Applications of Derivatives

4.3-4.4 Rogawski

a. Find the critical points and the intervals on which the function is increasing or decreasing.

b. Use that information to determine if the critical points are a local min or max

23. $y = -x^2 + 7x - 17$

25. $y = x^3 - 12x^2$

26. $y = x(x-2)^3$

29. $y = \frac{1}{3}x^3 + \frac{3}{2}x^2 + 2x + 4$

30. $y = x^4 + x^3$

34. $y = x^{5/2} - x^2$

35. $y = x + x^{-1}$

45. $y = x + e^{-x}$

Determine the intervals on which the function is concave up or down and find the points of inflection

3. $y = x^2 - 4x + 3$

4. $y = x^3 - 6x^2 + 4$

10. $y = x^{7/2} - 35x^2$

11. $y = (x-2)(1-x^3)$

12. $y = x^{7/5}$

17. $y = 2x^2 + \ln x$

18. $y = x - \ln x$

Find a point c satisfying the conclusion of the MVT for the given function and interval

1. $\mathrm{y} = \mathrm{x}^{-1}$ [2,8]

2. $\mathrm{y} = \sqrt{x}$ [9,25]

4. $\mathrm{y} = \dfrac{x}{x+2}$ [1,4]

5. $\mathrm{y} = x^3$ [-4,5]

Find the critical points and apply the second derivative test for local extrema (or state that it fails)

25. $y = x^3 - 12x^2 + 45x$

26. $y = x^4 - 8x^2 + 1$

27. $y = 3x^4 - 8x^3 + 6x^2$

28. $y = x^5 - x^3$

31. $y = 6x^{3/2} - 4x^{1/2}$

32. $f(x) = 9x^{7/3} - 21x^{1/2}$