Chapter 3 Solutions
MATH 251, CALCULUS I, FALL 2018

Section 3.1

3. 2^{40} is a constant so $f'(x) = 0$.

7. $f'(t) = 6t^2 - 6t - 4$

13. $F'(t) = -\dfrac{15}{r^4}$

14. $y' = \dfrac{5}{3}x^{2/3} - \dfrac{2}{3}x^{-1/3}$

23. $y' = \dfrac{3}{2}x^{1/2} + 2x^{-1/2} - \dfrac{3}{2}x^{-3/2}$

31. $z' = -10Ay^{-11} + Be^y$

32. $y' = e^{x+1}$

49. (a) $v(t) = 3t^2 - 3, \quad a(t) = 6t$ (b) $a(2) = 12m/s^2$ (c) $v(t) = 0$ when $t = 1$ $a(1) = 6m/s^2$

55. $S'(A) = 0.882(0.842A^{-0.158})$ so $S'(100) \approx 0.36$ The derivative is the instantaneous rate of change of the number of tree species with respect to area. Its units are number of species per square meter.

63. $(2, 4)$ and $(-2, 4)$

72. g is differentiable at $x = 0$ but not at $x = 2$.

Section 3.2

5,8,11,17,23,25,27,43,44,46,49,50,52

5. $y' = \dfrac{1 - x}{e^x}$

8. $H'(u) = 2u - 1$.

11. $F'(y) = 5 + 14y^{-2} + 9y^{-4}$

17. $e^p(1 + \dfrac{3}{2}\sqrt{p} + p + p\sqrt{p})$

23. $\dfrac{xe^x(x^3 + 2e^x)}{(x^2 + e^x)^2}$

25. $f'(x) = \dfrac{2cx}{(x^2 + c)^2}$

27. $f''(x) = e^x(x^3 + 6x^2 + 6x + 1)$

43. (a) -16 (b) $-\dfrac{20}{9}$ (c) 20.

44. (a) -6 (b) 24 (c) $\dfrac{36}{25}$

46. -2.5.

49. (a) 0 (b) $-\dfrac{2}{3}$

50. (a) $\dfrac{3}{2}$ (b) $\dfrac{43}{12}$

52. (a) $y' = xg'(x) + g(x)$ (b) $y' = \dfrac{xf'(x) - 2f(x)}{x^3}$ (c) $y' = \dfrac{f(x)(2x) - x^2 f'(x)}{[f(x)]^2}$
(d) $\dfrac{xf(x) + 2x^2 f'(x) - 1}{2x^{3/2}}$