the system of equations shown:

$$\begin{aligned} 2+3) \quad & 2x - 2y + 3z = 8 \\ & -2x + y - 2z = -9 \end{aligned}$$

$$\textcircled{4} \quad -y + z = -1$$

$$\begin{aligned} 1+2) \quad & 2x + 2y - 2z = -2 \\ & -2x + 2y - 3z = -8 \end{aligned}$$

$$\textcircled{5} \quad 4y - 5z = -10$$

$$\textcircled{(-2, 15, 14)}$$

$$\textcircled{1} \quad x + y - z = -1$$

$$\textcircled{2} \quad 2x - 2y + 3z = 8$$

$$\textcircled{3} \quad 2x - y + 2z = 9$$

$$4+5) \quad -4y + 4z = -4$$

$$4y - 5z = -10$$

$$-z = -14$$

$$\textcircled{z = 14}$$

$$\begin{aligned} 4) \quad & -y + 14 = -1 \\ & -y = -15 \\ & \textcircled{y = 15} \end{aligned}$$

$$1) \quad x + 15 - 14 = -1$$

$$x + 1 = -1$$

$$\textcircled{x = -2}$$

3. Determine the equation for the function shown:

$$d = \text{midline} : -3$$

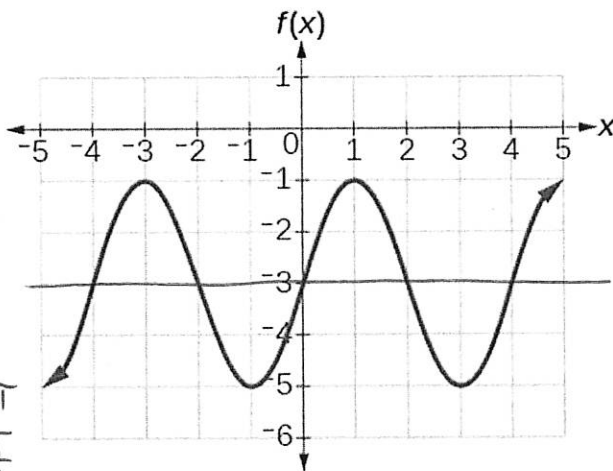
$$a = \text{amp} : 2$$

$$\text{period} = 4 \rightarrow b = \text{freq} : \frac{2\pi}{4} = \frac{\pi}{2}$$

$$4b = 2\pi$$

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

$$\textcircled{y = 2 \sin \frac{\pi}{2} x - 3}$$



4. Write the following quadratic in vertex form. Determine the vertex of the function.

$$y = 3x^2 - 6x + 5$$

$3 \cdot 1 = 3$

$$y = 3(x^2 - 2x + \frac{1}{3}) + 5 - 3$$

$$\frac{1}{2}(-2) = -1$$

$$(-1)^2 = 1$$

$y = 3(x-1)^2 + 2$
Vertex: (1, 2)

5. Determine if $(x - 3)$ is a factor of $(3x^3 + 2x - 11)$. Explain your reasoning.

option 1:
(long div)

$$\begin{array}{r}
 3x^2 + 9x + 29 \text{ R } 76 \\
 x-3 \overline{) 3x^3 + 0x^2 + 2x - 11} \\
 \underline{3x^3 - 9x^2} \\
 9x^2 + 2x - 11 \\
 \underline{9x^2 - 27x} \\
 29x - 11 \\
 \underline{29x - 87} \\
 76
 \end{array}$$

option 2:
(syn div)

$$\begin{array}{r|l}
 3 & 3 \ 0 \ 2 \ -11 \\
 & \downarrow 9 \ 27 \ 87 \\
 \hline
 & 3 \ 9 \ 29 \ 76
 \end{array}$$

option 3:

$$\begin{aligned}
 f(3) &= 3(3)^3 + 2(3) - 11 \\
 f(3) &= 3(27) + 6 - 11 \\
 f(3) &= 81 + 6 - 11 \\
 f(3) &= 76
 \end{aligned}$$

