MCR3U - UNIT 6 TEST
Trigonometric Functions II

Name : _____ /43 /10

Expectations: 1. demonstrate an understanding of periodic relationships and sinusoidal functions, and make connections between the numeric, graphical, and algebraic representations of sinusoidal functions;

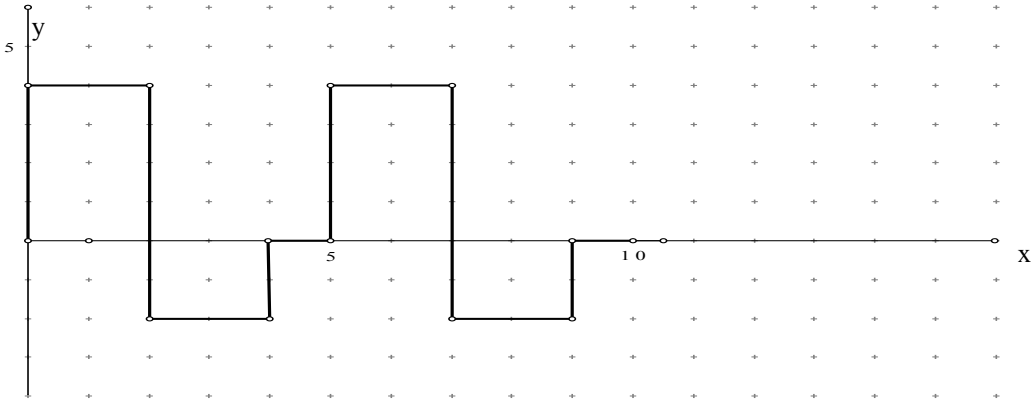
2. Identify and represent sinusoidal functions, and solve problems involving sinusoidal functions, including problems arising from real-world applications.

1.For the given periodic function defined by $y = f(x)$, the pattern will continue.

a) State $f(75)$. _____

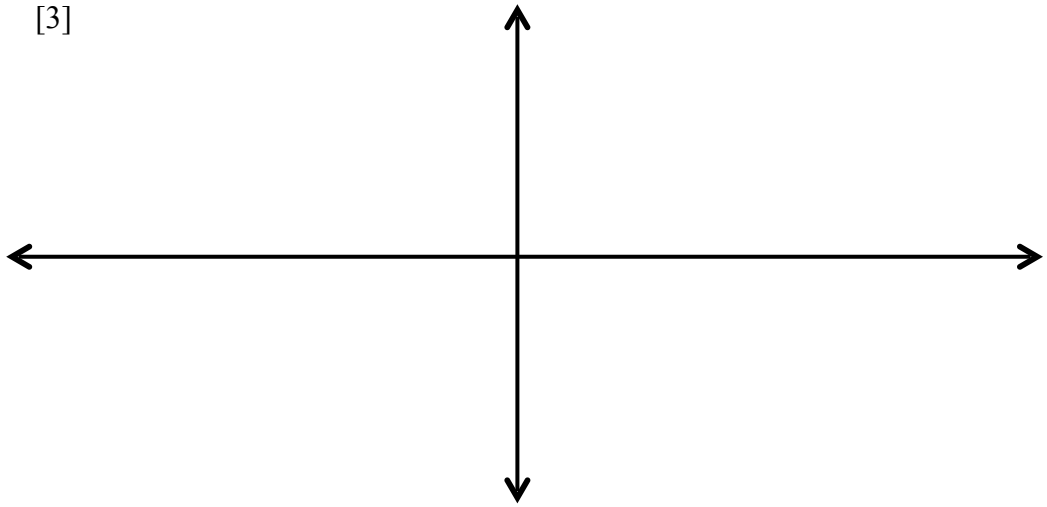
b) Add one more cycle to the graph.

