

Mathematics 3201 Unit 8: Sinusoidal Functions: Unit Assignment

Name: _____

Selected Response: Write the UPPERCASE letter of the correct answer in the correct blank on page 7. [20 marks]

1. What is 315° written as a radian measure?

(A) $\frac{7}{8}$

(B) $\frac{7}{4}$

(C) $\frac{7\pi}{4}$

(D) $\frac{9\pi}{4}$

2. What is the value of $\frac{5\pi}{6}$ in degrees?

(A) 120°

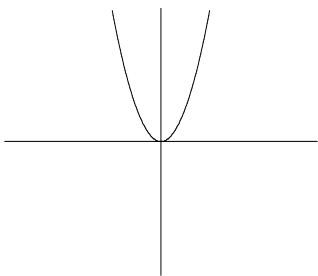
(B) 150°

(C) 210°

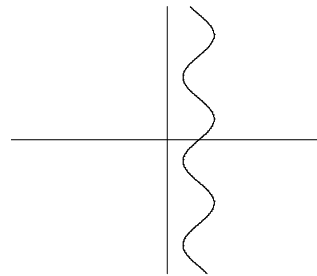
(D) 240°

3. Which graph represents a function that is periodic and sinusoidal?

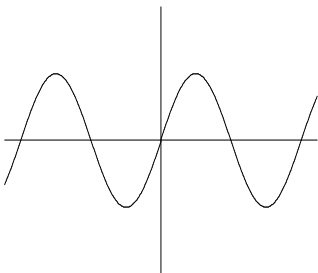
(A)



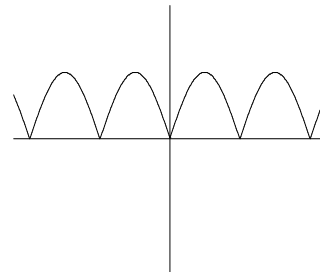
(C)



(B)

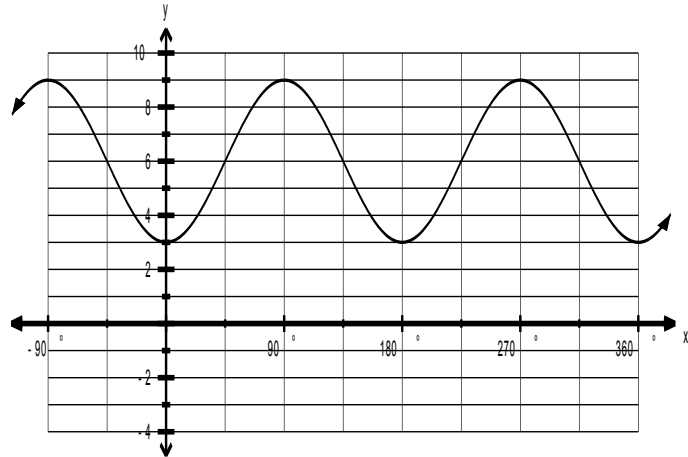


(D)



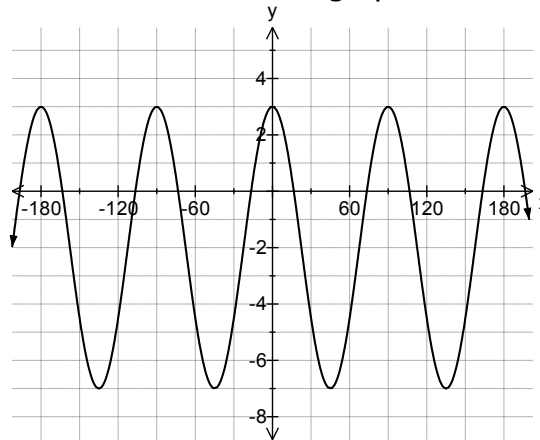
4. Given the graph of the function below, what is the equation of the midline?

