

Unit 1 Review

Describe the end behavior of the function.

1) $f(x) = 5x^4 + 5x + 11$

- A) $\lim_{x \rightarrow \infty} f(x) = \infty$; $\lim_{x \rightarrow -\infty} f(x) = -\infty$
B) $\lim_{x \rightarrow \infty} f(x) = -\infty$; $\lim_{x \rightarrow -\infty} f(x) = -\infty$
C) $\lim_{x \rightarrow \infty} f(x) = \infty$; $\lim_{x \rightarrow -\infty} f(x) = \infty$
D) $\lim_{x \rightarrow \infty} f(x) = -\infty$; $\lim_{x \rightarrow -\infty} f(x) = \infty$

Find dy.

2) $y = 4x^2 + 9x - 3$

- A) $8x - 3 \, dx$
B) $8x + 18 \, dx$
C) $8x \, dx$
D) $(8x + 9) \, dx$

Find average rate of change for the function over the given interval.

3) $y = x^2 + 9x$ between $x = 3$ and $x = 6$

- A) 9
B) 18
C) 15
D) 30

Find the equation of the tangent line to the curve when x has the given value.

4) Find the equation of the tangent line to the graph of the function at the given value of x.

$f(x) = x^2 + 5x$ at $x = 4$

- A) $y = 13x - 16$
B) $y = \frac{1}{20}x + \frac{1}{5}$
C) $y = -\frac{4}{25}x + \frac{8}{5}$
D) $y = -39x - 80$

Find the instantaneous rate of change for the function at the value given.

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

- A) -16
B) -1
C) 8
D) -9

Find the limit, if it exists.

6) Find: $\lim_{x \rightarrow -1} \frac{6x + 5}{5x - 6}$

A) $-\frac{1}{11}$

B) $\frac{1}{11}$

C) -11

D) 1

7) Find: $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$

A) 16

B) -8

C) -24

D) 8

8) Evaluate the following limit

$$\lim_{x \rightarrow 2^-} \frac{1}{x - 2}$$

A) $-\infty$

B) 2

C) ∞

D) Does not exist

Find the limit.

9) Determine the limit.

$$\lim_{x \rightarrow 5^+} f(x), \text{ where } f(x) = \frac{x^2}{(x - 5)^3}$$

A) -2

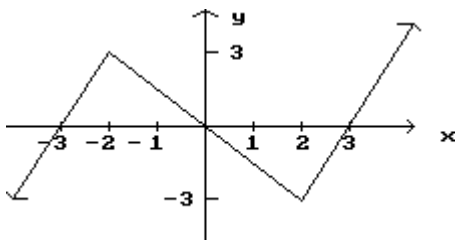
B) 5

C) $-\infty$

D) ∞

List the x-values in the graph at which the function is not differentiable.

10)



A) $x = -2, x = 2$

B) $x = -2, x = 0, x = 2$

C) $x = -3, x = 0, x = 3$

D) $x = -3, x = 3$

Provide an appropriate response.

- 11) If the limit at infinity exists, find the limit.

$$\lim_{x \rightarrow \infty} \frac{5x^2 + 7x - 9}{-6x^2 + 2}$$

A) 0

B) ∞

C) $-\frac{5}{6}$

D) $-\frac{2}{9}$

- 12) Find the vertical asymptote(s) of the graph of the given function.

$$f(x) = \frac{3x - 9}{5x + 30}$$

A) $x = -6$

B) $y = 8$

C) $x = -8$

D) $y = -3$

- 13) Find the horizontal asymptote, if any, of the given function.

$$f(x) = \frac{2x^3 - 3x - 9}{9x^3 - 5x + 3}$$

A) $y = \frac{2}{9}$

B) $y = \frac{3}{5}$

C) $y = 0$

D) None

- 14) Find y' if $y = 6x$.

A) x

B) 6

C) 0

D) x^2

- 15) Find $f'(x)$ for $f(x) = 2x^5 + 6x^8$.

A) $2x^4 + 6x^7$

B) $10x^4 + 48x^7$

C) $10x^3 + 48x^2$

D) $10x^6 + 48x^9$

16) Find the derivative of $y = \frac{3x^5 - 7x^2 - 4}{x^2}$.

- A) $y' = 9x^{-2} + 8x^{-3}$
- B) $y' = 9x^2 + 8x^3$
- C) $y' = 18x^2 + 8x^{-3}$
- D) $y' = 9x^2 + 8x^{-3}$

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

- A) $3x^5 + 7x^8$
- B) $4x^3 + 7x^6$
- C) $12x^3 + 42x^6$
- D) $7x^3 + 13x^6$

18) Find: $\frac{dy}{dt}$ if $y = 3t^{-4} - 5t^{-1}$

- A) $-12t^{-5} - 5t^{-2}$
- B) $-\frac{12}{t^5} - \frac{5}{t^2}$
- C) $-12 t^5 - 5t^2$
- D) $-12t^{-5} + 5t^{-2}$

19) 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 $x = 5$.