[2]



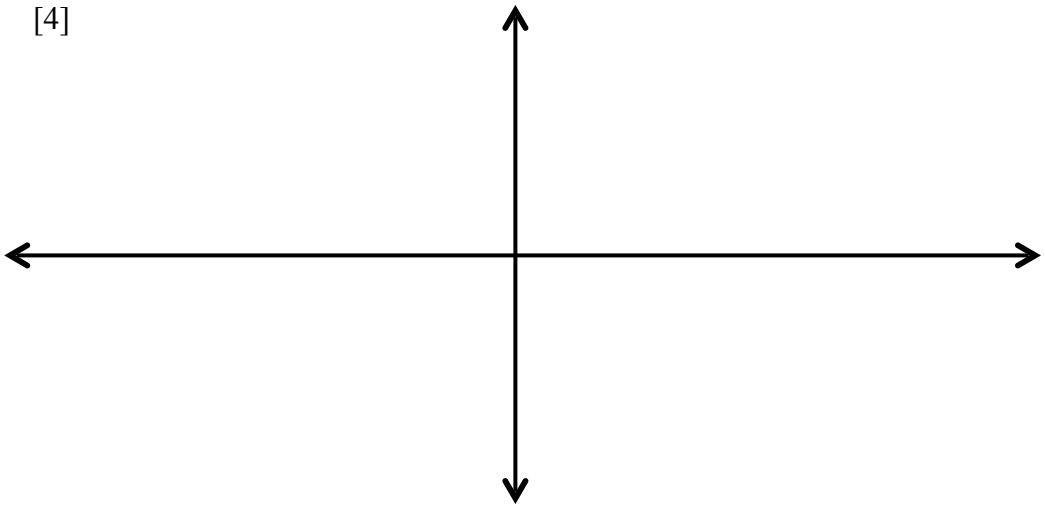
2. Graph $y = 3\cos 2x$, $-180° \le x \le 360°$.

[3]



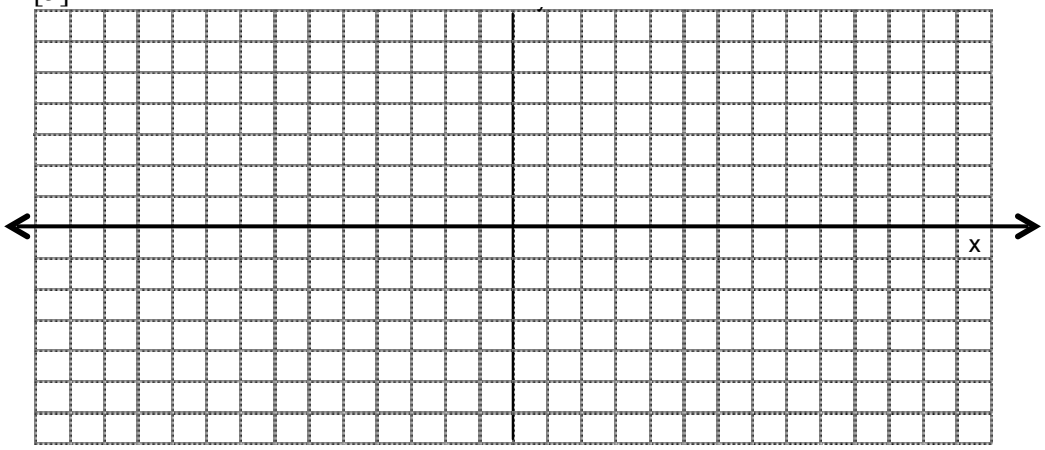
3. Graph $y = -\sin(x + 30°) - 2$, $-180° \le x \le 180°$.

[4]



4. Graph $y = \frac{1}{2}\cos\left(-\frac{x}{3} + 20°\right) + \frac{3}{2}$, $-360° \le x \le 360°$.

[5]



