

A

Selected Answers

- 1.1.1. $(2/3)x + (1/3)$
 1.1.2. $y = -2x$
 1.1.3. $(-2/3)x + (1/3)$
 1.1.4. $y = 2x + 2, 2, -1$
 1.1.5. $y = -x + 6, 6, 6$
 1.1.6. $y = x/2 + 1/2, 1/2, -1$
 1.1.7. $y = 3/2$, y -intercept: $3/2$, no x -intercept
 1.1.8. $y = (-2/3)x - 2, -2, -3$
 1.1.9. yes
 1.1.10. $y = 0, y = -2x + 2, y = 2x + 2$
 1.1.11. $y = 75t, 164$ minutes
 1.1.12. $y = (9/5)x + 32, (-40, -40)$
 1.1.13. $y = 0.15x + 10$
 1.1.14. $0.03x + 1.2$
 1.1.15. (a) $y = \begin{cases} 0 & 0 \leq x < 100 \\ (x/10) - 10 & 100 \leq x \leq 1000 \\ x - 910 & 1000 < x \end{cases}$

- 1.1.16. $y = \begin{cases} 0.15x & 0 \leq x \leq 19450 \\ 0.28x - 2528.50 & 19450 < x \leq 47050 \\ 0.33x - 4881 & 47050 < x \leq 97620 \end{cases}$
 1.1.17. (a) $P = -0.0001x + 2$
 (b) $x = -10000P + 20000$
 1.1.18. $(2/25)x - (16/5)$
 1.2.1. (a) $x^2 + y^2 = 9$
 (b) $(x - 5)^2 + (y - 6)^2 = 9$
 (c) $(x + 5)^2 + (y + 6)^2 = 9$
 1.2.2. (a) $\Delta x = 2, \Delta y = 3, m = 3/2,$
 $y = (3/2)x - 3, \sqrt{13}$
 (b) $\Delta x = -1, \Delta y = 3, m = -3,$
 $y = -3x + 2, \sqrt{10}$
 (c) $\Delta x = -2, \Delta y = -2, m = 1,$
 $y = x, \sqrt{8}$
 1.2.6. $(x + 2/7)^2 + (y - 41/7)^2 = 1300/49$
 1.3.1. $\{x \mid x \geq 3/2\}$
 1.3.2. $\{x \mid x \neq -1\}$
 1.3.3. $\{x \mid x \neq 1 \text{ and } x \neq -1\}$
 1.3.4. $\{x \mid x < 0\}$
 1.3.5. $\{x \mid x \in \mathbb{R}\}$, i.e., all x

275

Appendix A Selected Answers 277

- 3.2.5. $3x^2 + 6x - 1$
 3.2.6. $9x^2 - x/\sqrt{625 - x^2}$
 3.2.7. $y = 13x/4 + 5$
 3.2.8. $y = 24x - 48 - \pi^3$
 3.2.9. $-49t/5 + 5, -49/5$
 3.2.11. $\sum_{k=1}^n ka_k x^{k-1}$
 3.2.12. $x^3/16 - 3x/4 + 4$
 3.3.1. $3x^2(x^3 - 5x + 10) + x^3(3x^2 - 5)$
 3.3.2. $(x^2 + 5x - 3)(5x^4 - 18x^2 + 6x - 7) + (2x + 5)(x^5 - 6x^3 + 3x^2 - 7x + 1)$
 3.3.3. $\frac{\sqrt{625 - x^2}}{2\sqrt{x}} - \frac{x\sqrt{x}}{\sqrt{625 - x^2}}$
 3.3.4. $\frac{-1}{x^{19}\sqrt{625 - x^2}} - \frac{20\sqrt{625 - x^2}}{x^{21}}$
 3.3.5. $f' = 4(2x - 3), y = 4x - 7$
 3.4.1. $\frac{3x^2}{x^3 - 5x + 10} - \frac{x^3(3x^2 - 5)}{(x^3 - 5x + 10)^2}$
 3.4.2. $\frac{2x + 5}{x^5 - 6x^3 + 3x^2 - 7x + 1} - \frac{(x^2 + 5x - 3)(5x^4 - 18x^2 + 6x - 7)}{(x^5 - 6x^3 + 3x^2 - 7x + 1)^2}$
 3.4.3. $\frac{1}{2\sqrt{x}\sqrt{625 - x^2}} + \frac{x^{3/2}}{(625 - x^2)^{3/2}}$
 3.4.4. $\frac{-1}{x^{19}\sqrt{625 - x^2}} - \frac{20\sqrt{625 - x^2}}{x^{21}}$
 3.4.5. $y = 17x/4 - 41/4$
 3.4.6. $y = 11x/16 - 15/16$
 3.4.8. $y = 19/169 - 5x/338$
 3.4.9. $13/18$
 3.5.1. $4x^3 - 9x^2 + x + 7$
 3.5.2. $3x^2 - 4x + 2/\sqrt{x}$
 3.5.3. $6(x^2 + 1)^2 x$

