Test Review for Applications of Derivatives Test

1. What is the x-coordinate of the point of inflection of the graph $y = x^3 + 3x^2 - 45x + 81$

a) -9 b) -5 c) -1 d) 1 e) 3

2. The side of a cube is expanding at a constant rate of 2 cm per second. What is the instantaneous rate of change of the surface area of the cube, in cm^2 per second, when its volume is 27 cubic centimeters?

a) 6 b) 25 c) 36 d) 54 e) 72

3. If $f'(x) = x^3(x+2)^2$, then the graph has inflection points when x =

a) -2 only c) -2 and 0 e) -2, -6/5 and 0

b) 0 only d) -2 and -6/5

4. The function $g(x) = \frac{3x^2}{e^{3x}}$ is increasing on which of the following intervals?

a) $(-\infty, 0)$ c) (0, 2/3) e) $(2/3, \infty)$

b) $(-\infty, 2/3)$ d) $(0, \infty)$

5. Suppose $f(x) = x^4 + ax^2$. What is the value of a if f has a local minimum at x = 2

a) -24 b) -8 c) -4 d) -1/2 e) -1/6

6. If $f'(x) = -5(x-3)^2(x-2)$, which of the following features does the graph of f(x) have?

a) A local minimum at x =2 and a local max at x = 3

b) A local max at x = 2 and a local min at x = 3

c) A point of inflection at x = 2 and a local min at x = 3

d) A local min at x = 2 and point of inflection at x = 3

e) A local max at x = 2 and a point of inflection at x = e

7. If $x + siny = lny$, then dy/dx =

a) $y + ycosy$

b) $\frac{y+cosy-1}{y}$

c) $\frac{1-y}{ycosy}$

d) $\frac{y}{ycosy-1}$

e) $\frac{y}{1-ycosy}$

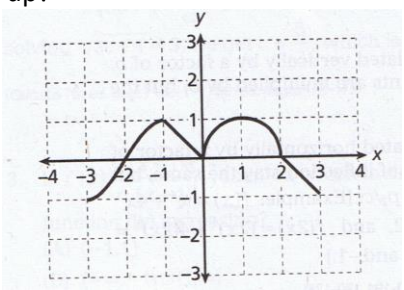
8. The maximum acceleration attained on the interval $\mathbf{0 \le t \le 3}$ by the particle whose velocity is given by $\boldsymbol{v(t) = t^3 - 3t^2 + 12t + 4}$ is

(A) 9 (B) 12 (C) 14 (D) 21 (E) 40

9. What is the equation of the line normal to the curve $y = e^{2x}\ln(x)$ where x = 1?

(A) $y = e^2(x-1)$ $y = e^{-2}(x-1)$ (B) $y = -e^2(x-1)$ (C) $y = -e(x-1)$ (D) $y = -e^{-2}(x-1)$ (E)

10. The graph of f'(x) is given below for $x \in [-3,3]$. On which interval(s) is the function f(x) both increasing and concave up?



(A) (-2, 2) (B) (-2, 0)U(0, 2) (C) (-3, -2) (D) (-2, -1)U(0, 1)

11. What value of c in the open interval (0, 4) satisfies the Mean Value Theorem for $f(x) = \sqrt{3x+4}$?

(A) 0 (B) 3/5 (C) 5/3 (D) 3 (E) 3

Answers

1) C
2) E
3) D
4) C
5) B
6) E
7) E
8) D
9) D
10) d
11) c