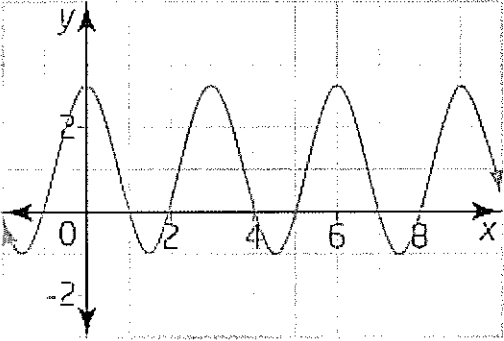
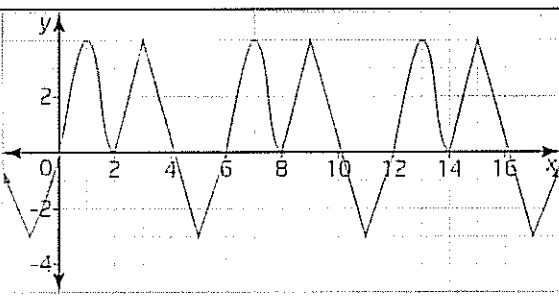


## Unit #5 Test Review

### Topics:

1. Understand the terms {periodic, amplitude, period, cycle, horizontal axis}
2. Analyze periodic graphs – find period, amplitude, future values.
3. Understand the relationships between a point  $(x,y)$  on a circle, radius  $(r)$ , and principal angle  $\Theta$ .
4. Know sine function and cosine function – key-points and graph.
- 5.\* Transformations on the sine function – four different variables
  - a) Find amplitude, period, horizontal axis, max/min.
  - b) State transformations and order in which they apply.
  - c) Graphing sine or cosine transformations.
  - d) Find a formula to match a transformation.
6. Apply transformations to applications.

1. Determine whether or not each graph is periodic. **If it is periodic**, determine the period, amplitude, equation of the axis of the curve, domain, and range.

	<p>periodic or not? _____</p> <p>period _____</p> <p>amplitude _____</p> <p>horiz. axis _____</p> <p>domain _____</p> <p>range _____</p>
	<p>periodic or not? _____</p> <p>period _____</p> <p>amplitude _____</p> <p>horiz. axis _____</p> <p>domain _____</p> <p>range _____</p>

2.
  - a. In the first graph above, what would be the coordinates of the next maximum (not shown in the graph) be?
  - b. In the second graph above, what is  $f(32)=?$

## Unit #5 Test Review

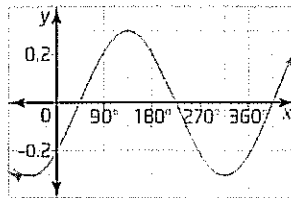
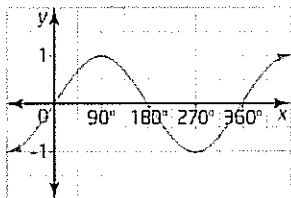
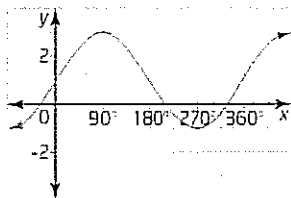
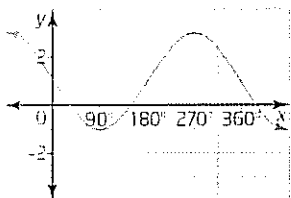
3. Match each equation with the corresponding graph.

A  $y = \sin x$

C  $y = 2 \sin x + 1$

B  $y = -2 \sin x + 1$

D  $y = 0.3 \sin(x - 45^\circ)$



4. For each of the following functions, find the period, amplitude, horizontal axis, and min/max values.

a.  $f(x) = 2\sin(x-30)-4$

b.  $f(x) = -0.5\sin(2x)+3$

c.  $f(x) = 4\sin(0.25(x+90))-2$

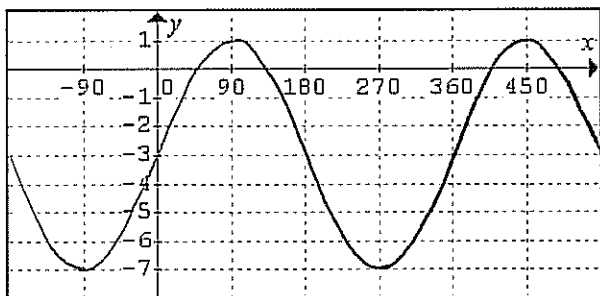
5. Set up an RST chart and find the transformation functions for  $x$  and  $y$  for each of the functions in question 4.