- 3.5.4. $\sqrt{169 - x^2} - x^2/\sqrt{169 - x^2}$
 3.5.5. $(2x - 4)\sqrt{25 - x^2} - (x^2 - 4x + 5)x/\sqrt{25 - x^2}$
 3.5.6. $-x/\sqrt{r^2 - x^2}$
 3.5.7. $2x^3/\sqrt{1 + x^4}$
 3.5.8. $\frac{1}{4\sqrt{x}(5 - \sqrt{x})^{3/2}}$
 3.5.9. $6 + 18x$
 3.5.10. $\frac{2x + 1}{1 - x} + \frac{x^2 + x + 1}{(1 - x)^2}$
 3.5.11. $-1/\sqrt{25 - x^2} - \sqrt{25 - x^2}/x^2$
 3.5.12. $\frac{1}{2} \left(\frac{-169}{x^2} - 1 \right) / \sqrt{\frac{169}{x} - x}$
 3.5.13. $\frac{3x^2 - 2x + 1/x^2}{2\sqrt{x^3 - x^2 - (1/x)}}$
 3.5.14. $\frac{300x}{(100 - x^2)^{5/2}}$
 3.5.15. $\frac{1 + 3x^2}{3(x + x^3)^{2/3}}$
 3.5.16. $\left(4x(x^2 + 1) + \frac{4x^3 + 4x}{2\sqrt{1 + (x^2 + 1)^2}} \right) / 2\sqrt{(x^2 + 1)^2 + \sqrt{1 + (x^2 + 1)^2}}$
 3.5.17. $5(x + 8)^4$
 3.5.18. $-3(4 - x)^2$
 3.5.19. $6x(x^2 + 5)^2$
 3.5.20. $-12x(6 - 2x^2)^2$
 3.5.21. $24x^2(1 - 4x^3)^{-3}$
 3.5.22. $5 + 5/x^2$
 3.5.23. $-8(4x - 1)(2x^2 - x + 3)^{-3}$
 3.5.24. $1/(x + 1)^2$
 3.5.25. $3(8x - 2)/(4x^2 - 2x + 1)^2$
 3.5.26. $-3x^2 + 5x - 1$
 3.5.27. $6x(2x - 4)^3 + 6(3x^2 + 1)(2x - 4)^2$

276 Appendix A Selected Answers

- 1.3.6. $\{x \mid x \geq 0\}$
 1.3.7. $\{x \mid h - r \leq x \leq h + r\}$
 1.3.8. $\{x \mid x \geq 1\}$
 1.3.9. $\{x \mid -1/3 < x < 1/3\}$
 1.3.10. $\{x \mid x \geq 0 \text{ and } x \neq 1\}$
 1.3.11. $\{x \mid x \geq 0 \text{ and } x \neq 1\}$
 1.3.12. \mathbb{R}
 1.3.13. $\{x \mid x \geq 3\}, \{x \mid x \geq 0\}$
 1.3.14. $A = x(500 - 2x), \{x \mid 0 \leq x \leq 250\}$
 1.3.15. $V = r(50 - \pi r^2), \{r \mid 0 < r \leq \sqrt{50/\pi}\}$
 1.3.16. $A = 2\pi r^2 + 2000/r, \{r \mid 0 < r < \infty\}$
 2.1.1. $-5, -2.47106145, -2.4067927, -2.400676, -2.4$
 2.1.2. $-4/3, -24/7, 7/24, 3/4$
 2.1.3. $-0.107526881, -0.11074197, -0.1110741, \frac{-1}{3(3 + \Delta x)} \rightarrow \frac{-1}{9}$
 2.1.4. $\frac{3 + 3\Delta x + \Delta x^2}{1 + \Delta x} \rightarrow 3$
 2.1.5. $3.31, 3.003001, 3.0000, 3 + 3\Delta x + \Delta x^2 \rightarrow 3$
 2.1.6. m
 2.2.1. $10, 25/2, 20, 15, 25, 35.$
 2.2.2. $5, 4.1, 4.01, 4.001, 4 + \Delta t \rightarrow 4$
 2.2.3. $-10.29, -9.849, -9.8049, -9.8 - 4.9\Delta t \rightarrow -9.8$
 2.3.1. 7
 2.3.2. 5
 2.3.3. 0
 2.3.4. undefined
 2.3.5. $1/6$
 2.3.6. 0
 2.3.7. 3
 2.3.8. 172
 2.3.9. 0
 2.3.10. 2
 2.3.11. does not exist
 2.3.12. $\sqrt{2}$
 2.3.13. $3a^2$
 2.3.14. 512
 2.3.15. -4
 2.3.16. 0
 2.3.18. (a) 8, (b) 6, (c) dne, (d) -2 , (e) -1 , (f) 8, (g) 7, (h) 6, (i) 3, (j) $-3/2$, (k) 6, (l) 2
 2.4.1. $-x/\sqrt{169 - x^2}$
 2.4.2. $-9.8t$
 2.4.3. $2x + 1/x^2$
 2.4.4. $2ax + b$
 2.4.5. $3x^2$
 2.4.8. $-2/(2x + 1)^{3/2}$
 2.4.9. $5/(t + 2)^2$
 2.4.10. $y = -13x + 17$
 2.4.11. -8
 3.1.1. $100x^{99}$
 3.1.2. $-100x^{-101}$
 3.1.3. $-5x^{-6}$
 3.1.4. $\pi x^{\pi-1}$
 3.1.5. $(3/4)x^{-1/4}$
 3.1.6. $-(9/7)x^{-16/7}$
 3.2.1. $15x^2 + 24x$
 3.2.2. $-20x^4 + 6x + 10/x^3$
 3.2.3. $-30x + 25$
 3.2.4. $6x^2 + 2x - 8$

