

## Answers for Even-Numbered Problems

### Unit 2

#### 3.1

4.  $f'(x) = 0$

10.  $h'(x) = 4x - 1$

16.  $h'(t) = \frac{1}{4t^{3/4}} - 4e^t$

26.  $k'(r) = e^r + er^{e-1}$

52.  $x = \ln 2$

66.  $a = 3, b = -2, c = 7 \rightarrow y = 3x^2 - 2x + 7$

6.  $F'(x) = 6x^7$

14.  $\frac{dy}{dx} = \frac{5x^{2/3}}{3} - \frac{2}{3x^{1/3}} = \frac{5x-2}{3x^{1/3}}$

18.  $y' = \frac{3\sqrt{x}}{2} - \frac{1}{2\sqrt{x}} = \frac{3x-1}{2\sqrt{x}}$

34.  $y-2 = 7(x-1)$  or  $y = 7x-5$

54.  $y-8 = 3(x-4)$  or  $y = 3x-4$

74.  $c = 6$

#### 3.2

4.  $g'(x) = \sqrt{x}e^x + \frac{e^x}{2\sqrt{x}} = \frac{e^x(2x+1)}{2\sqrt{x}}$

32.  $y = e$

44b.  $h'(2) = -29$

44d.  $h'(2) = -3/2$

50b.  $Q'(7) = 43/12$

22.  $g'(t) = \frac{2}{3t^{1/3}} - \frac{1}{6t^{5/6}}$

44a.  $h'(2) = -38$

44c.  $h'(2) = 13/16$

50a.  $P'(2) = 3/2$

#### 3.3

2.  $f'(x) = \sqrt{x} \cos x + \frac{\sin x}{2\sqrt{x}} = \frac{2x \cos x + \sin x}{2\sqrt{x}}$

8.  $f'(t) = -\frac{\csc^2 t + \cot t}{e^t}$

22.  $y-1 = x$  or  $y = x+1$

32b.  $h'\left(\frac{\pi}{3}\right) = \frac{1-2\sqrt{3}}{16}$

4.  $y' = 2 \sec x \tan x + \csc x \cot x$

12.  $\frac{dy}{dx} = \frac{1}{1-\sin x}$

32a.  $g'\left(\frac{\pi}{3}\right) = 2 - \sqrt{3}$

#### 3.4

8.  $F'(x) = 100(4-2x)(4x-x^2)^{99}$

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

$$12. f'(t) = e^t \cos(e^t) + e^{\sin t} \cos t$$

$$16. y' = -2e^{-2t} (2 \sin 4t + \cos 4t)$$

$$20. F'(t) = \frac{6(t+3)(3t-1)^3}{(2t+1)^4}$$

$$24. y' = -2 \ln(10) x 10^{1-x^2}$$

$$14. y' = -3 \cos^2 x \sin x$$

$$18. g'(x) = 6x(3x^2+4)(x^2+1)^2(x^2+2)^5$$

$$22. f'(s) = \frac{3s}{\sqrt{s^2+1}(s^2+4)^{3/2}}$$

$$32. y' = 2m \sec^2(m\theta) \tan(m\theta)$$

### 3.9

$$8a. \left. \frac{dx}{dt} \right|_{\left(2, \frac{2\sqrt{5}}{3}\right)} = -\frac{\sqrt{5}}{4}$$

$$8a. \left. \frac{dy}{dt} \right|_{\left(-2, \frac{2\sqrt{5}}{3}\right)} = \frac{4}{\sqrt{5}}$$

$$10. \left. \frac{dx}{dt} \right|_{(4,2)} = 6 \text{ cm/s}$$

### 3.5

$$6. \frac{dy}{dx} = -\frac{2\sqrt{y}}{\sqrt{x}} = -2\sqrt{\frac{y}{x}}$$

$$8. \frac{dy}{dx} = \frac{y^3 - 2xy - 6x^2}{x^2 - 3xy^2}$$

$$12. \frac{dy}{dx} = -\frac{y \sin(xy)}{x \sin(xy) + \cos y}$$

$$14. \frac{dy}{dx} = \frac{1+y-e^y \cos x}{e^y \sin x - x}$$

$$28. y-2 = \frac{7}{2}(x-1) \text{ or } y = \frac{7}{2}x - \frac{3}{2}$$

$$34a. y+2 = -\frac{9}{4}(x-1) \text{ or } y = -\frac{9}{4}x + \frac{1}{4}$$

$$34b. (-2, -2), (-2, 2)$$

$$38. \frac{d^2y}{dx^2} = -\frac{3a^4x^2}{y^7}$$

$$50. y' = \frac{2x}{1+x^4}$$

$$76. y=3 \text{ and } y-3 = \frac{2}{3}(x-12) \text{ or } y = \frac{2}{3}x - 5$$

$$78b. f^{-1}(1) = 0$$

$$78c. (f^{-1})'(1) = \frac{1}{2}$$

### 3.6

$$2. f'(x) = \ln x$$

$$8. f'(x) = \frac{x+1}{x \ln(5)}$$

$$14. g'(r) = \frac{2r^2}{2r+1} + 2r \ln(2r+1)$$

$$34. y = x - 1$$

$$44. \frac{dy}{dx} = x^{\cos x} \left( \frac{\cos x}{x} - \ln(x) \sin(x) \right)$$

$$46. \frac{dy}{dx} = \frac{(\sqrt{x})^x}{2} (1 + \ln x)$$