- (A) $y = 3$
- (B) $y = 6$
- (C) $x = 3$
- (D) $x = 6$



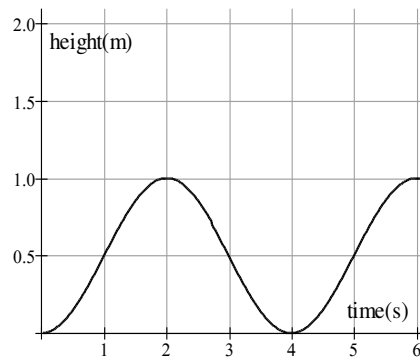
5. What is the equation of the midline of the function graphed below?

- (A) $y = -7$
- (B) $y = -2$
- (C) $y = 2$
- (D) $y = 3$



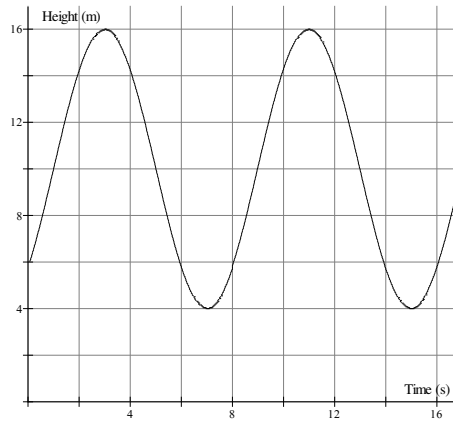
6. The graph below shows the height of a pebble stuck in a tire tread. What is the amplitude of the sinusoidal function that models the rotation of the tire, in metres?

- (A) -0.5
- (B) 0.5
- (C) 1
- (D) 2



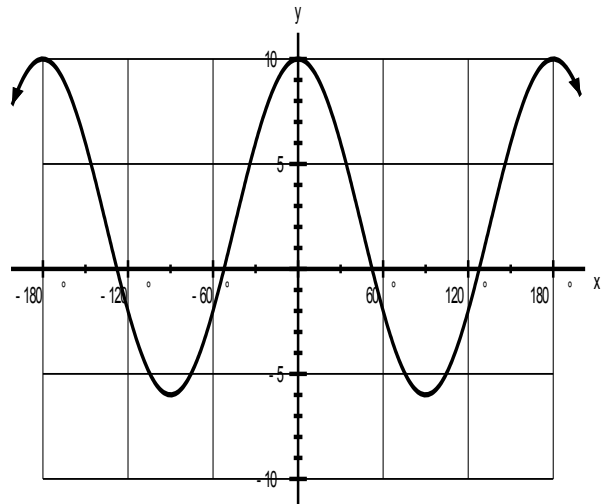
7. The graph below shows Jane's height on a Ferris wheel over a period of time. What is the amplitude of the sinusoidal function that models the Ferris wheel?

- (A) 6
 (B) 10
 (C) 12
 (D) 20



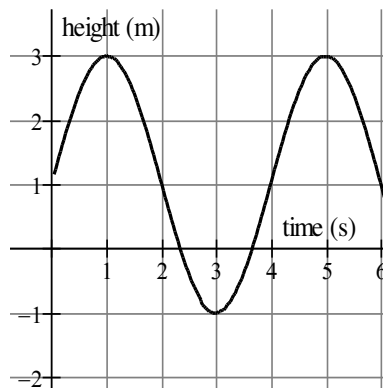
8. What is the range of the graph to the right?

- (A) $\{x \mid -10 \leq x \leq 10, x \in \mathbb{R}\}$
 (B) $\{x \mid -10 < x < 10, x \in \mathbb{R}\}$
 (C) $\{y \mid -6 \leq y \leq 10, y \in \mathbb{R}\}$
 (D) $\{y \mid -6 < y < 10, y \in \mathbb{R}\}$



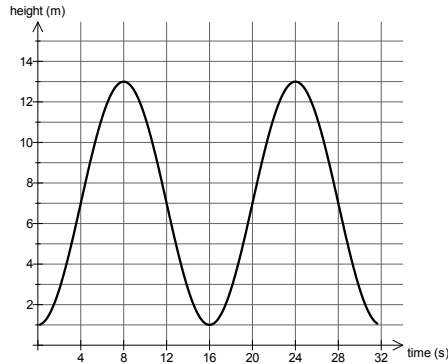
9. What is the period of the graph below?