278 Appendix A Selected Answers

- 3.5.28. $-2/(x - 1)^2$
 3.5.29. $4x/(x^2 + 1)^2$
 3.5.30. $(x^2 - 6x + 7)/(x - 3)^2$
 3.5.31. $-5/(3x - 4)^2$
 3.5.32. $60x^4 + 72x^3 + 18x^2 + 18x - 6$
 3.5.33. $(5 - 4x)/((2x + 1)^2(x - 3)^2)$
 3.5.34. $1/(2(2 + 3x)^2)$
 3.5.35. $56x^6 + 72x^5 + 110x^4 + 100x^3 + 60x^2 + 28x + 6$
 3.5.36. $y = 23x/96 - 29/96$
 3.5.37. $y = 3 - 2x/3$
 3.5.38. $y = 13x/2 - 23/2$
 3.5.39. $y = 2x - 11$
 3.5.40. $y = \frac{20 + 2\sqrt{5}}{5\sqrt{4 + \sqrt{5}}}x + \frac{3\sqrt{5}}{5\sqrt{4 + \sqrt{5}}}$
 4.1.1. $2n\pi - \pi/2$, any integer n
 4.1.2. $n\pi \pm \pi/6$, any integer n
 4.1.3. $(\sqrt{2} + \sqrt{6})/4$
 4.1.4. $-(1 + \sqrt{3})/(1 - \sqrt{3}) = 2 + \sqrt{3}$
 4.1.11. $t = \pi/2$
 4.3.1. 5
 4.3.2. $7/2$
 4.3.3. $3/4$
 4.3.4. 1
 4.3.5. $-\sqrt{2}/2$
 4.3.6. 7
 4.3.7. 2
 4.4.1. $\sin(\sqrt{x})\cos(\sqrt{x})/\sqrt{x}$
 4.4.2. $\frac{\sin x}{2\sqrt{x}} + \sqrt{x}\cos x$
 4.4.3. $-\frac{\cos x}{\sin^2 x}$
 4.4.4. $\frac{(2x + 1)\sin x - (x^2 + x)\cos x}{\sin^2 x}$
 4.4.5. $\frac{-\sin x \cos x}{\sqrt{1 - \sin^2 x}}$
 4.5.1. $\cos^2 x - \sin^2 x$
 4.5.2. $-\sin x \cos(\cos x)$
 4.5.3. $\frac{\tan x + x \sec^2 x}{2\sqrt{x} \tan x}$
 4.5.4. $\frac{\sec^2 x(1 + \sin x) - \tan x \cos x}{(1 + \sin x)^2}$
 4.5.5. $-\csc^2 x$
 4.5.6. $-\csc x \cot x$
 4.5.7. $3x^2 \sin(23x^2) + 46x^4 \cos(23x^2)$
 4.5.8. 0
 4.5.9. $-6 \cos(\cos(6x)) \sin(6x)$
 4.5.10. $\sin \theta / (\cos \theta + 1)^2$
 4.5.11. $5t^4 \cos(6t) - 6t^5 \sin(6t)$
 4.5.12. $3t^2(\sin(3t) + t \cos(3t)) / \cos(2t) + 2t^3 \sin(3t) \sin(2t) / \cos^2(2t)$
 4.5.13. $n\pi/2$, any integer n
 4.5.14. $\pi/2 + n\pi$, any integer n
 4.5.15. $\sqrt{3}x/2 + 3/4 - \sqrt{3}\pi/6$
 4.5.16. $8\sqrt{3}x + 4 - 8\sqrt{3}\pi/3$
 4.5.17. $3\sqrt{3}x/2 - \sqrt{3}\pi/4$
 4.5.18. $\pi/6 + 2n\pi, 5\pi/6 + 2n\pi$, any integer n
 4.7.1. $2 \ln(3)x^{3x^2}$
 4.7.2. $\frac{\cos x - \sin x}{e^x}$
 4.7.3. $2e^{2x}$
 4.7.4. $e^x \cos(e^x)$
 4.7.5. $\cos(x)e^{\sin x}$
 4.7.6. $x^{\sin x} \left(\cos x \ln x + \frac{\sin x}{x} \right)$

- 4.7.7. $3x^2e^x + x^3e^x$
 4.7.8. $1 + 2^x \ln(2)$
 4.7.9. $-2x \ln(3)(1/3)^{x^2}$
 4.7.10. $e^{4x}(4x - 1)/x^2$
 4.7.11. $(3x^2 + 3)/(x^3 + 3x)$
 4.7.12. $-\tan(x)$
 4.7.13. $(1 - \ln(x^2))/(x^2 \sqrt{\ln(x^2)})$
 4.7.14. $\sec(x)$
 4.7.15. $x^{\cos(x)}(\cos(x)/x - \cos(x) \ln(x))$
 4.7.20. e
 4.8.1. x/y
 4.8.2. $-(2x + y)/(x + 2y)$
 4.8.3. $(2xy - 3x^2 - y^2)/(2xy - 3y^2 - x^2)$
 4.8.4. $\sin(x) \sin(y)/(\cos(x) \cos(y))$
 4.8.5. $-\sqrt{y}/\sqrt{x}$
 4.8.6. $(y \sec^2(x/y) - y^2)/(x \sec^2(x/y) + y^2)$
 4.8.7. $(y - \cos(x + y))/(\cos(x + y) - x)$
 4.8.8. $-y^2/x^2$
 4.8.9. 1
 4.8.11. $y = 2x \pm 6$
 4.8.12. $y = x/2 \pm 3$
 4.8.13. $(\sqrt{3}, 2\sqrt{3}), (-\sqrt{3}, -2\sqrt{3}),$
 $(2\sqrt{3}, \sqrt{3}), (-2\sqrt{3}, -\sqrt{3})$
 4.8.14. $y = 7x/\sqrt{3} - 8/\sqrt{3}$
 4.8.15. $y = (-y_1^{1/3}x + y_1^{1/3}x_1 + x_1^{1/3}y_1)/x_1^{1/3}$
 4.8.16. $(y - y_1)/(x - x_1) = (2x_1^3 + 2x_1y_1^2 -$
 $x_1)/(2y_1^3 + 2y_1x_1^2 + y_1)$
 4.9.3. $\frac{-1}{1 + x^2}$
 4.9.5. $\frac{2x}{\sqrt{1 - x^4}}$
 4.9.6. $\frac{e^x}{1 + e^{2x}}$

