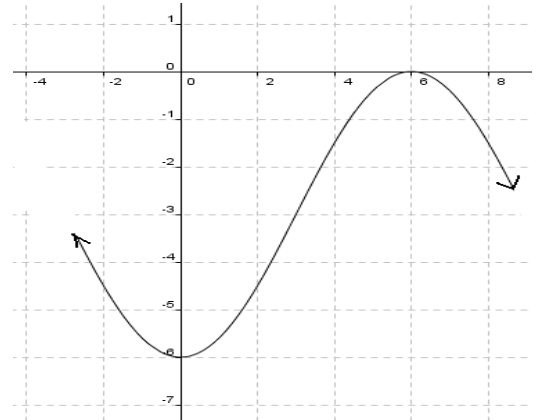


Name \_\_\_\_\_ Date \_\_\_\_\_

**Part A : Multiple choice (choose the best response)**

Use the graph on the right to answer #1 and #2



1. What is the period of the sinusoidal function?

- a) 3                      b) 6                      c)  $6\pi$                       d) 12

2. What is the amplitude of the sinusoidal function?

- a) 0                      b) 3                      c) 6                      d) 12

3. Find the equation of all the zeros of  $f(x) = \tan x$ 

- a)  $x = \frac{\pi}{2} + k\pi, k \in Z$     b)  $x = \frac{\pi}{2} + 2k\pi, k \in Z$     c)  $x = k\pi, k \in Z$     d)  $x = 2k\pi, k \in Z$

4. Which is equivalent to  $\cot^2 x$ ?

- a)  $\frac{1 - \sin^2 x}{\sin^2 x}$                       b)  $\frac{1 - \cos^2 x}{\cos^2 x}$                       c)  $\frac{\sin^2 x}{\cos^2 x}$                       d)  $\sec^2 x + 1$

5. What is the period of the following function:  $y = \sin\left(\frac{2}{3}x\right)$ 

- a)  $\frac{\pi}{3}$                       b)  $2\pi$                       c)  $3\pi$                       d)  $\frac{3\pi}{2}$

6. Which is equivalent to  $2\sin(4x)\cos(4x)$ ?

- a)  $2\cos(4x)$                       b)  $2\sin(4x)$                       c)  $\sin(8x)$                       d)  $\cos(8x)$

7. Find all the non-permissible values of the following expression:  $\frac{\cos x}{\sin x - 3}$ 

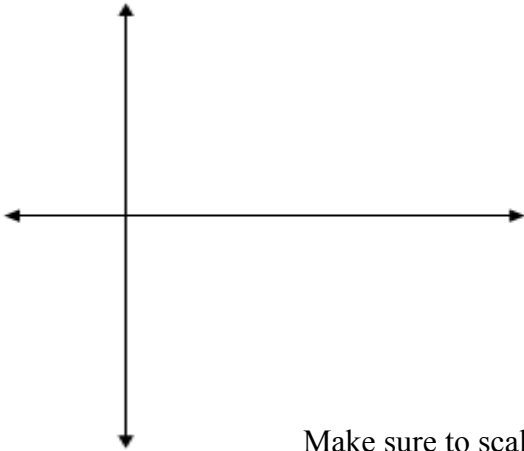
- a)  $x \neq \frac{\pi}{2} + 2\pi k, k \in Z$     b)  $x \neq \frac{3\pi}{2} + 2\pi k, k \in Z$     c)  $x \neq \frac{\pi}{2} + \pi k, k \in Z$     d) no non-permissible values

8. Find the exact value of the following expression:  $\cos^2\left(\frac{\pi}{12}\right) - \sin^2\left(\frac{\pi}{12}\right)$ 

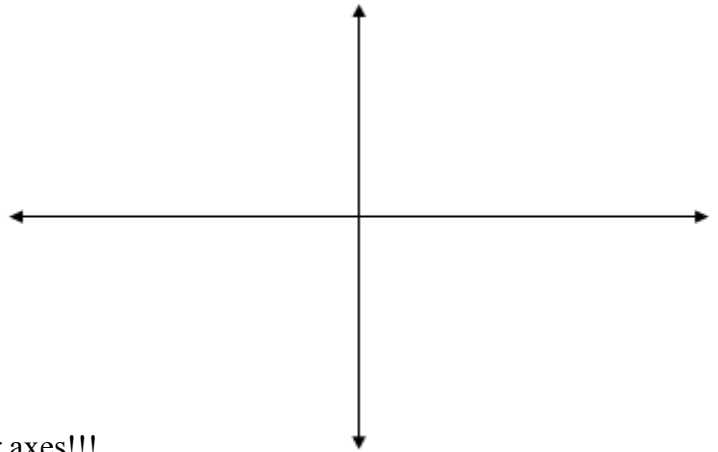
- a)  $\frac{\sqrt{2}}{2}$                       b)  $-\frac{\sqrt{2}}{2}$                       c)  $-\frac{\sqrt{3}}{2}$                       d)  $\frac{\sqrt{3}}{2}$

**Part B : Short Answer (non-calculator)**

1. Sketch the graph of  $y = \cos x + 1$  on the interval  $0 \leq \theta \leq 360^\circ$ .



2. Sketch the graph of  $y = 2 \sin x$  on the interval  $-2\pi \leq \theta \leq 2\pi$ .



Make sure to scale your axes!!!