- (A) 2
 (B) 3
 (C) 4
 (D) 5



10. Reuben is riding on a Ferris wheel. The graph of his height, h , above ground at time, t , is shown. What is the diameter of the Ferris wheel, in metres?

- (A) 6
 (B) 12
 (C) 13
 (D) 16



11. What are the amplitude and maximum value for the function below?

$$f(x) = 2\sin 3(x + 60^\circ) + 1$$

	Amplitude	Maximum Value
(A)	2	3
(B)	2	4
(C)	3	3
(D)	3	4

12. The graph of which function has a period of 180° ?

- (A) $y = 3\cos \frac{1}{2}x - 1$
 (B) $y = 3\cos(x - 180^\circ) - 1$
 (C) $y = 4\cos(x + 180^\circ) + 1$
 (D) $y = 4\cos 2x + 1$

13. What is the domain of the function $y = 4\cos x + 2$?

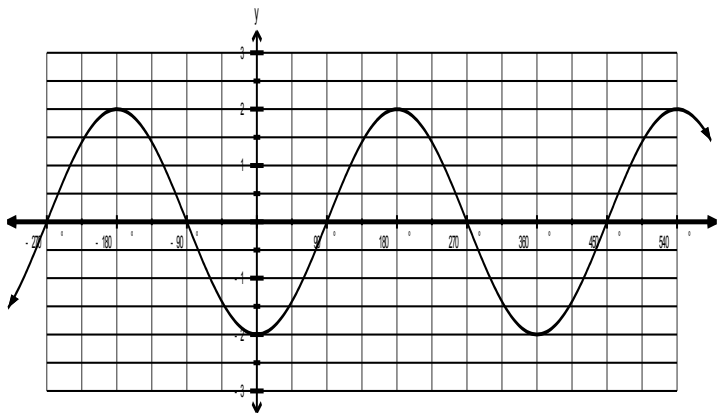
- (A) $\{x \mid -2 \leq x \leq 6, x \in R\}$
 (B) $\{x \in R\}$
 (C) $\{y \mid -2 \leq y \leq 6, y \in R\}$
 (D) $\{y \in R\}$

14. The graph of the function $y = 4 \cos 3x$ has its amplitude doubled and its period halved. Which represents the new function?

- (A) $y = 2 \cos \frac{3}{2}x$
- (B) $y = 2 \cos 6x$
- (C) $y = 8 \cos \frac{3}{2}x$
- (D) $y = 8 \cos 6x$

15. Which equation represents the function graphed below?

- (A) $y = 2 \sin (x - 90^\circ)$
- (B) $y = 2 \sin (x + 90^\circ)$
- (C) $y = \frac{1}{2} \sin (x - 90^\circ)$
- (D) $y = \frac{1}{2} \sin (x + 90^\circ)$



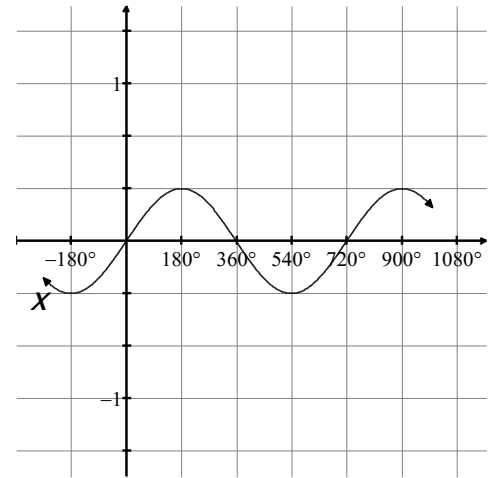
16. Given the table of values below for a sinusoidal function, what is the period of the function?