- A) \$32
- B) \$45
- C) \$15
- D) \$35

20) Let $C(x)$ be the cost function and $R(x)$ the revenue function. Compute the marginal cost, marginal revenue, and the marginal profit functions.

$$C(x) = 0.0003x^3 - 0.012x^2 + 100x + 40,000$$

$$R(x) = 400x$$

- A) $C'(x) = 0.0009x^2 - 0.024x + 100$
 $R'(x) = 400$
 $P'(x) = 0.0009x^2 - 0.024x - 300$
- B) $C'(x) = 0.0009x^2 - 0.024x + 100$
 $R'(x) = 400$
 $P'(x) = -0.0009x^2 + 0.024x + 300$
- C) $C'(x) = 0.0009x^2 + 0.024x + 100$
 $R'(x) = 400$
 $P'(x) = 0.0009x^2 + 0.024x + 300$

- 21) The total cost to produce x units of paint is $C(x) = (5x + 3)(7x + 4)$. Find the marginal average cost function.
- A) $\bar{C}(x) = 70 - \frac{41}{x}$
- B) $\bar{C}(x) = 35 - \frac{12}{x^2}$
- C) $\bar{C}(x) = 35x + 41 + \frac{12}{x}$
- D) $\bar{C}(x) = 70x + 41$
- 22) Use the four step process to find $f'(x)$ for the function $f(x) = 5x^2 - 3x$.
- A) $10x + 5h - 3$
- B) $10x - 3$
- C) $5h^2 - 3h$
- D) $5h - 3$
- 23) Find the slope of the graph $f(x) = -x^2 + 3x$ at the point $(1, 2)$.
- A) -2
- B) -1
- C) 1
- D) 2

Solve the problem.

- 24) A cube 7 inches on an edge is given a protective coating 0.1 inches thick. About how much coating should a production manager order for 900 cubes?
- A) About 26,460 in.³
- B) About 4410 in.²
- C) About 13,230 in.²
- D) About 30,870 in.³
- 25) The demand equation for a certain item is $p = 14 - \frac{x}{1,000}$ and the cost equation is $C(x) = 7,000 + 4x$. Find the marginal profit at a production level of 3,000 and interpret the result.
- A) \$16; at the 3,000 level of production, profit will increase by approximately \$16 for each unit increase in production.
- B) \$14; at the 3,000 level of production, profit will increase by approximately \$14 for each unit increase in production.
- C) \$4; at the 3,000 level of production, profit will increase by approximately \$4 for each unit increase in production.
- D) \$7; at the 3,000 level of production, profit will increase by approximately \$7 for each unit increase in production.
- 26) Suppose the demand for a certain item is given by $D(p) = -3p^2 + 7p + 6$, where p represents the price of the item. Find $D'(p)$, the rate of change of demand with respect to price.
- A) $D'(p) = -6p^2 + 7$
- B) $D'(p) = -6p + 7$
- C) $D'(p) = -3p^2 + 7$
- D) $D'(p) = -3p + 7$

27) A pen manufacturer determined that the total cost in dollars of producing x dozen pens in one day is given by:

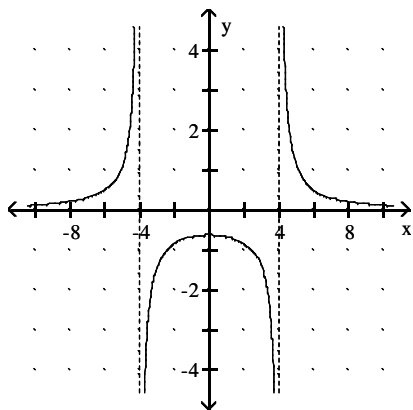
$$C(x) = 350 + 2x - 0.01x^2, \quad 0 \leq x \leq 100$$

Find the marginal cost at a production level of 70 dozen pens and interpret the result.

- A) The marginal cost is \$0.58/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.58.
- B) The marginal cost is \$0.60/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.60.
- C) The marginal cost is \$0.59/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.59.
- D) The marginal cost is \$0.62/doz. The cost of producing 1 dozen more pens at a production level of 70 dozen pens is approximately \$0.62.

Use the given graph to find the indicated limit.

28)

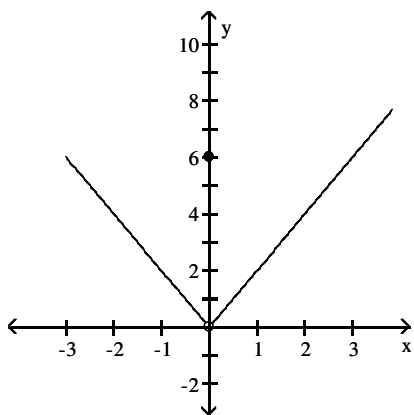


$$\lim_{x \rightarrow 4^+} f(x)$$

- A) 0
- B) $-\infty$
- C) 4
- D) ∞

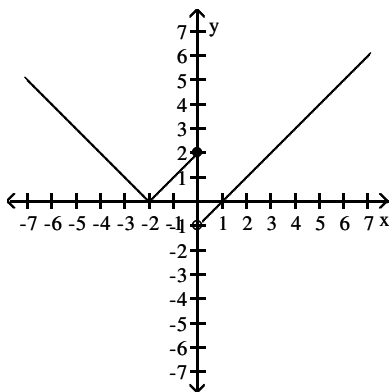
Use the graph to evaluate the indicated limit and function value or state that it does not exist.

29) Find $\lim_{x \rightarrow 0} f(x)$ and $f(0)$.



- A) 6; 0
- B) 0; 6
- C) Does not exist; 6
- D) 0; does not exist

30) Find $\lim_{x \rightarrow 0^-} f(x)$ and $\lim_{x \rightarrow 0^+} f(x)$.



- A) Does not exist; does not exist
- B) 2; Does not exist
- C) 2; -1
- D) -1; 2

Answer Key

Testname: TEST1SP2011

- 1) C
- 2) D
- 3) B
- 4) A
- 5) D
- 6) B
- 7) B
- 8) D
- 9) D
- 10) A
- 11) C
- 12) A
- 13) A
- 14) B
- 15) B
- 16) D
- 17) C
- 18) D
- 19) D
- 20) B
- 21) B
- 22) A
- 23) C
- 24) A
- 25) C
- 26) B
- 27) B
- 28) D
- 29) B
- 30) C