## **Cosine Function Assignment**

1. A class was asked "in which of the following intervals does the basic cosine function increase?" Four different answers were given & shown below. Which answer is correct? (4 pts)

A)  $[0, \pi]$  C)  $[\pi, 2\pi]$ B)  $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$  D)  $\left[\frac{3\pi}{2}, \frac{5\pi}{2}\right]$ 

2. The following statements were made regarding the function  $f(x) = 2\cos\left(x + \frac{\pi}{3}\right) - 1$ . Which statement is correct? (Tip: Graph it!) (4 pts)

- A) It increases on  $\left[\frac{\pi}{6}, \frac{2\pi}{3}\right]$  and decreases on  $\left[\frac{2\pi}{3}, \frac{7\pi}{6}\right]$
- B) It decreases on  $\left[\frac{\pi}{6}, \frac{2\pi}{3}\right]$  and increases on  $\left[\frac{2\pi}{3}, \frac{7\pi}{6}\right]$
- C) It increases on  $\left[\frac{-\pi}{3}, \frac{\pi}{6}\right]$  and decreases on  $\left[\frac{5\pi}{3}, 2\pi\right]$
- D) It decreases on  $\left[\frac{-\pi}{3}, \frac{\pi}{6}\right]$  and increases on  $\left[\frac{5\pi}{3}, 2\pi\right]$
- 3. Which one of the following rules defines the function represented by the graph below?

(4 pts)



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

4. The piston in the motor of a lawn mower moves within a cylinder. The following graph represents the height of the piston, in centimetres, as a function of time in seconds.



Which expression should be used to determine the height of the piston in the cylinder?

(4 pts)

A) 
$$f(x) = 3\sin\left(\frac{3}{40}x\right) + 3$$
  
B)  $f(x) = 3\sin\left(\frac{80\pi}{3}\left(x - \frac{3}{80}\right)\right) + 3$   
C)  $f(x) = 3\cos\left(\frac{3}{40}x\right) + 3$   
D)  $f(x) = -3\cos\left(\frac{80\pi}{3}\left(x - \frac{9}{160}\right)\right) + 3$ 

5. Given the cosine function below, if the *h* parameter is  $\frac{\pi}{4}$ , state the rule of the function.

(4 pts)



6. Determine the zeros of the following function:

$$f(x) = 3\cos\left(2\left(x + \frac{\pi}{4}\right)\right) - 3$$

7. Given  $f(x) = -0.5 \cos\left(\frac{\pi}{2}(x+2)\right) + 1$ , determine when the  $f(x) \ge 1$  over  $x \in [0,5]$