

10. [15 points] For each of the questions below, circle **all** correct answers. You do not need to show your work for this problem. Make sure your answers are clear.

a. [3 points] The function  $f(x) = \sin(x - \frac{\pi}{2})$  is

equal to  $\cos(x)$       an even function      an odd function  
 neither even nor odd      none of the above

b. [3 points] Suppose  $\theta$  is an angle between 0 and 90 degrees. If  $v = \sin(\theta)$ , then  $\cos(180^\circ + \theta)$  is equal to

$v$        $-v$        $\sqrt{1 - v^2}$        $-\sqrt{1 - v^2}$       none of the above

c. [3 points] Suppose a function  $A(x)$  has a vertical asymptote of  $x = 5$ . The function  $B(x) = 3A(3x - 6) + 1$  has a vertical asymptote of

$x = -1/3$        $x = 13/3$        $x = 15$        $x = 23/3$       none of the above

d. [3 points] When an ant is given chemical Y, it grows to any given mass in half the time it takes for a regular ant to reach that mass. If  $A(t)$  is the mass of a regular ant  $t$  weeks after it's born, and  $B(t)$  is the mass of an ant given chemical Y,  $t$  weeks after it's born, which of the following equalities are true?

$A(t) = 2B(t)$        $2A(t) = B(t)$        $A(t) = B(2t)$   
 $A(2t) = B(t)$       none of the above

e. [3 points] Let  $A > 1$  be a positive number. For which of the following intervals is the function  $C(t) = A \cos(t + 1)$  concave down for the entire interval?

$[-1, 0]$        $[0, 1]$        $[\frac{3\pi}{2} - 1, \frac{5\pi}{2} - 1]$        $[\frac{3\pi}{2} + 1, \frac{5\pi}{2} + 1]$       none of the above