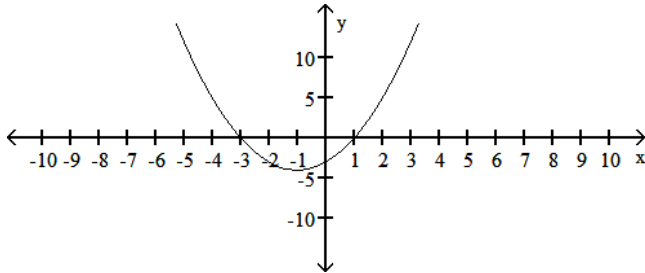


Use the given graph of $f(x)$ to find the intervals on which $f'(x) > 0$.

1)



- A) $f'(x) > 0$ on $(-1, \infty)$, $f'(x) < 0$ on decreasing on $(-\infty, -1]$
- B) $f'(x) > 0$ on $[-3, \infty)$, $f'(x) < 0$ on $(-\infty, -3]$
- C) $f'(x) < 0$ on $(-\infty, \infty)$
- D) $f'(x) > 0$ on $(-\infty, -3] \cup [1, \infty)$, $f'(x) < 0$ on $[-3, 1]$

1) _____

Provide an appropriate response.

2) Determine the interval(s) where $f(x) = \frac{x^2}{x-3}$ is decreasing.

- A) $(0, 6)$
- B) $(-\infty, 0)$ and $(6, \infty)$
- C) $(0, 3)$ and $(3, 6)$
- D) $(0, 3)$ and $(6, \infty)$

2) _____

3) Use the first derivative test to determine the local extrema, if any, for the function:

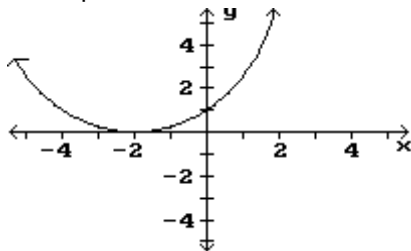
$$f(x) = x^3 + 3x^2 - 24x + 6$$

- A) local min at $x = 2$
- B) local max at $x = 2$ and local min at -4
- C) local max at $x = -4$
- D) local max at $x = -4$ and local min at $x = 2$

3) _____

Find the intervals where the function has the indicated concavity. Give the x coordinates of inflection points.

4) Concave upward

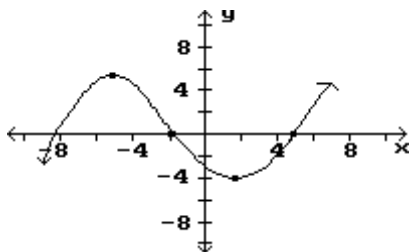


- A) $(-\infty, -2)$; no inflection points
- B) $(-\infty, \infty)$; no inflection points
- C) $(-\infty, \infty)$; $x = -2$
- D) $(-2, \infty)$; no inflection points

4) _____

Find the intervals where $f'(x) < 0$:

5)



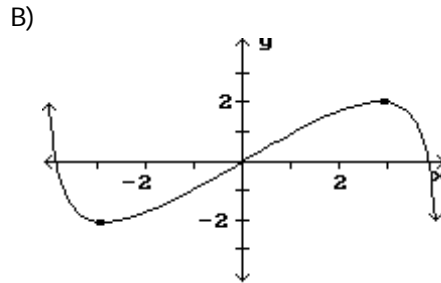
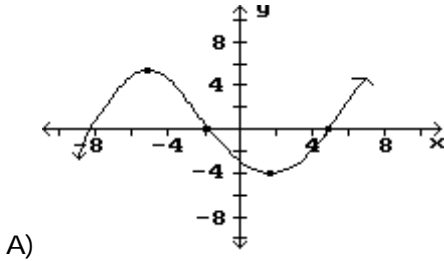
- A) $(-5, 5)$
- B) $(-5, 2)$
- C) $(-\infty, -2)$
- D) $(-2, \infty)$

5) _____

Sketch a graph of a single function that has these properties.

- 13) a) Continuous and differentiable for all real numbers
 b) $f'(x) < 0$ on $(-\infty, -3)$ and $(3, \infty)$
 c) $f'(x) > 0$ on $(-3, 3)$
 d) $f''(x) > 0$ on $(-\infty, 0)$
 e) $f''(x) < 0$ on $(0, \infty)$
 f) $f'(-3) = f'(3) = 0$
 g) An inflection point at $(0,0)$

13) _____



Solve the problem.

- 14) If the price charged for a bolt is p cents, then x thousand bolts will be sold in a certain hardware store, where $p = 96 - \frac{x}{36}$. How many bolts must be sold to maximize revenue?

14) _____

- A) 1728 bolts
 B) 1728 thousand bolts
 C) 3456 bolts
 D) 3456 thousand bolts

- 15) The average manufacturing cost per unit (in hundreds of dollars) for producing x units of a product is given by:

15) _____

$$\bar{C}(x) = 2x^3 - 42x^2 + 288x + 12, \quad 1 \leq x \leq 5$$

At what production level will the average cost per unit be maximum?

- A) 1 unit
 B) 5 units
 C) 12 units
 D) 652 units

- 16) The cost of a computer system increases with increased processor speeds. The cost C of a system as a function of processor speed is estimated as $C = 7S^2 - 6S + 1900$, where S is the processor speed in MHz. Find the processor speed for which cost is at a minimum. (Round the result to one decimal place)

16) _____

- A) 0.4 MHz
 B) 8.6 MHz
 C) 3.4 MHz
 D) 0.3 MHz

Answer Key

Testname: REVIEW CHAP 4

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