- 4.9.7. $-3x^2 \cos(x^3)/\sqrt{1 - \sin^2(x^3)}$
 4.9.8. $\frac{2}{(\arcsin x)\sqrt{1 - x^2}}$
 4.9.9. $-e^x/\sqrt{1 - e^{2x}}$
 4.9.10. 0
 4.9.11. $\frac{(1 + \ln x)x^x}{\ln 5(1 + x^{2x}) \arctan(x^x)}$
 4.10.1. 0
 4.10.2. ∞
 4.10.3. 1
 4.10.4. 0
 4.10.5. 0
 4.10.6. 1
 4.10.7. $1/6$
 4.10.8. $-\infty$
 4.10.9. $1/16$
 4.10.10. $1/3$
 4.10.11. 0
 4.10.12. $3/2$
 4.10.13. $-1/4$
 4.10.14. -3
 4.10.15. $1/2$
 4.10.16. 0
 4.10.17. -1
 4.10.18. $-1/2$
 4.10.19. 5
 4.10.20. ∞
 4.10.21. ∞
 4.10.22. $2/7$
 4.10.23. 2
 4.10.24. $-\infty$
 4.10.25. 3

- 4.10.26. $2/3$
 4.10.27. 1
 4.10.28. 1
 4.10.29. 2
 4.10.30. 1
 4.10.31. 0
 4.10.32. $1/2$
 4.10.33. 2
 4.10.34. 0
 4.10.35. ∞
 4.10.36. $1/2$
 4.10.37. 0
 4.10.38. $1/2$
 4.10.39. 5
 4.10.40. $2\sqrt{2}$
 4.10.41. $-1/2$
 4.10.42. 2
 4.10.43. 0
 4.10.44. ∞
 4.10.45. 0
 4.10.46. $3/2$
 4.10.47. ∞
 4.10.48. 5
 4.10.49. $-1/2$
 4.10.50. does not exist
 4.10.51. ∞
 4.10.52. $y = 1$ and $y = -1$
 5.1.1. min at $x = 1/2$
 5.1.2. min at $x = -1$, max at $x = 1$
 5.1.3. max at $x = 2$, min at $x = 4$
 5.1.4. min at $x = \pm 1$, max at $x = 0$.
 5.1.5. min at $x = 1$
 5.1.6. none
 5.1.7. none
 5.1.8. min at $x = 7\pi/12 + k\pi$, max at
 $x = -\pi/12 + k\pi$, for integer k .
 5.1.9. none
 5.1.10. local max at $x = 5$
 5.1.11. local min at $x = 49$
 5.1.12. local min at $x = 0$
 5.1.15. one
 5.2.1. min at $x = 1/2$
 5.2.2. min at $x = -1$, max at $x = 1$
 5.2.3. max at $x = 2$, min at $x = 4$
 5.2.4. min at $x = \pm 1$, max at $x = 0$.
 5.2.5. min at $x = 1$
 5.2.6. none
 5.2.7. none
 5.2.8. min at $x = 7\pi/12 + k\pi$, max at
 $x = -\pi/12 + k\pi$, for integer k .
 5.2.9. none
 5.2.10. max at $x = 0$, min at $x = \pm 11$
 5.2.11. min at $x = -3/2$, neither at $x = 0$
 5.2.13. min at $n\pi$, max at $\pi/2 + n\pi$
 5.2.14. min at $2n\pi$, max at $(2n + 1)\pi$
 5.2.15. min at $\pi/2 + 2n\pi$, max at $3\pi/2 + 2n\pi$
 5.3.1. min at $x = 1/2$
 5.3.2. min at $x = -1$, max at $x = 1$
 5.3.3. max at $x = 2$, min at $x = 4$
 5.3.4. min at $x = \pm 1$, max at $x = 0$.
 5.3.5. min at $x = 1$
 5.3.6. none
 5.3.7. none

