

Pre-Calculus 40S
Trig Functions Unit Test

Name: _____
Total Mark= ___/47

Multiple Choice: Circle the BEST answer. (1 mark each)

1. A circle has a diameter 10 cm. An arc on the circle is 8 cm long. Which central angle does the arc subtend?

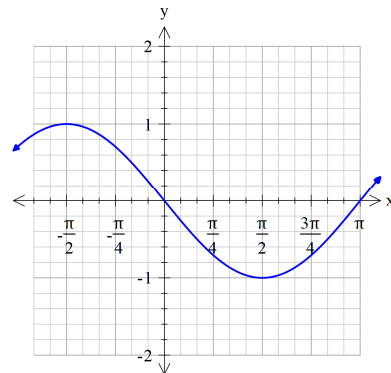
- A) 0.625
- B) 0.8
- C) 1.25
- D) 1.6

2. For which pair of values of θ is $\sin \theta = -\cos \theta$?

- A) $\theta = \frac{\pi}{4}$
- B) $\theta = \frac{3\pi}{4}$
- C) $\theta = \frac{\pi}{2}$
- D) $\theta = 0$

3. What is the period of the given graph?

- A) 2π
- B) π
- C) 4π
- D) $\frac{\pi}{2}$



4. Which function best describes the graph in Question 3?

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

5. Which coordinates represent a maximum point of the function $y = 4 \cos \frac{\pi}{4}(x - 1) + 3$?

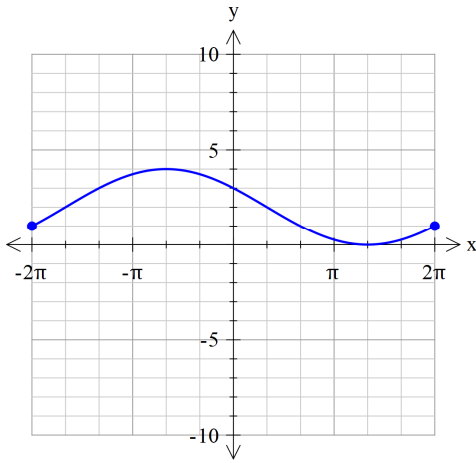
- A) (5,7)
- B) (0,7)
- C) (1,7)

D) None of the above

Short Answers and Long Answer Responses

6. Given the graph below, identify the following characteristics:

(8 marks)



maximum=

minimum=

amplitude=

period=

median=

range=

zeros=

y-intercept=

7. Consider the function $y = -5 \cos\left(\frac{\pi}{2}(x + 3)\right)$. State the following characteristics:

(6 marks)

Amplitude=

Period=

Phase Shift=

Maximum=

Minimum=

Vertical Shift=

8. Write an equation of a sinusoidal function using the following information: amplitude of 10, period of $\frac{\pi}{2}$, phase shift of 2 to the left, and a vertical shift of 4 units up. (4 marks)

9. Graph the function $y = 3 \sin\left(\frac{\pi}{4}(x - 1)\right) + 4$ showing at least 2 cycles

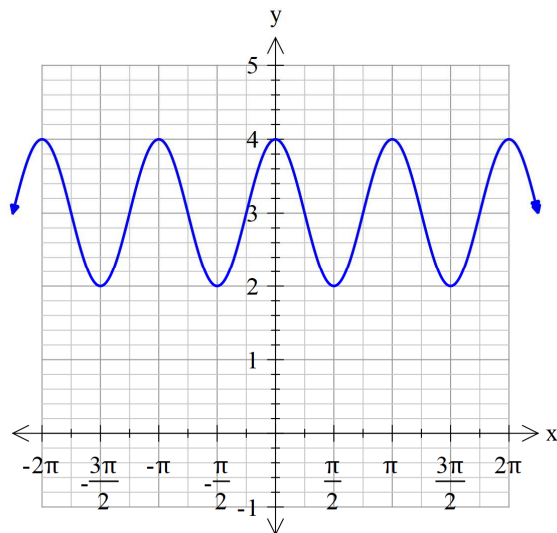
(4 marks)

10. Graph the function $y = -\cos\left(2\left(x - \frac{\pi}{2}\right)\right) + 1$ for $[-2\pi, 2\pi]$

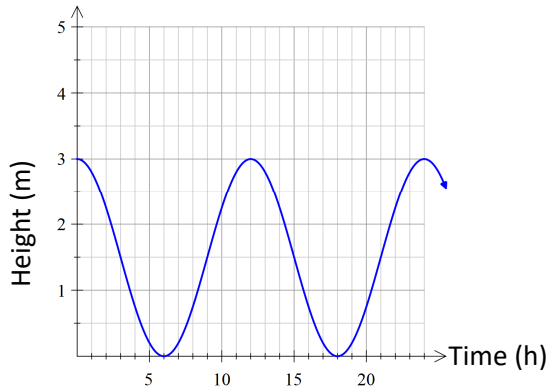
(4 marks)

11. Using the graph below, write the equation as a sine function AND cosine function.

(5 marks)



12. The graph below represents the height (in meters) of the tidal wave above the mean sea level as a function of time (in hours). (4 marks)



- What is the maximum height of the wave?
 - In the first cycle, at what times does the maximum occur?
 - What is the period of the wave?
 - What is the height of the wave 2 hours after high tide?
13. A Ferris wheel of diameter 40 m has its center 21 m above the ground. The wheel rotates once every 30 seconds.
- Draw the graph to show a rider's height above the ground during a 2 minute ride, starting at the lowest position. (5 marks)

- Determine an equation of the graph using the sine function. (2 marks)

BONUS QUESTION: Evaluate $\frac{\cos \theta \sin \theta}{1 + \sin \theta}$ for $\theta = \frac{5\pi}{3}$ (2 marks)