No b/c
 $f(3) \neq 0$

No b/c
remainder

No b/c
remainder

6. Determine the cosine equation that has an amplitude of 4, frequency of 2, and a midline of 5.

$$y = 4 \cos 2x + 5$$

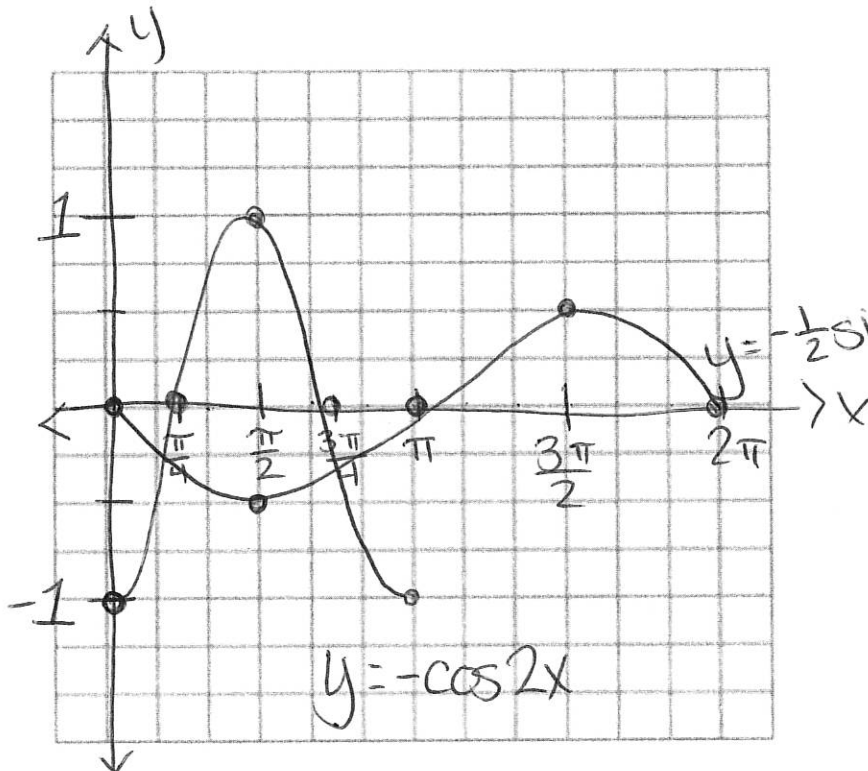
7. Graph one cycle of each function on the same set of axes:

$$y = \frac{-1}{2} \sin x$$

$$y = -\cos 2x$$

amp = $\frac{1}{2}$
freq = 1
per = 2π
interval = $\frac{\pi}{2}$

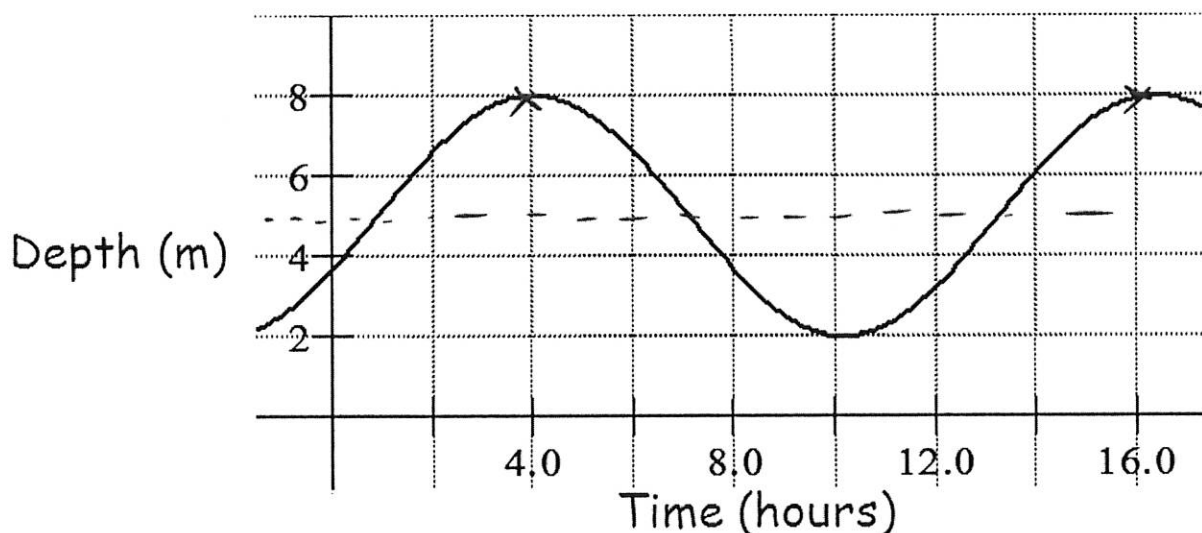
amp = +1
freq = 2
per = π
interval = $\frac{\pi}{4}$



$$y = -\cos 2x$$

$$y = -\frac{1}{2} \sin x$$

8. The depth of the water at a generating station can be represented by the graph shown:



- Determine a possible function for this graph.
- Calculate the depth of the water at 9:30 am (assuming $x = 0$ is midnight).
- Based on your graph, determine the amplitude, period and midline of the function
- Explain the meaning of the amplitude in context with this problem.

a) midline = 5
 $\left(\frac{8+2}{2}\right)$

amp = 3
 $(8-5)$

per = 12
 $(16-4)$

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

$\frac{2\pi}{5} = 12$

$\frac{12 \cdot 5}{12} = \frac{2\pi}{12}$

h.o.s. = -4

$y = 3\cos\left(\frac{\pi}{6}(x-4)\right) + 5$

b) $y = 3\cos\left(\frac{\pi}{6}(9.5-4)\right) + 5$
 $y = 2.102\dots$
 $\approx 2.1\text{m}$

c) see part a

d) ~~Temperature~~ Depths have a range of 6 (3·2) ... between 8+2 b/c $5+3$ + $5-3$.