- 5.3.8. min at $x = 7\pi/12 + n\pi$, max at
 $x = -\pi/12 + n\pi$, for integer n .
 5.3.9. max at $x = 63/64$
 5.3.10. max at $x = 7$
 5.3.11. max at $-5^{-1/4}$, min at $5^{-1/4}$
 5.3.12. none
 5.3.13. max at -1 , min at 1
 5.3.14. min at $2^{-1/3}$
 5.3.15. none
 5.3.16. min at $n\pi$
 5.3.17. max at $n\pi$, min at $\pi/2 + n\pi$
 5.3.18. max at $\pi/2 + 2n\pi$, min at $3\pi/2 + 2n\pi$
 5.4.1. concave up everywhere
 5.4.2. concave up when $x < 0$, concave
 down when $x > 0$
 5.4.3. concave down when $x < 3$, concave
 up when $x > 3$
 5.4.4. concave up when $x < -1/\sqrt{3}$ or
 $x > 1/\sqrt{3}$, concave down when
 $-1/\sqrt{3} < x < 1/\sqrt{3}$
 5.4.5. concave up when $x < 0$ or $x > 2/3$,
 concave down when $0 < x < 2/3$
 5.4.6. concave up when $x < 0$, concave
 down when $x > 0$
 5.4.7. concave up when $x < -1$ or $x > 1$,
 concave down when $-1 < x < 0$ or
 $0 < x < 1$
 5.4.8. concave down on $((8n - 1)\pi/4, (8n +$
 $3)\pi/4)$, concave up on $((8n +$
 $3)\pi/4, (8n + 7)\pi/4)$, for integer n
 5.4.9. concave down everywhere
 5.4.10. concave up on $(-\infty, (21 - \sqrt{497})/4)$
 and $(21 + \sqrt{497})/4, \infty)$
 5.4.11. concave up on $(0, \infty)$
 5.4.12. concave down on $(2n\pi/3, (2n +$
 $1)\pi/3)$
 5.4.13. concave up on $(0, \infty)$
 5.4.14. concave up on $(-\infty, -1)$ and $(0, \infty)$
 5.4.15. concave down everywhere
 5.4.16. concave up everywhere
 5.4.17. concave up on $(\pi/4 + n\pi, 3\pi/4 + n\pi)$
 5.4.18. inflection points at $n\pi$,
 $\pm \arcsin(\sqrt{2/3}) + n\pi$
 5.4.19. up/incr: $(3, \infty)$, up/decr: $(-\infty, 0)$,
 $(2, 3)$, down/decr: $(0, 2)$
 6.1.1. max at $(2, 5)$, min at $(0, 1)$
 6.1.2. 25×25
 6.1.3. $P/4 \times P/4$
 6.1.4. $w = l = 2 \cdot 5^{2/3}$, $h = 5^{2/3}$, $h/w =$
 $1/2$
 6.1.5. $\sqrt[3]{100} \times \sqrt[3]{100} \times 2\sqrt[3]{100}$, $h/s = 2$
 6.1.6. $w = l = 2^{1/3}V^{1/3}$, $h = V^{1/3}/2^{2/3}$,
 $h/w = 1/2$
 6.1.7. 1250 square feet
 6.1.8. $l^2/8$ square feet
 6.1.9. \$5000
 6.1.10. 100
 6.1.11. r^2
 6.1.12. $h/r = 2$
 6.1.13. $h/r = 2$
 6.1.14. $r = 5$, $h = 40/\pi$, $h/r = 8/\pi$
 6.1.15. $8/\pi$
 6.1.16. $4/27$
 6.1.17. Go direct from A to D .
 6.1.18. (a) 2, (b) $7/2$
 6.1.19. $\frac{\sqrt{3}}{6} \times \frac{\sqrt{3}}{6} + \frac{1}{2} \times \frac{1}{4} - \frac{\sqrt{3}}{12}$

- 6.1.20. (a) $a/6$, (b) $(a + b -$
 $\sqrt{a^2 - ab + b^2})/6$
 6.1.21. 1.5 meters wide by 1.25 meters tall
 6.1.22. If $k \leq 2/\pi$ the ratio is $(2 - k\pi)/4$;
 if $k \geq 2/\pi$, the ratio is zero: the
 window should be semicircular with
 no rectangular part.
 6.1.23. a/b
 6.1.24. $w = 2r/\sqrt{3}$, $h = 2\sqrt{2}r/\sqrt{3}$
 6.1.25. $1/\sqrt{3} \approx 58\%$
 6.1.26. $18 \times 18 \times 36$
 6.1.27. $r = 5/(2\pi)^{1/3} \approx 2.7$ cm,
 $h = 5 \cdot 2^{5/3}/\pi^{1/3} = 4r \approx 10.8$ cm
 6.1.28. $h = \frac{750}{\pi} \left(\frac{2\pi^2}{750^2} \right)^{1/3}$, $r =$
 $\left(\frac{750^2}{2\pi^2} \right)^{1/6}$
 6.1.29. $h/r = \sqrt{2}$
 6.1.30. The ratio of the volume of the
 sphere to the volume of the cone is
 $1033/4096 + 33/4096\sqrt{17} \approx 0.2854$,
 so the cone occupies approximately
 28.54% of the sphere.
 6.1.31. P should be at distance $c\sqrt[3]{a}/(\sqrt[3]{a} +$
 $\sqrt[3]{b})$ from charge A .
 6.1.32. $1/2$
 6.1.33. \$7000
 6.1.34. There is a critical point when
 $\sin \theta_1/v_1 = \sin \theta_2/v_2$, and the
 second derivative is positive, so
 there is a minimum at the critical
 point.
 6.2.1. $1/(16\pi)$ cm/s
 6.2.2. $3/(1000\pi)$ meters/second
 6.2.3. $1/4$ m/s
 6.2.4. $-6/25$ m/s
 6.2.5. 80π mi/min
 6.2.6. $3\sqrt{5}$ ft/s
 6.2.7. $20/(3\pi)$ cm/s
 6.2.8. $13/20$ ft/s
 6.2.9. $5\sqrt{10}/2$ m/s
 6.2.10. $75/64$ m/min
 6.2.11. $145\pi/72$ m/s
 6.2.12. $25\pi/144$ m/min
 6.2.13. $\pi\sqrt{2}/36$ ft³/s
 6.2.14. tip: 6 ft/s, length: 5/2 ft/s
 6.2.15. tip: 20/11 m/s, length: 9/11 m/s
 6.2.16. $380/\sqrt{3} - 150 \approx 69.4$ mph
 6.2.17. $500/\sqrt{3} - 200 \approx 88.7$ km/hr
 6.2.18. 18 m/s
 6.2.19. $136\sqrt{475}/19 \approx 156$ km/hr
 6.2.20. -50 m/s
 6.2.21. 68 m/s
 6.2.22. $3800/\sqrt{329} \approx 210$ km/hr
 6.2.23. $820/\sqrt{329} + 150\sqrt{57}/\sqrt{47} \approx 210$ km/hr
 6.2.24. 4000/49 m/s
 6.2.25. (a) $x = a \cos \theta - a \sin \theta \cot(\theta + \beta) =$
 $a \sin \beta / \sin(\theta + \beta)$, (c) $\dot{x} \approx 3.79$ cm/s
 6.3.1. $x_3 = 1.475773162$
 6.3.2. 2.15
 6.3.3. 3.36
 6.3.4. 2.19 or 1.26
 6.4.1. $\Delta y = 65/16$, $dy = 2$
 6.4.2. $\Delta y = \sqrt{11/10} - 1$, $dy = 0.05$
 6.4.3. $\Delta y = \sin(\pi/50)$, $dy = \pi/50$

