## 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?
A) $[0, \pi]$
B) $\left[\frac{\pi}{2}, \frac{3 \pi}{2}\right]$
C) $[\pi, 2 \pi]$
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!)
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) $y=2 \sin \frac{1}{2}(x-2 \pi)$
B) $y=2 \sin \frac{-1}{2} x$
C) $y=2 \cos \frac{1}{2}(x-\pi)$
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?
A) $f(x)=3 \sin \left(\frac{3}{40} x\right)+3$
B) $\quad f(x)=3 \sin \left(\frac{80 \pi}{3}\left(x-\frac{3}{80}\right)\right)+3$
C) $f(x)=3 \cos \left(\frac{3}{40} x\right)+3$
D) $\quad f(x)=-3 \cos \left(\frac{80 \pi}{3}\left(x-\frac{9}{160}\right)\right)+3$
5. Given the cosine function below, if the $h$ parameter is $\frac{\pi}{4}$, state the rule of the function.

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 $f(x) \geq 1$ over $x \in[0,5]$
