Chapter 3 Practice Test

1. Find all open intervals on which the function $f(x) = \dfrac{x}{x^2 + x - 2}$ is decreasing.

(a) $(-\infty, \infty)$ (b) $(-\infty, 0)$ (c) $(-\infty, -2)$ and $(1, \infty)$

(d) $(-\infty, -2)$, $(-2, 1)$ and $(1, \infty)$ (e) None of these

2. Find all critical numbers for the function $f(x) = (9 - x^2)^{3/5}$.

(a) 0 (b) 3 (c) $-3, 3$

(d) $-3, 0, 3$ (e) None of these

3. 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: $x = 1$

(b) Relative maxima: $x = 1, x = 3$; Relative minimum: $x = -1$

(c) Relative minimum: $x = 2$

(d) Relative maximum: $x = -1$; Relative minimum: $x = 2$

(e) None of these

4. Find all intervals on which the graph of the function is concave upward: $f(x) = \dfrac{x - 1}{x + 3}$.

(a) $(-\infty, \infty)$ (b) $(-\infty, -3)$ (c) $(1, \infty)$

(d) $(-3, \infty)$ (e) None of these

5. Let $f''(x) = 3x^2 - 4$ and let $f(x)$ have critical numbers -2, 0, and 2. Use the Second Derivative Test to determine which critical numbers, if any, gives a relative maximum.

(a) -2 (b) 2 (c) 0

(d) -2 and 2 (e) None of these

6. Find $\lim\limits_{x \to \infty} \dfrac{\sqrt{4x^2 - 1}}{x^2}$.

(a) 4 (b) 0 (c) 2

(d) ∞ (e) None of these

7. Which of the following functions has a horizontal asymptote at $y = -\frac{1}{2}$?

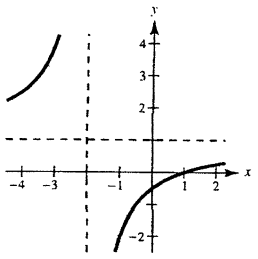
(a) $\dfrac{x^3}{1 - 2x^3}$ (b) $\dfrac{x}{\sqrt{2x + 1}}$ (c) $\dfrac{2x^2 - 6x + 1}{1 + x^2}$

(d) $\dfrac{x - 1}{2x^2 + 1}$ (e) None of these

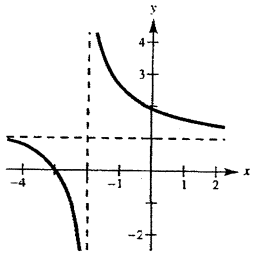
Chapter 3 Practice Test

8. Which of the following is the correct sketch of the graph of the function $f(x) = \dfrac{x-1}{x+2}$?

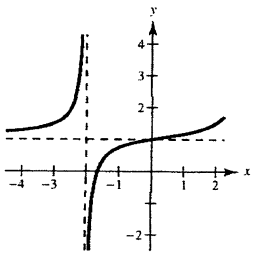
(a)



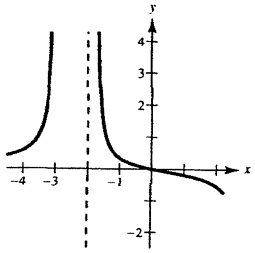
(b)



(c)



(d)



(e) None of these

9. Find all points of inflection: $f(x) = x^3 - 12x$.

(a) $(0, 0), (\pm\sqrt{12}, 0)$ (b) $(0, 0)$ (c) $(2, 0), (-2, 0)$

(d) $(2, -16), (-2, 16)$ (e) None of these

10. State the Mean Value Theorem