3. Give the equation of a sinusoidal function with a period of  $6\pi$  and amplitude of 2.

$y =$  \_\_\_\_\_

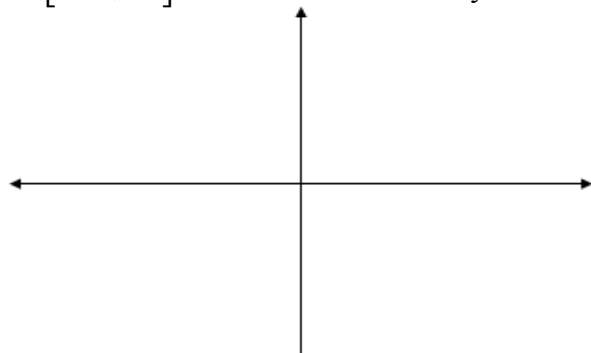
4. If  $\cos^2 \theta = \frac{2}{5}$ , what is the value of  $\sin^2 \theta$ ?

\_\_\_\_\_

5. If  $f(x) = 4 \sin\left(\frac{\pi}{2}(x-1)\right) + 1$ , find the value of  $f(4)$ .

\_\_\_\_\_

6. Sketch the graph of  $y = \tan x$  on the interval  $[-2\pi, 2\pi]$ . Make sure to include your scale.



**Part C : Long answer (NO CALCULATOR)**

1. a) Find all the non-permissible values of the identity on the interval  $[0, 2\pi]$

$$\frac{\sin x + \tan x}{1 + \sec x} = \sin x$$

/2

- b) Prove the following identity:  $\frac{\sin x + \tan x}{1 + \sec x} = \sin x$

/3

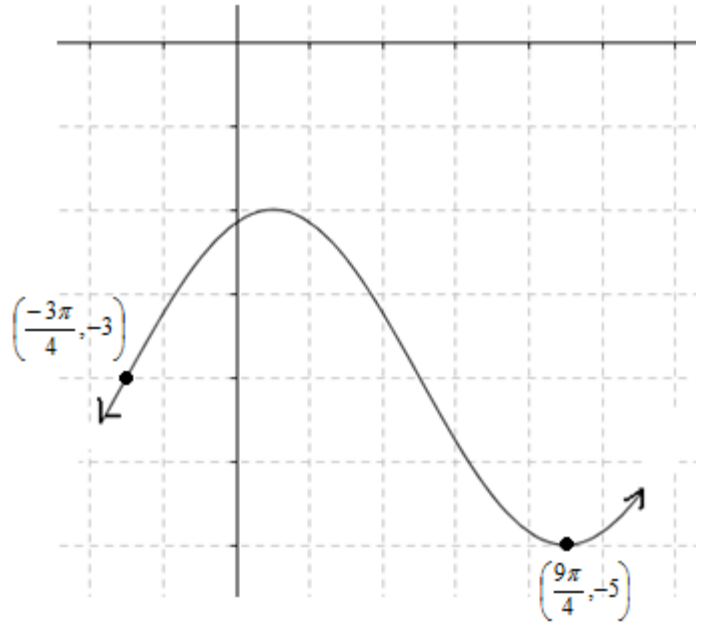
Left-Hand Side	Right-Hand Side

2. Find the exact value of  $\cos \frac{13\pi}{12}$

/3

3. Find the equation of the sinusoidal curve in the form  $y = a \cos(b(x - c)) + d$  :

/4



$a =$  \_\_\_\_\_

$b =$  \_\_\_\_\_

$c =$  \_\_\_\_\_

$d =$  \_\_\_\_\_

4. If  $\cos \alpha = \frac{3}{7}$  and  $\sin \beta = \frac{4}{5}$ , find the exact value of  $\cos(\alpha - \beta)$  if  $\alpha$  and  $\beta$  are not in the first quadrant.

/4

**Part D: Long answer (WITH CALCULATOR)**

Name : \_\_\_\_\_

1. Solve on the interval  $[0, 2\pi]$  :

/4  $2\cos^2 x = 3\sin x$

2. Sketch the graph on the interval  $[-2, 7]$ :  $y = -5\sin\left[\frac{\pi}{3}(x-1)\right] - 3$

/4