- 6.4.4. $dV = 8\pi/25$
 6.5.1. $c = 1/2$
 6.5.2. $c = \sqrt{18} - 2$
 6.5.6. $x^3/3 + 47x^2/2 - 5x + k$
 6.5.7. $\arctan x + k$
 6.5.8. $x^4/4 - \ln x + k$
 6.5.9. $-\cos(2x)/2 + k$
 7.1.1. 10
 7.1.2. 35/3
 7.1.3. x^2
 7.1.4. $2x^2$
 7.1.5. $2x^2 - 8$
 7.1.6. $2b^2 - 2a^2$
 7.1.7. 4 rectangles: $41/4 = 10.25$,
 8 rectangles: $183/16 = 11.4375$
 7.1.8. 23/4
 7.2.1. $(16/3)x^{3/2} + C$
 7.2.2. $t^3 + t + C$
 7.2.3. $8\sqrt{x} + C$
 7.2.4. $-2/z + C$
 7.2.5. $7 \ln s + C$
 7.2.6. $(5x + 1)^3/15 + C$
 7.2.7. $(x - 6)^3/3 + C$
 7.2.8. $2x^{5/2}/5 + C$
 7.2.9. $-4/\sqrt{x} + C$
 7.2.10. $4t - t^2 + C$, $t < 2$; $t^2 - 4t + 8 + C$,
 $t \geq 2$
 7.2.11. 87/2
 7.2.12. 2
 7.2.13. $\ln(10)$
 7.2.14. $e^5 - 1$
 7.2.15. $3^4/4$

- 7.2.16. $2^6/6 - 1/6$
 7.2.17. $x^2 - 3x$
 7.2.18. $2x(x^4 - 3x^2)$
 7.2.19. e^{x^2}
 7.2.20. $2xe^{x^3}$
 7.2.21. $\tan(x^2)$
 7.2.22. $2x \tan(x^4)$
 7.3.1. It rises until $t = 100/49$, then falls.
 The position of the object at time
 t is $s(t) = -4.9t^2 + 20t + k$. The
 net distance traveled is $-45/2$, that
 is, it ends up 45/2 meters below
 where it started. The total distance
 traveled is 6205/98 meters.
 7.3.2. $\int_0^{2\pi} \sin t \, dt = 0$
 7.3.3. net: 2π , total: $2\pi/3 + 4\sqrt{3}$
 7.3.4. 8
 7.3.5. 17/3
 7.3.6. $A = 18$, $B = 44/3$, $C = 10/3$
 8.1.1. $-(1-t)^{10}/10 + C$
 8.1.2. $x^5/5 + 2x^3/3 + x + C$
 8.1.3. $(x^2 + 1)^{101}/202 + C$
 8.1.4. $-3(1-5t)^{2/3}/10 + C$
 8.1.5. $(\sin^4 x)/4 + C$
 8.1.6. $-(100 - x^2)^{3/2}/3 + C$
 8.1.7. $-2\sqrt{1-x^3}/3 + C$
 8.1.8. $\sin(\sin \pi t)/\pi + C$
 8.1.9. $1/(2 \cos^2 x) = (1/2) \sec^2 x + C$
 8.1.10. $-\ln|\cos x| + C$
 8.1.11. 0
 8.1.12. $\tan^2(x)/2 + C$

