

PreCalc '14-15
Chapter 9 Test--MC
Calculator NOT Allowed

Name Southern Key

Score _____

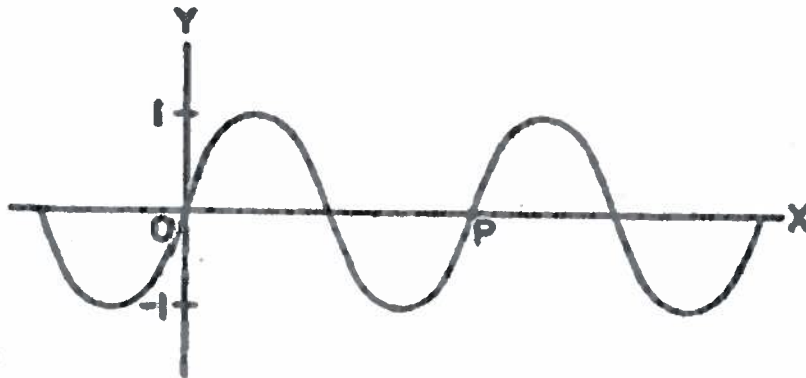
Form B

1. On the graph of $y = -\cos x$, 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 $y = \sin(2x)$.



What is the x -value of P?

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

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

~~I.~~ The vertical shift of $g(x)$ is -4 .

II. The period of $g(x)$ is 4 .

~~III.~~ The phase shift is -3 .

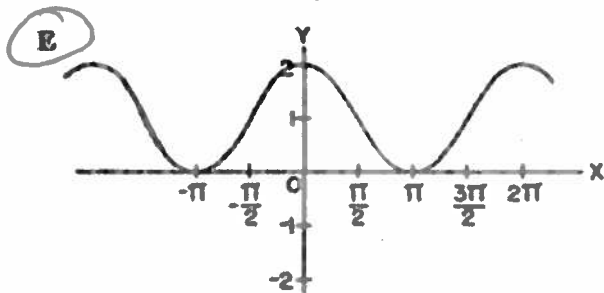
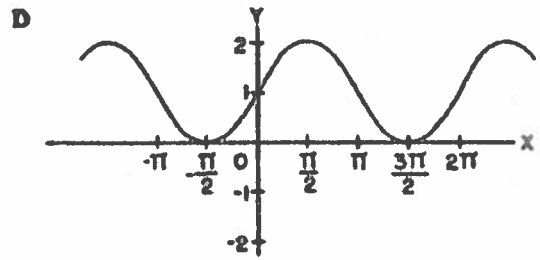
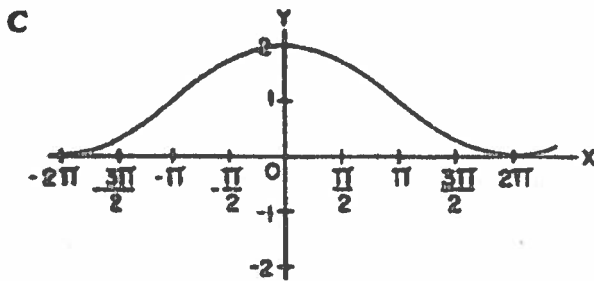
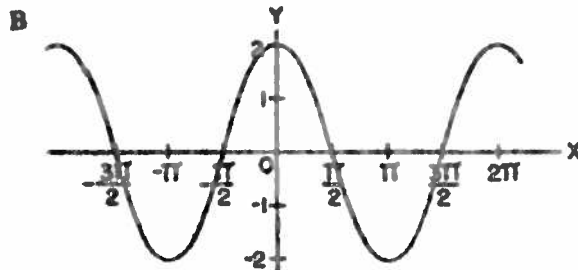
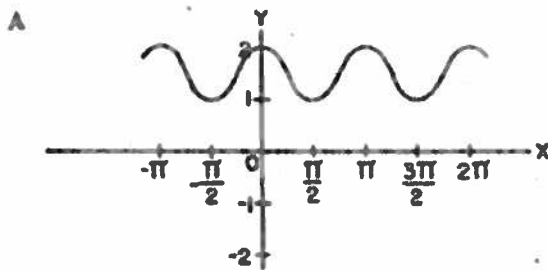
(a) I only (b) II only (c) III only

