

EXAMINATION THREE REVIEW

Select the correct answer.

1. Find all critical numbers for the function  $f(x) = (x + 2)^4(x - 1)^3$ .

- a. None of these
- b.  $2, -\frac{2}{7}, 1$
- c.  $2, -\frac{2}{7}, 1$
- d. 2 and -1
- e. -2 and 1

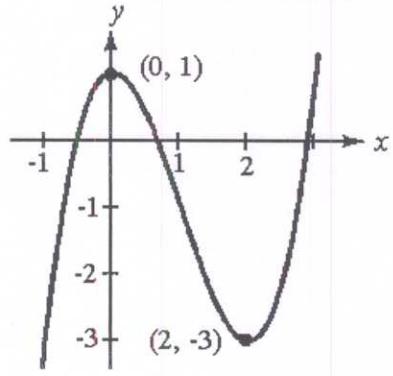
2. Given  $f(x) = 8 - \frac{7}{x}$ , find all  $c$  in the interval  $(1, 7)$  such that

$$f'(c) = \frac{f(7) - f(1)}{7 - 1}.$$

- a.  $\sqrt{7}$
- b. 4
- c. 7
- d.  $\pm\sqrt{7}$
- e. None of these

Select the correct answer.

3. Use the graph to identify the open intervals on which the function is increasing or decreasing.
- a. Increasing  $(-\infty, 0)$  and  $(2, \infty)$ ; decreasing  $(0, 2)$
  - b. Increasing  $(-\infty, 1)$  and  $(-3, \infty)$ ; decreasing  $(1, -3)$
  - c. Increasing  $(-\infty, \infty)$
  - d. Increasing  $(0, 2)$ ; decreasing  $(-\infty, 0)$  and  $(2, \infty)$
  - e. None of these



4. Find the values of  $x$  that give relative extrema for the function  $f(x) = (x + 1)^2(x - 2)$ .
- a. Relative maximum:  $x = -1$ ; relative minimum:  $x = 2$
  - b. Relative maximum:  $x = -1$ ; relative minimum:  $x = 1$
  - c. Relative minimum:  $x = 2$
  - d. None of these
  - e. Relative maxima:  $x = 1, x = 3$ ; relative minimum:  $x = -1$

5. Use a graphing utility to graph  $f(x) = -\frac{1}{(x + 1)^2}$ . Use the graph to determine the open intervals where the graph of the function is concave upward or concave downward.
- a. Concave downward:  $(-\infty, -1)$ ; concave upward:  $(-1, \infty)$
  - b. Concave downward:  $(-\infty, \infty)$
  - c. Concave upward:  $(-\infty, -1)$  and  $(-1, \infty)$
  - d. None of these
  - e. Concave downward:  $(-\infty, -1)$  and  $(-1, \infty)$

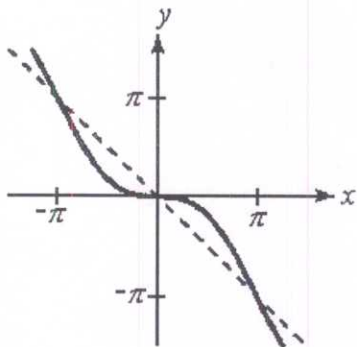
Select the correct answer.

6. Find the limit:  $\lim_{x \rightarrow \infty} \frac{2x^3 + 6x^2 + 5}{3 + x^3}$ .

- a.  $\infty$
- b. 2
- c. 1
- d.  $\frac{2}{3}$
- e. None of these

7. Match the graph with the correct function.

- a.  $y = -x + \sin x$
- b.  $y = x \sin x$
- c.  $y = -x - \sin x$
- d.  $y = -x \sin x$
- e. None of these



8. The management of a large store wishes to add a fenced-in rectangular storage yard of 20,000 square feet, using the building as one side of the yard. Find the minimum amount of fencing that must be used to enclose the remaining 3 sides of the yard.
- a. 500 ft
  - b. 400 ft
  - c. None of these
  - d. 200 ft
  - e. 20,000 ft
9. Use Newton's Method to approximate the real zero of the function in the interval  $[0, 1]$ :  $f(x) = 3x^3 + x^2 - 16x + 10$ .
- a. 0.94
  - b. 0.58
  - c. 0.65
  - d. 0.73
  - e. None of these

Select the correct answer.

10. The radius of a sphere is measured to be 3.0 inches. If the measurement is correct to within 0.01 inch, use differentials to estimate the propagated error in the volume of the sphere.
- a.  $\pm 0.36\pi \text{ in.}^3$
  - b.  $\pm 0.036\pi \text{ in.}^3$
  - c. None of these
  - d.  $\pm 0.000001 \text{ in.}^3$
  - e.  $\pm 0.06 \text{ in.}^3$