5. Consider the function defined by $y = 3\cos(5\theta - 45°) - 18$.

a) State the amplitude. _____

b) State the equation of the axis of the curve. _____

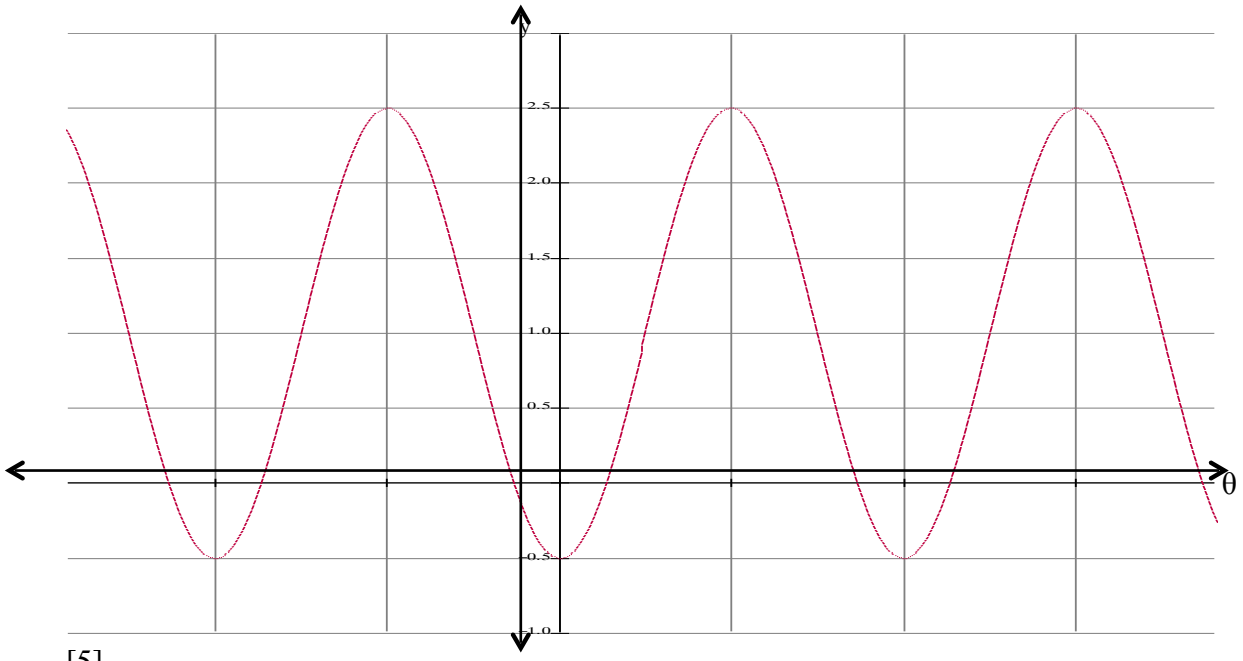
c) State the period. _____

d) State the phase shift. _____

e) State the range. _____

6. a) Determine a cosine equation for the graph below.

b) Determine a sine equation that includes a reflection in the x-axis.



[5]

Solutions : a) _____

b) _____

7. The function $P(t) = 20\sin(360°t) + 100$ models a person's blood pressure while resting, where $P(t)$ represents the blood pressure, in millimetres of mercury, and t is the time, in seconds.
[3, 2, 2]

a) Sketch a graph of this function for $0 \le t \le 3$.
b) Determine the period of the function and describe what the period represents.
c) Determine the person's blood pressure at t = 1.4s. *Round your answer to the nearest tenth.*

a)

b)

c)

8. Heather went to the Super Ex this past summer. While she was in line for the Ferris wheel she had an educational conversation with the Ferris wheel operator. Heather learned that the Ferris wheel had a radius of 11m, it made ***two*** complete revolutions every 48 seconds, and the bottom of the wheel was 1.5m above the ground. When Heather's turn arrived, she got on the Ferris wheel, went around ***twice*** and got kicked off for accidentally dropping her candy apple on the Ferris wheel operator's head.
[3, 3, 2,1,1]

a) Sketch a graph to show how Heather's height above the ground varied with time. Time, t, is in seconds and height, h, is in metres.
b) Determine an equation of the function graphed in part a).
c) Determine the speed of the ferris wheel in metres per second.
d) If it took 90 seconds to complete one revolution, how would the function in b) change?
e) If the radius of the ferris wheel remained the same but the axle of the wheel was one metre lower, how would the function in b) change?
f) Use your equation to determine Heather's height at 15 sec and 36 sec (to one decimal place)

a)