(d) I and II only (e) I, II and III

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

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

5. Which of the following is the graph of $y = \cos x + 1$?



PreCalc '14-15

Chapter 9 Test--

Calculator required

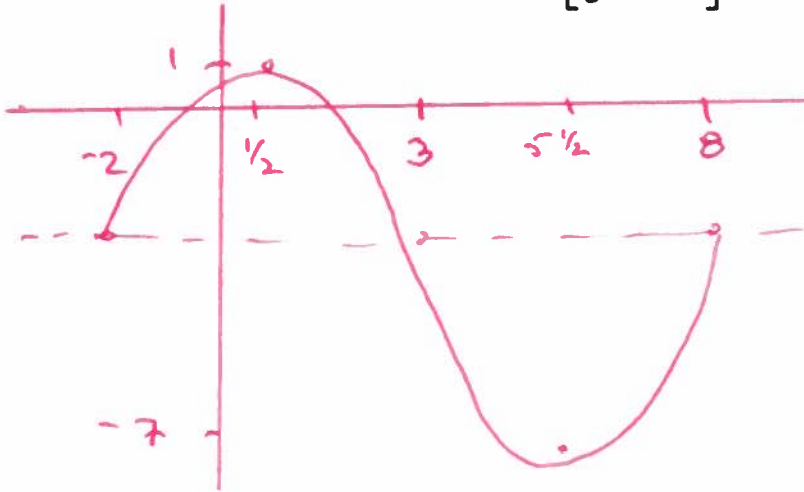
Round all answers to 3 decimals

Name SOLUTION KEY

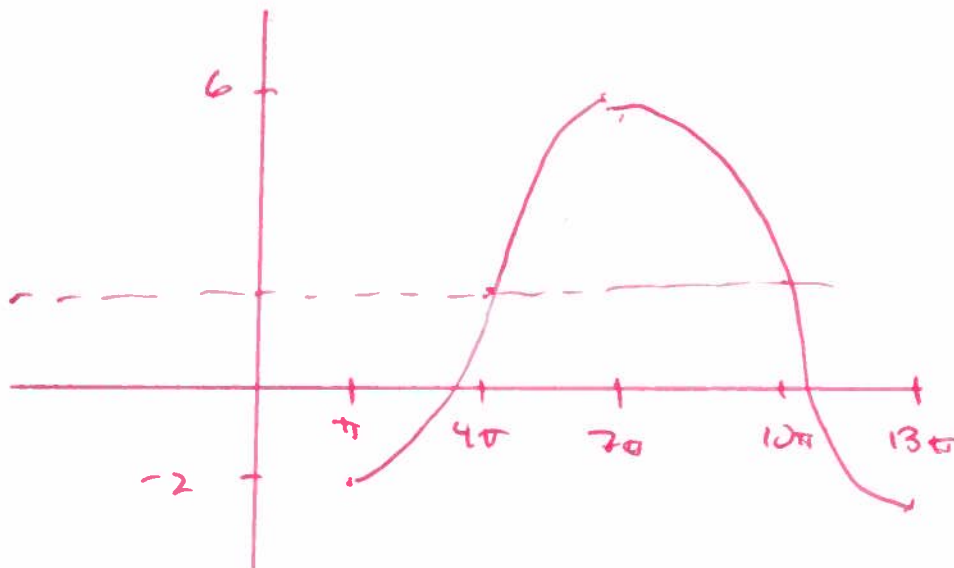
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Part B