6. Write an equation for each sine function.

a. amplitude of 5; phase shift of  $30^\circ$  to the right

b. amplitude of 2 and reflected in the  $x$ -axis; phase shift  $90^\circ$  to the left; vertical translation down 9.

c.



7. Use an RST chart (or a method of your choice) to help you graph the following transformations on  $f(x) = \sin x$ , graph each function over the domain  $\{0 < x < 540\}$ :

a.  $f(x) = 1.5\sin(x)+1.5$

b.  $f(x) = 3\sin(x+90)-3$

c.  $f(x) = -2\sin(3x)+3$

d.  $f(x) = -\sin(x+180)$

e.  $f(x) = 0.8\sin(0.6(x-45))-1$

## Unit #5 Test Review

8. Tides in one section of the Bay of Fundy caused the water level to rise 7 m above sea level and to drop to 7 m below. The tide completes one cycle approximately every 12 h. Assume the height of water with respect sea level to be modelled by a sine function.
- Find max, min, the amplitude "a", the average water level (ie. "c" the horizontal axis) and the "k" value. We will find the phase shift "d" later.
  - Draw a graph for a 24h duration. *From the graph, identify the sine curve to find the phase shift "d" is \_\_\_*
  - Let y metres represent the height of the water with respect sea level after x seconds and use the sine model to write an equation to represent this situation.
  - Use the equation to calculate the height of the water above the sea level after 13 hours
  - By reading and showing this on your graph, *estimate* the first time the water level is at a height of 4 m.
9. A Ferris wheel has a radius of 6 m and rotates once every 3 minutes. The bottom of the wheel is 2 m off the ground.
- Draw a sketch of the Ferris wheel showing the heights described (2 marks)
  - Draw a graph to show a person's height above or below the center of rotation starting with  $x = 0$  minutes at the **lowest position**. (3 marks)
  - Find the equation of the graph.
  - Use the equation to find the height above the ground of a person who has been on the wheel for 4.5 minutes.

Also try: Pg. 404-405

Q. #1, 3, 6 (no calc), 7, 8, 9, 12, 13

## Answers

1.	Periodic Period = 3 Amplitude = 2 Horizontal axis = $y=1$	Periodic Period = 6 Amplitude = 3.5 Horizontal axis = $y=0.5$
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2. A) max at (12,3)                      B)  $f(32) = 0$  ( $32-6x$ , till you get in the range of the graph you see)

3. Order {B, C, A, D}

4.	Period = 360 Amplitude = 2 Horizontal axis = $y=-4$ Max = -2 Min = -6	Period = 180 Amplitude = 0.5 Horizontal axis = $y=3$ Max = 3.5 Min = 2.5	Period = 1440 Amplitude = 4 Horizontal axis = $y=-2$ Max = 2 Min = -6
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5. A)  $(x+30, 2y-4)$                       B)  $(x/2, -0.5y+3)$                       C)  $(4x-90, 4y-2)$

6. A)  $y = 5\sin(x-30)$                       B)  $y = -2\sin(+90)-9$                       C)  $y = 4\sin x - 3$

7.

	a	b		c		d		e	
x	$1.5y+1.5$	$x-90$	$3y-3$	$x/3$	$-2y+3$	$x-180$	$-y$	$x/0.6+45$	$0.8y-1$
0	1.5	-90	-3	0	3	-180	0	45	-1
90	3	0	0	30	1	-90	-1	195	-0.2
180	1.5	90	-3	60	3	0	0	345	-1
270	0	180	-6	90	5	90	1	495	-1.8
360	1.5	270	-3	120	3	180	0	645	-1

Use Desmos.com to check your graph.

8. A) max=7, min=-7, amplitude = 7, axis -  $y=0$ ,  $k = 30$

B) d – depends on where it starts, we can pretend it starts at the axis and goes up.  $d=0$

C)  $y = 7\sin[30x]$

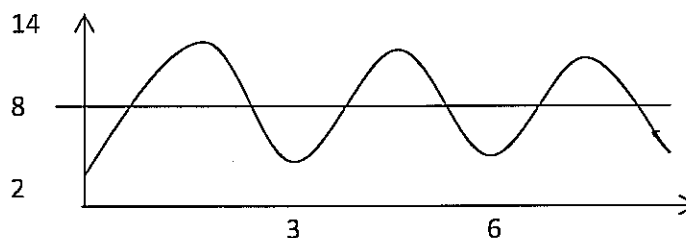
D)  $y = 3.5m$

E)  $x = 1.17h?$

F)  $y = 9+12n$  Where  $n$  is a member of the integers.

9. A) Easy Diagram

B)



C)  $y = 6\sin[120(x-2.25)]+8$

D)  $y = 14m$