x	-45°	0°	45°	90°	135°
y	-2	1	-2	-5	-2

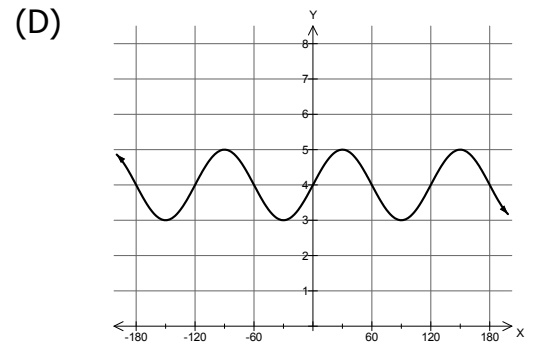
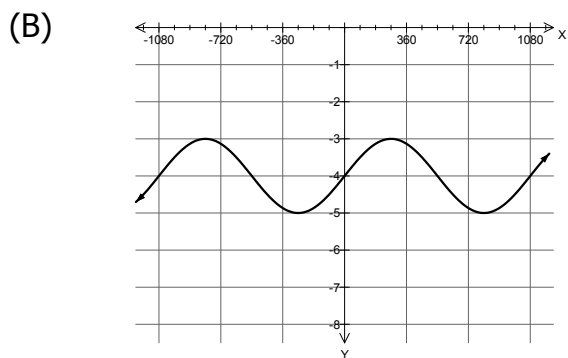
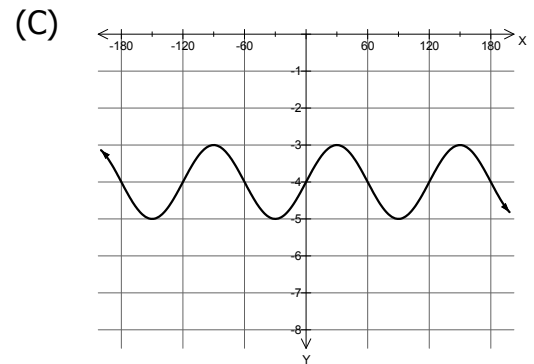
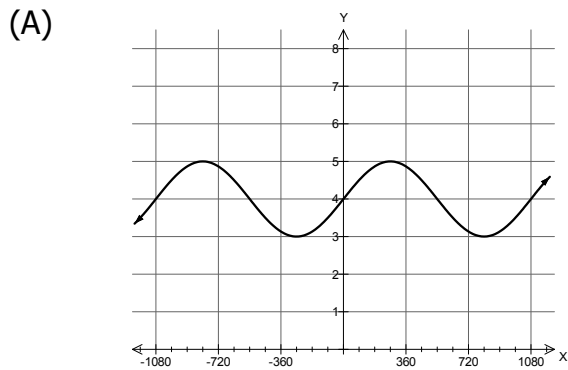
- (A) 45°
- (B) 90°
- (C) 180°
- (D) 360°

17. What is the equation of the sinusoidal function graphed below?

- (A) $y = \frac{1}{3} \sin\left(\frac{1}{2}x\right)$
- (B) $y = \frac{1}{3} \sin(2x)$
- (C) $y = 3 \sin\left(\frac{1}{2}x\right)$
- (D) $y = 3 \sin(2x)$



18. Which graph represents the equation $y = \sin(3x) + 4$?



19. Which equation produces a sinusoidal graph with a period of 180° ?

- (A) $y = 2 \sin x$
- (B) $y = \sin 2x$
- (C) $y = \frac{1}{2} \sin x$
- (D) $y = \sin \frac{1}{2}x$

20. What is the maximum value of the function $y = 4 \sin 2(x + 30^\circ) + 3$?

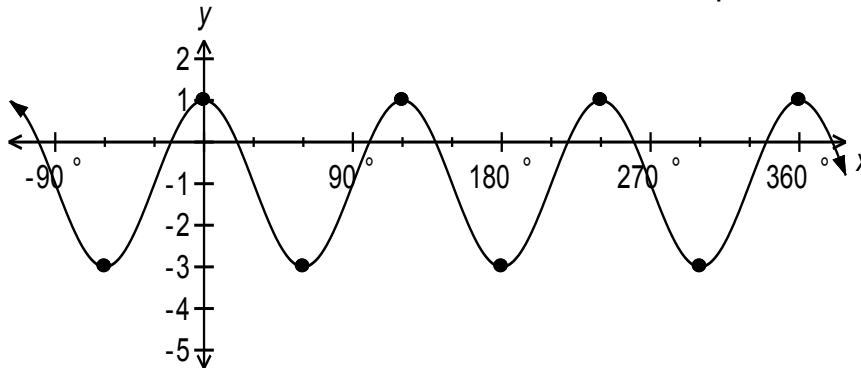
- (A) -7
- (B) -1
- (C) 1
- (D) 7

Selected Response Answer Sheet: (UPPERCASE letters please!!)