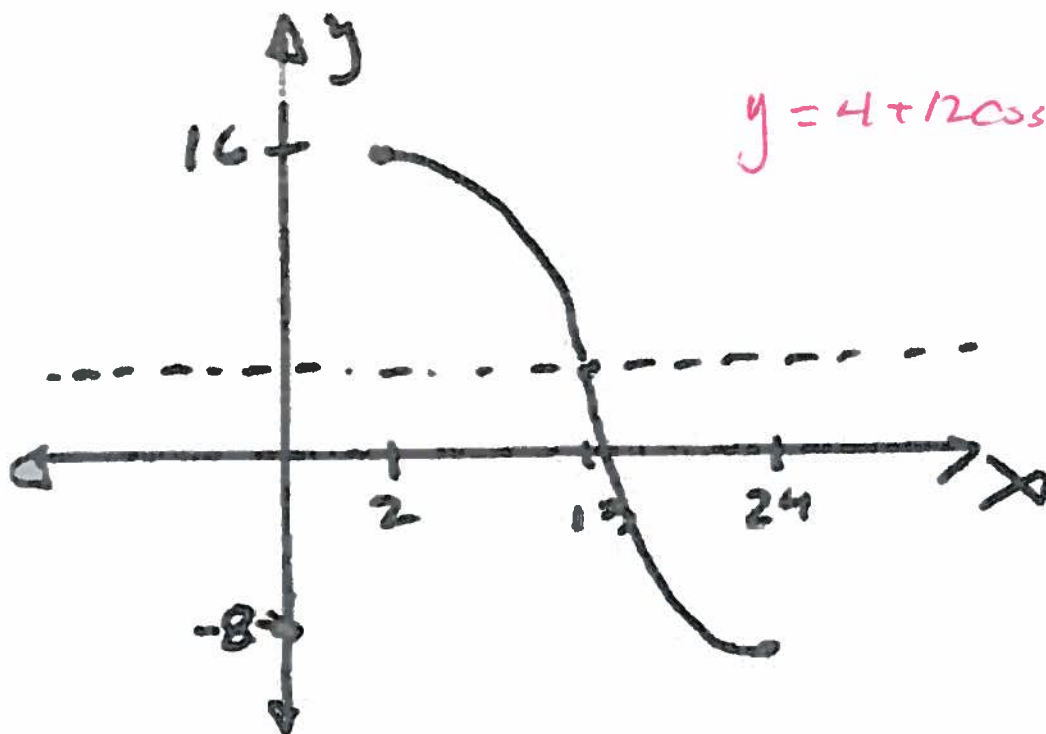
7. Sketch one cycle of $H(x) = -3 + 4 \sin\left[\frac{\pi}{5}(x+2)\right]$