- 8.1.13. 1/4
 8.1.14. $-\cos(\tan x) + C$
 8.1.15. 1/10
 8.1.16. $\sqrt{3}/4$
 8.1.17. $(27/8)(x^2 - 7)^{8/9}$
 8.1.18. $-(3^7 + 1)/14$
 8.1.19. 0
 8.1.20. $f(x)^2/2$
 8.2.1. $x/2 - \sin(2x)/4 + C$
 8.2.2. $-\cos x + (\cos^3 x)/3 + C$
 8.2.3. $3x/8 - (\sin 2x)/4 + (\sin 4x)/32 + C$
 8.2.4. $(\cos^5 x)/5 - (\cos^3 x)/3 + C$
 8.2.5. $\sin x - (\sin^3 x)/3 + C$
 8.2.6. $x/8 - (\sin 4x)/32 + C$
 8.2.7. $(\sin^3 x)/3 - (\sin^5 x)/5 + C$
 8.2.8. $-2(\cos x)^{5/2}/5 + C$
 8.2.9. $\tan x - \cot x + C$
 8.2.10. $(\sec^3 x)/3 - \sec x + C$
 8.3.1. $-\ln|\csc x + \cot x| + C$
 8.3.2. $-\csc x \cot x/2 - (1/2) \ln|\csc x + \cot x| + C$
 8.3.3. $x\sqrt{x^2-1}/2 - \ln|x + \sqrt{x^2-1}|/2 + C$
 8.3.4. $x\sqrt{9+4x^2}/2 + (9/4) \ln|2x + \sqrt{9+4x^2}| + C$
 8.3.5. $-(1-x^2)^{3/2}/3 + C$
 8.3.6. $\arcsin(x)/8 - \sin(4 \arcsin x)/32 + C$
 8.3.7. $\ln|x + \sqrt{1+x^2}| + C$
 8.3.8. $(x + 1)\sqrt{x^2 + 2x}/2 - \ln|x + 1 + \sqrt{x^2 + 2x}|/2 + C$
 8.3.9. $-\arctan x - 1/x + C$
 8.3.10. $2 \arcsin(x/2) - x\sqrt{4-x^2}/2 + C$

- 8.3.11. $\arcsin(\sqrt{x}) - \sqrt{x}\sqrt{1-x} + C$
 8.3.12. $(2x^2 + 1)\sqrt{4x^2 - 1}/24 + C$
 8.4.1. $\cos x + x \sin x + C$
 8.4.2. $x^2 \sin x - 2 \sin x + 2x \cos x + C$
 8.4.3. $(x-1)e^x + C$
 8.4.4. $(1/2)e^{x^2} + C$
 8.4.5. $(x/2) - \sin(2x)/4 + C = (x/2) - (\sin x \cos x)/2 + C$
 8.4.6. $x \ln x - x + C$
 8.4.7. $(x^2 \arctan x + \arctan x - x)/2 + C$
 8.4.8. $-x^2 \cos x + 2x \sin x + 2 \cos x + C$
 8.4.9. $x^2/4 - (\cos^2 x)/4 - (x \sin x \cos x)/2 + C$
 8.4.10. $x/4 - (x \cos^2 x)/2 + (\cos x \sin x)/4 + C$
 8.4.11. $x \arctan(\sqrt{x}) + \arctan(\sqrt{x}) - \sqrt{x} + C$
 8.4.12. $2 \sin(\sqrt{x}) - 2\sqrt{x} \cos(\sqrt{x}) + C$
 8.4.13. $\sec x \csc x - 2 \cot x + C$
 8.5.1. $-\ln|x-2|/4 + \ln|x+2|/4 + C$
 8.5.2. $-x^3/3 - 4x - 4 \ln|x-2| + 4 \ln|x+2| + C$
 8.5.3. $-1/(x+5) + C$
 8.5.4. $-x - \ln|x-2| + \ln|x+2| + C$
 8.5.5. $-4x + x^3/3 + 8 \arctan(x/2) + C$
 8.5.6. $(1/2) \arctan(x/2 + 5/2) + C$
 8.5.7. $x^2/2 - 2 \ln(4+x^2) + C$
 8.5.8. $(1/4) \ln|x+3| - (1/4) \ln|x+7| + C$
 8.5.9. $(1/5) \ln|2x-3| - (1/5) \ln|1+x| + C$
 8.5.10. $(1/3) \ln|x| - (1/3) \ln|x+3| + C$
 8.6.1. $\frac{(t+4)^4}{4} + C$
 8.6.2. $\frac{(t^2-9)^{5/2}}{5} + C$

- 8.6.3. $\frac{(e^{t^2} + 16)^2}{4} + C$
 8.6.4. $\cos t - \frac{2}{3} \cos^3 t + C$
 8.6.5. $\frac{\tan^2 t}{2} + C$
 8.6.6. $\ln|t^2 + t + 3| + C$
 8.6.7. $\frac{1}{8} \ln|1 - 4/t^2| + C$
 8.6.8. $\frac{1}{25} \tan(\arcsin(t/5)) + C = \frac{t}{25\sqrt{25-t^2}} + C$
 8.6.9. $\frac{2}{3} \sqrt{\sin 3t} + C$
 8.6.10. $t \tan t + \ln|\cos t| + C$
 8.6.11. $2\sqrt{e^t + 1} + C$
 8.6.12. $\frac{3t}{8} + \frac{\sin 2t}{4} + \frac{\sin 4t}{32} + C$
 8.6.13. $\frac{\ln|t|}{3} - \frac{\ln|t+3|}{3} + C$
 8.6.14. $\frac{-1}{\sin \arctan t} + C = -\sqrt{1+t^2}/t + C$
 8.6.15. $\frac{-1}{2(1+\tan t)^2} + C$
 8.6.16. $\frac{(t^2+1)^{5/2}}{5} - \frac{(t^2+1)^{3/2}}{3} + C$
 8.6.17. $\frac{e^t \sin t - e^t \cos t}{2} + C$
 8.6.18. $\frac{(t^{3/2} + 47)^4}{6} + C$
 8.6.19. $\frac{2}{3(2-t^2)^{3/2}} - \frac{1}{(2-t^2)^{1/2}} + C$
 8.6.20. $\frac{\ln|\sin(\arctan(2t/3))|}{9} + C = \frac{(\ln(4t^2) - \ln(9+4t^2))/18}{9} + C$
 8.6.21. $\frac{(\arctan(2t))^2}{4} + C$
 8.6.22. $\frac{3 \ln|t+3|}{4} + \frac{\ln|t-1|}{4} + C$

