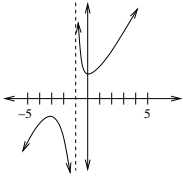


SOLUTIONS to 142 Final Exam Review

1. x -int: $(-819.2, 0)$; y -int: $(0, 16)$
2. $\frac{2}{\ln 3} \approx 1.8205$
3. 1
4. -1
5. (a) $p(x) = -0.02x + 2.02$
 (b) $C(x) = 0.25x$
 (c) $R(x) = -0.02x^2 + 2.02x$
 (d) $P(x) = -0.02x^2 + 1.77x$
6. $\left(\frac{2e^3 + \pi}{e^6}\right)(b - a)$
7. VA: $x = -1/2, x = -3$
 HA: $y = 0$
 Hole at $x = 6$
8. $f'(x) = 0.5 \left(e^{(x^8)} + (\ln(x^6 + 4) + 12)^3 \right)^{-1/2} \left[8x^7 e^{(x^8)} + 3(\ln(x^6 + 4) + 12)^2 \left(\frac{6x^5}{x^6 + 4} \right) \right]$
9. Abs. Max of 131 at $x = 4$
 Abs. Min of -45 at $x = 0$
10. $x = 10^{243}$
11. $AC(x) = 3.2 + \frac{5.4}{x}$
12. \$8017.60
13. $4e^{x^2+4x+5} + C$
14. One small yard: 15.38 ft. by 8.33 ft.
15. ∞
16. $f'(x) = 4e^{4x} \ln|5x^2 + 2x| + e^{4x} \left(\frac{10x + 2}{5x^2 + 2x} \right)$
17. $\frac{4}{3}$
18. $x = \frac{\ln(400/123)}{\ln 3} \approx 1.0734$
19. ≈ 105.38 million gallons
20. $(0, -5)$
21. quartic
22. 13
23. $\frac{18}{25}x^{25/18} + \frac{18}{19}x^{19/18} + C$

24. $\frac{254}{105} \approx 2.419$



25.

26. (a) $(g \circ f)(x) = (\sqrt{x} + 20)^2 + 4$

(b) $(f \circ g)(x) = \sqrt{x^2 + 4} + 20$

(c) $(g \circ g)(x) = (x^2 + 4)^2 + 4$

27. 0

28. Net = $\frac{145}{12} \approx 12.083$
Gross = ≈ 17.468

29. $f'(x) = -18(3x^3 + 4x^2 - 2x + 10)^{-4}(9x^2 + 8x - 2)$

30. $x = \frac{\ln 13}{5 \ln 15} \approx 0.1894$

31. $\swarrow \dots \nearrow$

32. $x = 0, x = 1/5$

33. $k = -3$

34. From 1994 to 1998, the band's fanbase grew by 5392 people.

35. (a) Let $x = 1$ represent 1967.

(b) Logistic

(c) 77.7%

36. $\ln \frac{28}{3} \approx 2.234$

37. b

38. $x > -1$

39. $f'(x) = 0.5(x + 4)^{-1/2}$

40. $\frac{25}{401} \approx 0.0623$

41. ≈ 19.22 in.

42. $x = 0.5 \left(10^{(3^{125})} \right)$

43. Profit gain when making and selling between (and including) 2 and 10 lollipops.

44. ≈ 27.73 years

45. $\log \left(\frac{2x^4}{3y^4} \right)^{4/5}$

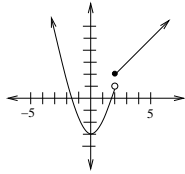
46. $f'(x) = 18x^2 e^{1/x} - 6x e^{1/x}$

47. $E(p) = 1/7$; Inelastic; Raise the price
48. $P'(250) = 0$; there will be zero profit made from selling the 251st tube of lipstick.
49. (a) 0.10
(b) ∞

50. $8x + 4h - 7$

51. $f(x) = \left(2 - \frac{1}{x}\right)^{4/3}$; Domain: $x \neq 0$

52. (a) $f(-2) = 1$; $f(2) = 2$; $f(5) = 5$
(b)



- (c) Discontinuous at $x = 2$; Non-differentiable at $x = 2$ (no limit value)

53. \$5053.07

54. $x \approx 34.399$

55. $f'(x) = \frac{2x}{5\sqrt{e}}$

56. $\frac{1}{3}x^6 - \frac{5}{2}x^2 + C$

57. (a) CV: $x = -2, 4$; Rel Max at $x = -2$; Rel Min at $x = 4$
(b) IP at $x = 1$

58. 12.85 in. by 12.85 in. by 6.42 in.

59. (a) $V(t) = -450t + 3500$
(b) 2007

60. $y = -2416x + 3824$

61. $MP(x) = 10.4x - 361.7$

62. $x = 2$

63. $(e^2 - \sqrt{2})(\ln 5)$

64. -5

65. $\frac{1}{3}(e - 1)$