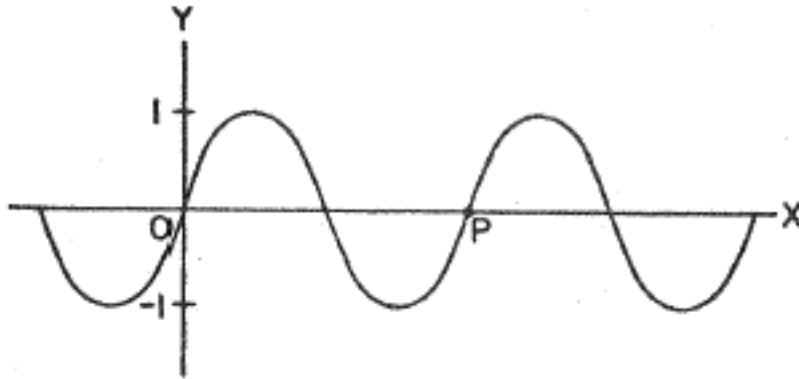


1. On the graph of $y = -\sin x$, as x increases on $x \in \left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$, the function y

- (a) decreases (b) is constant (c) increases
(d) decreases, then increases (e) increases, then decreases

2. This is the graph of $y = \sin(3x)$.



What is the x -value of P?

- A. $\frac{\pi}{3}$ B. $\frac{2\pi}{3}$ C. 2π D. 3π E. 6π

3. Given $g(x) = 1 - 4\sin\left[\frac{\pi}{2}(x+3)\right]$, which of the following statements is true?

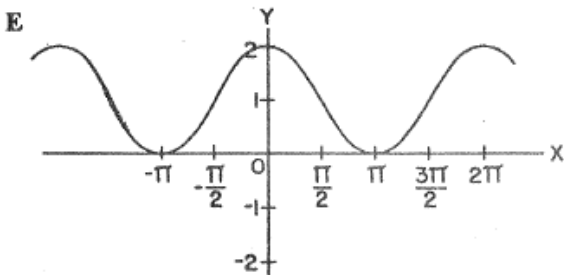
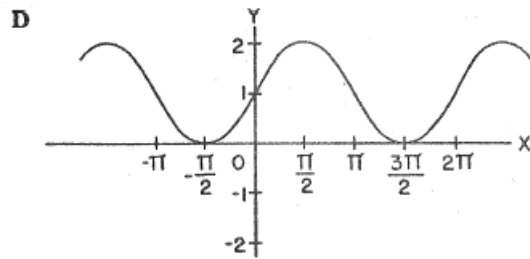
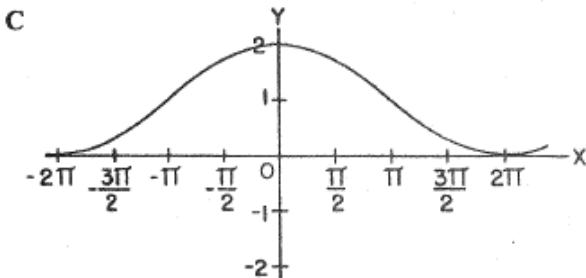
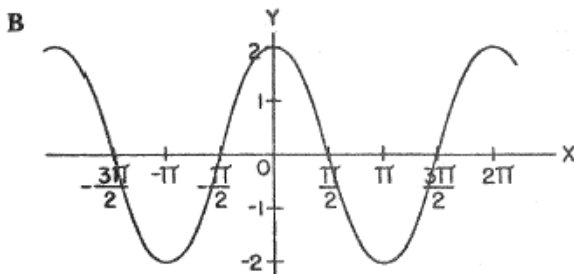
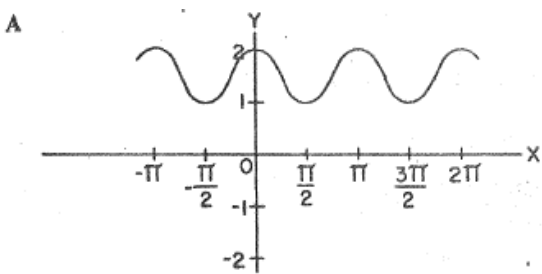
- I. The vertical shift of $g(x)$ is -4 .
II. The period of $g(x)$ is $\frac{\pi}{4}$.
III. The phase shift is -3 .

- (a) I only (b) II only (c) III only
(d) II and III only (e) I, II and III

4. What is the smallest positive value where $y = 3 - 2\cos\left[\frac{\pi}{8}(x-3)\right]$ has a point on the sinusoidal axis?