8. Sketch one cycle of $H(x) = 2 - 4 \cos\left[\frac{1}{6}(x - \pi)\right]$

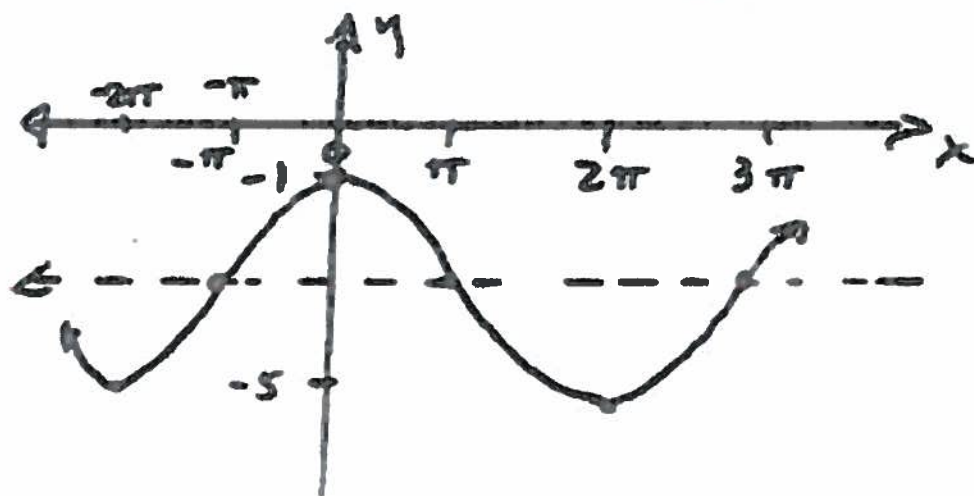


9. Find a cosine equation for this graph:



$$y = 4 + 12 \cos \frac{\pi}{22} (x - 2)$$

10. Find a sine equation for this graph:



$$y = -3 + 25 \sin \left[\frac{1}{2} (x + \pi) \right]$$

11. If $H(x) = -3 + 3\cos\left[\frac{\pi}{7}(x+1)\right]$, find the first three negative values of x where $H(x) = -1.3$.

$$-1.3 = -3 + 3\cos\frac{\pi}{7}(x+1)$$

$$2.7 = 3\cos\frac{\pi}{7}(x+1)$$

$$.967 = \cos\frac{\pi}{7}(x+1)$$

$$\left. \begin{array}{l} .968 \pm 2\pi n \\ -.968 \pm 2\pi n \end{array} \right\} = \frac{\pi}{7}(x+1)$$

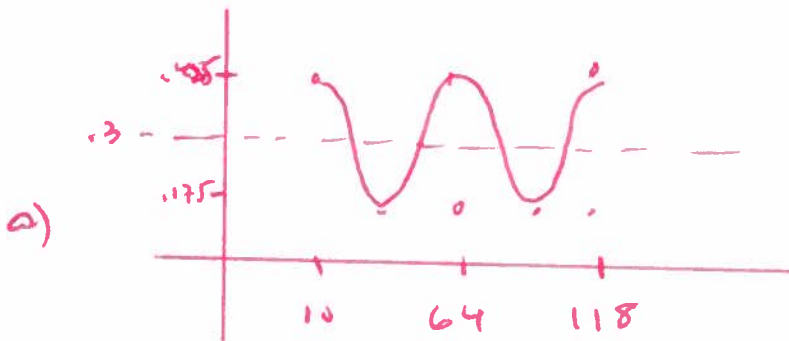
$$\left. \begin{array}{l} 2.158 \pm 14\pi n \\ -2.158 \pm 14\pi n \end{array} \right\} = x+1$$

$$\left. \begin{array}{l} 1.158 \pm 14\pi n \\ -3.158 \pm 14\pi n \end{array} \right\} = x$$

$$x = -3.158, -12.842, -17.158.$$

12. A baseball player who bats .300 over a season has streaks and slumps and rarely bats exactly .300 at a particular time. Let us assume that a player's batting average varies sinusoidally with time and ranges from a high of .425 to a low of .175. Let us further assume that each cycle lasts 54 games and he reaches his first high 10 games into the season.

- Sketch two cycles of the situation.
- Find an equation that represents B (batting average) in terms of time t .
- According to this model, what would be his batting average in the last game of the season (game 162)?
- When are the first three times that his batting average is .375?



b) $B = .3 + .125 \cos \frac{\pi}{27} (t - 10)$ ~~$.350$~~

c) .350

d) $.375 = .3 + .125 \cos \frac{\pi}{27} (t - 10)$

$\frac{.075}{.125} = \cos \frac{\pi}{27} (t - 10)$

$.6 = \cos \frac{\pi}{27} (t - 10)$

$\left. \begin{array}{l} .927 \pm 2\pi n \\ -.927 \pm 2\pi n \end{array} \right\} = \frac{\pi}{27} (t - 10)$

$\left. \begin{array}{l} 7.970 \pm 54n \\ -7.970 \pm 54n \end{array} \right\} = t - 10$

$t = \begin{cases} 17.970 \pm 54n \\ 2.030 \pm 54n \end{cases}$

$t = \text{GAME } 2, \text{ GAME } 18 \neq \text{GAME } 56.$