

# Section 4.1

$$1. f'(x) = 0 = \frac{d}{dx}(13)$$

$$27. f'(x) = 5x^4 - 5e^x = \frac{d}{dx}(x^5 - 5e^x + 1)$$

$$3. f'(x) = 0$$

$$29. f'(x) = 0.7x - 0.3e^x$$

$$5. f'(x) = 23x^{22}$$

$$31. f'(x) = -\frac{1}{x} - 0.02x - 0.09x^2$$

$$7. f'(x) = 1.4x^{0.4}$$

$$33. f'(x) = \frac{1}{6}(e^x + 2x - 2)$$

$$9. f'(x) = ex^{e-1}$$

$$35. f'(x) = 9x^2 - 9x^{-4}$$

$$11. f'(x) = \frac{4}{3}x^{1/3}$$

$$37. f'(x) = 2x + x^{-2}$$

$$13. f'(x) = -5.1x^{-2.7}$$

$$39. f(x) = 4 \ln x^5 - 3x^{-3} + 4x^2$$

$$f'(x) = \frac{20}{x} + 9x^{-4} + 8x$$

$$15. f'(x) = 0.12x^{-1/2}$$

$$41. f(t) = (-3t)^3$$

$$f'(t) = -81t^2$$

$$17. f'(x) = 2e^x$$

$$19. f'(x) = \pi + \frac{2}{x}$$

$$43. f'(t) = -1t^{-2} - 2t^{-3} - 3t^{-4}$$

$$21. f'(x) = -1 - 2x$$

$$45. f'(t) = \frac{1}{3}t^{-2/3} + \frac{1}{3}t^{-4/3}$$

$$23. f'(x) = \frac{2}{\pi}x + \pi$$

$$47. \frac{d}{du}(3u^{5/3} - 3u^{2/3}) = 5u^{2/3} - 2u^{-1/3}$$

$$25. f'(x) = -1 - 2x - 3x^2 - \frac{10}{x}$$

$$49. \frac{d}{du}[(u+1)(2u+1)] = 2u + 3$$

$$51. \frac{d}{du} \left( \frac{u + \frac{3}{u}}{\sqrt{u}} \right) = \frac{1}{2} u^{-1/2} - \frac{9}{2} u^{-5/2}$$

$$69. C'(x) = \frac{3}{2} x^{1/2} + 6 x^{-1/2} \quad [4.1p2]$$

$$C'(x) \Big|_{x=36} = \frac{10}{3}$$

$$53. \frac{dy}{dx} = x^{-1/2} + \frac{1}{6} x^{-3/2}$$

$$71. P'(x) = 2x - 17$$

$$P'(x) \Big|_{x=50} = \frac{83}{2}$$

$$55. \frac{dy}{dx} = \pi^2 x^{\pi-1} + \frac{2}{x}$$

$$57. \frac{dy}{dx} = \sqrt{2} x^{\sqrt{2}-1} + \sqrt{2} x^{-\sqrt{2}-1}$$

$$73. B'(T) = -0.28 + 0.02T$$

$$B'(25) = -0.28 + 0.02(25) =$$

$$59. \frac{dy}{dx} = \frac{-3}{2} x^{-5/2} - \frac{4}{5} x^{-9/5} + \frac{1}{2x}$$

$$89. f'(x) = 5x^4 + 6x^3 - 9$$

$$61. \frac{dy}{dx} = \frac{2}{3} x^{-1/3}$$

$$63. \frac{dy}{dx} = \frac{-2}{5} x^{-7/5}$$

$$65. m_T = f'(x) = 2x + e^x$$

$$m_T \Big|_{x=0} = f'(0) = 1$$

$$y = 2$$

$$y = m_T x + b$$

$$2 = 1(0) + b \rightarrow 2 = b$$

$$y = x + 2$$

$$67. m_T = f'(x) = 3x^2 - 9$$

$$3x^2 - 9 = 0$$

$$3(x^2 - 3) = 0$$

$$x = \pm\sqrt{3}$$

$$93. f'(x) = 3x^2 - 4\sin x - 3\cos x$$

$$95. f'(x) = 3x^2 - 4\sin x - 3\cos x$$