

This exam is closed book. No graphing calculators are allowed. No bathroom breaks are permitted while taking the exam. No cell phones are permitted. There are 15 questions, each is weighted equally. Good luck!

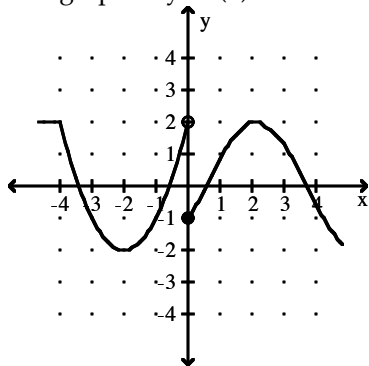
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Find the limit if it exists:  $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$  1) \_\_\_\_\_  
 A) 16                                      B) 8                                      C) -8                                      D) -24

- 2) The cost of manufacturing a particular videotape is  $C(x) = 9000 + 9x$ , where  $x$  is the number of tapes produced. The average cost per tape, denoted by  $\bar{C}(x)$ , is found by dividing  $C(x)$  by  $x$ . Find  $\lim_{x \rightarrow 9000} \bar{C}(x)$ . 2) \_\_\_\_\_  
 A) 6                                      B) 10                                      C) 14                                      D) Does not exist

- 3) If the limit at infinity exists, find the limit (ie. the horizontal asymptote): 3) \_\_\_\_\_  
 $\lim_{x \rightarrow \infty} \frac{5x^2 + 7x - 9}{-6x^2 + 2}$   
 A)  $\infty$                                       B)  $-\frac{2}{9}$                                       C) 0                                      D)  $-\frac{5}{6}$

- 4) The graph of  $y = f(x)$  is shown. Is  $f$  continuous at  $x = -3$ ? 4) \_\_\_\_\_



- A) No                                      B) Yes
- 5) Suppose that the value  $V$  of a certain product decreases, or depreciates, with time  $t$ , in months, where 5) \_\_\_\_\_  
 where

$$V(t) = 100 - \frac{60t^2}{(t+2)^2}$$

Find  $\lim_{t \rightarrow \infty} V(t)$ .

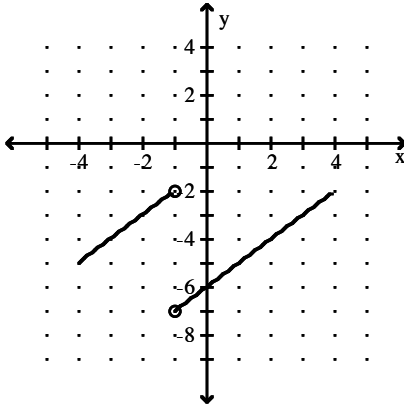
- A) 60                                      B) 40                                      C) 70                                      D) 100

6) Choose the graph of a function that satisfies the given conditions:

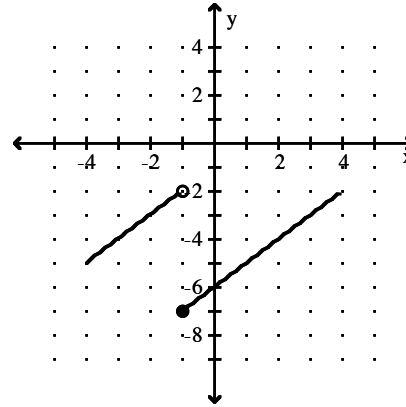
6) \_\_\_\_\_

$$f(-1) = -7; \quad \lim_{x \rightarrow (-1)^-} f(x) = -2; \quad \lim_{x \rightarrow (-1)^+} f(x) = -7$$

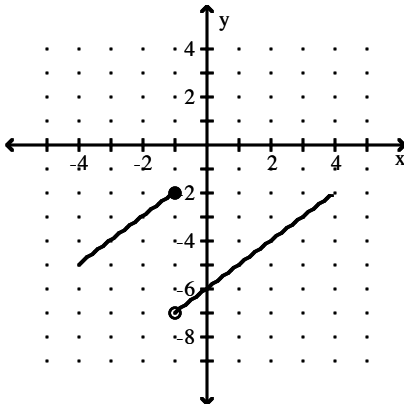
A)



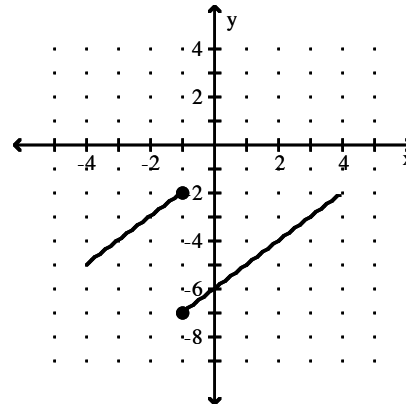
B)



C)



D)



7) Find the average rate of change for  $f(x) = \sqrt{2x}$  if  $x$  changes from 2 to 8.