- | | | | |
|--------|---------|---------|---------|
| 1. ___ | 6. ___ | 11. ___ | 16. ___ |
| 2. ___ | 7. ___ | 12. ___ | 17. ___ |
| 3. ___ | 8. ___ | 13. ___ | 18. ___ |
| 4. ___ | 9. ___ | 14. ___ | 19. ___ |
| 5. ___ | 10. ___ | 15. ___ | 20. ___ |

Section 2: Constructed Response: Answer all questions and showing all work.

1. Use the sinusoidal function shown below to answer the questions that follow.



(i) Determine the amplitude, period, equation of midline, and the range. [4 marks]

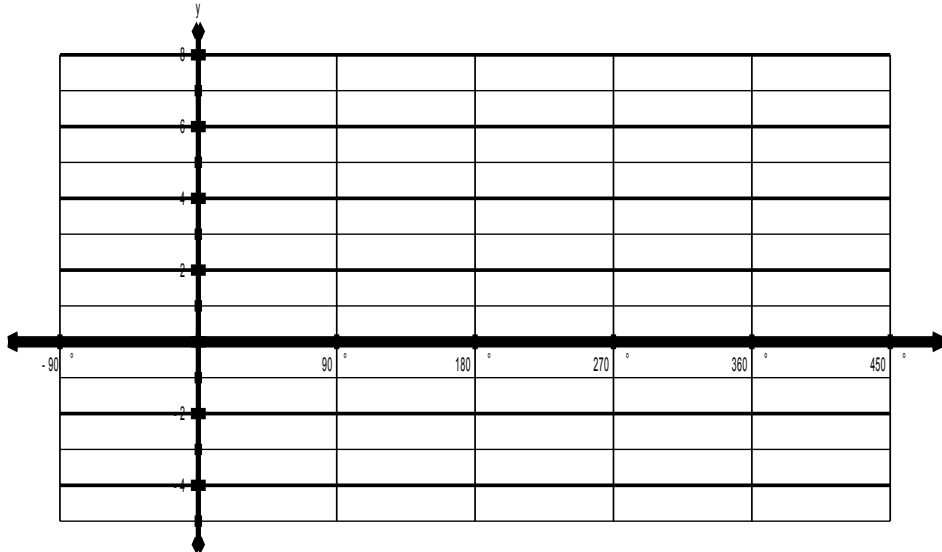
Amplitude = _____ Equation of Midline _____

Period = _____ Range _____

(ii) Use the information from part (i) to determine a function that represents the graph in the form $y = a \cos b(x) + d$. [4 marks]

2. Sketch a possible graph of a sinusoidal function with the following characteristics: [4 marks]

- Domain: $\{x | 0 \leq x \leq 360^\circ, x \in R\}$
- Range: $\{y | -2 \leq y \leq 6, y \in R\}$
- Period: 120°
- y-intercept: 0



3. The graph of a sinusoidal is shown. Describe this graph by determining its range, equation of the midline, its period, and its amplitude. [4 marks]

- Amplitude = _____
- Period = _____
- Equation of Midline _____
- Range _____



4. Describe the graph of the following function by stating the amplitude, equation of its midline, range, and period. $y = 6 \cos 8(x - 1.4) - 4$ [4 marks]

- Amplitude = _____
- Period = _____
- Equation of Midline _____
- Range _____

5. Determine the equation of the SINGLE sinusoidal function with the following characteristics:
[3 marks]

- i. amplitude is triple the amplitude of $y = 2 \sin 6x + 1$.
- ii. period is triple the period of $y = 2 \sin 6x + 1$.
- iii. midline is 5 units below the midline of $y = 2 \sin 6x + 1$.