- (a) 1 (b) 3 (c) 5 (d) 5 (e) 7

5. Which of the following is the graph of $y = \frac{3}{2} + \frac{1}{2}\cos 2x$?



PreCalc '14-15
Chapter 9 Test--FR
Calculator required

Name _____

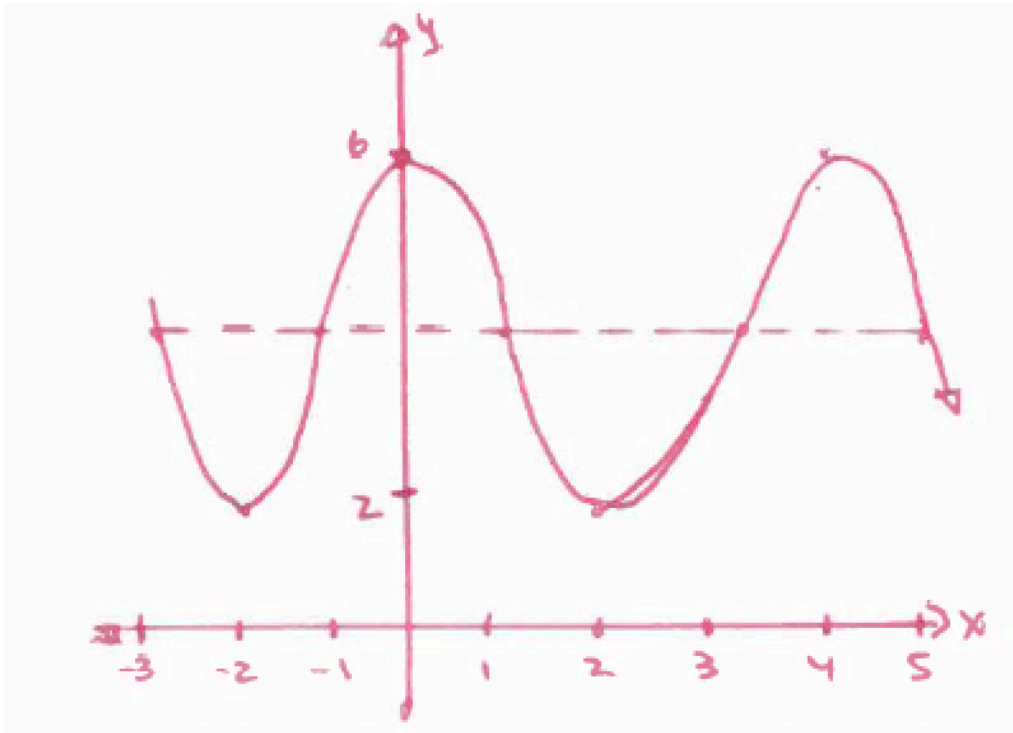
Score _____

Round all answers to 3 decimals

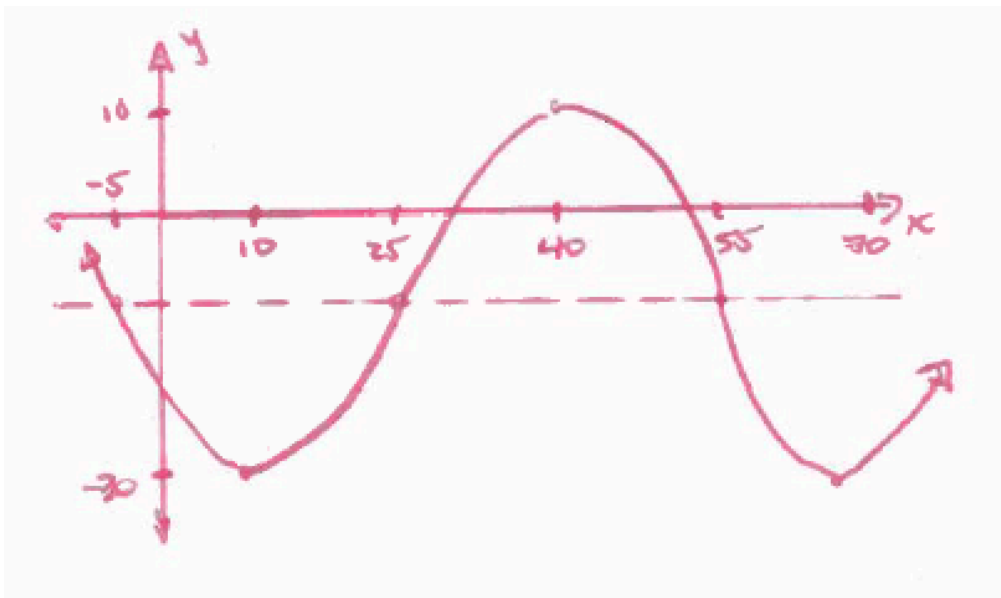
7. Sketch one cycle of $H(x) = -1 + 4 \sin\left[\frac{\pi}{3}(x+3)\right]$

8. Sketch one cycle of $H(x) = 4 - 3 \cos\left[\frac{\pi}{6}(x-1)\right]$

9. Find a cosine equation for this graph:



10. Find a sine equation for this graph:



11. If $H(x) = -1 + 4 \cos\left[\frac{\pi}{3}(x-2)\right]$, find the first three negative values of x where $H(x) = 1.3$.

12. While driving on HWY 280 from San Francisco to San Jose during rush hour, a driver notices that the speed of traffic seems to vary sinusoidally with the distance from San Francisco. There are bottle-necks at HWY 380, HWY 92, Stanford University and Cupertino where the speed of the traffic drops to 5 mph. Half way between each pair of sites, the speed gets up to 75 mph. The distance between each of these bottle-necks is 6 miles and HWY 380 is 3.5 miles south of San Francisco.

- a. Sketch one cycle of the situation.
- b. Find an equation that represents s in terms of d .
- c. What is the speed of the traffic 7.2 miles south of San Francisco?
- d. Between HWY 92 and Stanford, at what two distances from San Francisco is the speed of traffic 60 mph?