7) \_\_\_\_\_

A)  $-\frac{3}{10}$

B)  $\frac{1}{3}$

C) 7

D) 2

8) Find the instantaneous rate of change for the function  $x^2 + 3x$  at  $x = 7$ .

8) \_\_\_\_\_

A) 17

B) 70

C) 10

D) 14

9) Find the values of  $x$  where the tangent line is horizontal for  $f(x) = 3x^3 - 2x^2 - 9$ .

9) \_\_\_\_\_

A)  $x = 0, x = \frac{4}{9}$

B)  $x = 0, x = -\frac{4}{9}$

C)  $x = 0, x = -\frac{2}{3}$

D)  $x = 0, x = \frac{2}{3}$

10) Find  $f'(x)$  if  $f(x) = 3x^4 + 6x^7$ .

10) \_\_\_\_\_

A)  $12x^3 + 42x^6$

B)  $3x^5 + 7x^8$

C)  $4x^3 + 7x^6$

D)  $7x^3 + 13x^6$

11) Find  $dy$  if  $y = 9x^2 - 8x + 9$

11) \_\_\_\_\_

A)  $18x \, dx$

B)  $(18x - 8) \, dx$

C)  $18x + 9 \, dx$

D)  $18x - 16 \, dx$

- 12) Suppose that the total profit in hundreds of dollars from selling  $x$  items is given by  $P(x) = 4x^2 - 5x + 10$ . Find the marginal profit at  $x = 5$ . 12) \_\_\_\_\_  
A) \$32                      B) \$15                      C) \$35                      D) \$45
- 13) Let  $C(x)$  be the cost function and  $R(x)$  the revenue function. Compute the marginal cost, marginal revenue, and the marginal profit functions. 13) \_\_\_\_\_  
 $C(x) = 0.0001x^3 - 0.06x^2 + 300x + 10,000$   
 $R(x) = 350x$   
A)  $C'(x) = 0.0003x^2 + 0.12x + 300$   
 $R'(x) = 350$   
 $P'(x) = 0.0003x^2 + 0.12x + 50$   
B)  $C'(x) = 0.0003x^2 - 0.12x + 300$   
 $R'(x) = 350$   
 $P'(x) = 0.0003x^2 - 0.12x - 50$   
C)  $C'(x) = 0.0003x^2 - 0.12x + 300$   
 $R'(x) = 350$   
 $P'(x) = -0.0003x^2 + 0.12x + 50$
- 14) The total profit from selling  $x$  units of doorknobs is  $P(x) = (6x - 7)(9x - 8)$ . Find the marginal average profit function. 14) \_\_\_\_\_  
A)  $\bar{P}(x) = 54x - 56$                       B)  $\bar{P}(x) = 54 - \frac{56}{x^2}$   
C)  $\bar{P}(x) = 54x - 111$                       D)  $\bar{P}(x) = 54 - \frac{111}{x^2}$
- 15) A company is planning to manufacture a new blender. After conducting extensive market surveys, the research department estimates a weekly demand of 600 blenders at a price of \$50 per blender and a weekly demand of 800 blenders at a price of \$40 per blender. Assuming the demand equation is linear, use the research department's estimates to find the revenue equation in terms of the demand  $x$ . 15) \_\_\_\_\_  
A)  $R(x) = 80x - \frac{x^2}{20}$                       B)  $R(x) = 80x - 20$   
C)  $R(x) = 80x - 20x^2$                       D)  $R(x) = 20x + \frac{x^2}{20}$

Answer Key

Testname: ECON3410\_FINAL

- 1) C
- 2) B
- 3) D
- 4) B
- 5) B
- 6) B
- 7) B
- 8) A
- 9) A
- 10) A
- 11) B
- 12) C
- 13) C
- 14) B
- 15) A