- 8.6.23. $\frac{\cos^7 t}{7} - \frac{\cos^5 t}{5} + C$
 8.6.24. $\frac{-1}{t-3} + C$
 8.6.25. $\frac{-1}{\ln t} + C$
 8.6.26. $\frac{t^2(\ln t)^2}{2} - \frac{t^2 \ln t}{2} + \frac{t^2}{4} + C$
 8.6.27. $(t^3 - 3t^2 + 6t - 6)e^t + C$
 8.6.28. $\frac{5 + \sqrt{5}}{10} \ln(2t + 1 - \sqrt{5}) + \frac{5 - \sqrt{5}}{10} \ln(2t + 1 + \sqrt{5}) + C$
 9.1.1. $8\sqrt{2}/15$
 9.1.2. 1/12
 9.1.3. 9/2
 9.1.4. 4/3
 9.1.5. $2/3 - 2/\pi$
 9.1.6. $3/\pi - 3\sqrt{3}/(2\pi) - 1/8$
 9.1.7. 1/3
 9.1.8. $10\sqrt{5}/3 - 6$
 9.1.9. 500/3
 9.1.10. 2
 9.1.11. 1/5
 9.1.12. 1/6
 9.2.1. $1/\pi$, $5/\pi$
 9.2.2. 0, 245
 9.2.3. 20, 28
 9.2.4. $(3-\pi)/(2\pi)$, $(18-12\sqrt{3}+\pi)/(4\pi)$
 9.2.5. 10/49 meters, 20/49 seconds
 9.2.6. 45/98 meters, 30/49 seconds
 9.2.7. 25000/49 meters, 1000/49 seconds

- 9.2.8. $s(t) = \cos t$, $v(t) = -\sin t$,
 maximum distance is 1,
 maximum speed is 1
 9.2.9. $s(t) = -\sin(\pi t)/\pi^2 + t/\pi$,
 $v(t) = -\cos(\pi t)/\pi + 1/\pi$,
 maximum speed is $2/\pi$
 9.2.10. $s(t) = t^2/2 - \sin(\pi t)/\pi^2 + t/\pi$,
 $v(t) = t - \cos(\pi t)/\pi + 1/\pi$
 9.2.11. $s(t) = t^2/2 + \sin(\pi t)/\pi^2 - t/\pi$,
 $v(t) = t + \cos(\pi t)/\pi - 1/\pi$
 9.3.5. $8\pi/3$
 9.3.6. $\pi/30$
 9.3.7. $\pi(\pi/2 - 1)$
 9.3.8. (a) $114\pi/5$ (b) $74\pi/5$ (c) 20π
 (d) 4π
 9.3.9. 16π , 24π
 9.3.11. $\pi h^2(3r-h)/3$
 9.3.13. 2π
 9.4.1. $2/\pi$; $2/\pi$; 0
 9.4.2. 4/3
 9.4.3. 1/4
 9.4.4. $\pi/4$
 9.4.5. $-1/3$, 1
 9.4.6. $-4\sqrt{1224}$ ft/s; $-8\sqrt{1224}$ ft/s
 9.5.1. $\approx 5,305,028,517$ N-m
 9.5.2. $\approx 4,457,854,041$ N-m
 9.5.3. 367,500 N-m
 9.5.4. $49000\pi + 196000/3$
 9.5.5. 2450 N-m
 9.5.6. 0.05 N-m
 9.5.7. 6/5 N-m
 9.5.8. 3920 N-m
 9.5.9. 23520 N-m

- 9.6.1. 15/2
 9.6.2. 5
 9.6.3. 16/5
 9.6.5. $\bar{x} = 45/28$, $\bar{y} = 93/70$
 9.6.6. $\bar{x} = 0$, $\bar{y} = 4/(3\pi)$
 9.6.7. $\bar{x} = 1/2$, $\bar{y} = 2/5$
 9.6.8. $\bar{x} = 0$, $\bar{y} = 8/5$
 9.6.9. $\bar{x} = 4/7$, $\bar{y} = 2/5$
 9.6.10. $\bar{x} = \bar{y} = 1/5$
 9.6.11. $\bar{x} = 0$, $\bar{y} = 28/(9\pi)$
 9.6.12. $\bar{x} = \bar{y} = 28/(9\pi)$
 9.7.1. ∞
 9.7.2. 1/2
 9.7.3. diverges
 9.7.4. diverges
 9.7.5. 1
 9.7.6. diverges
 9.7.7. 2
 9.7.8. diverges
 9.7.9. $\pi/6$
 9.7.10. diverges, 0
 9.7.11. diverges, 0
 9.7.12. diverges, no CPV
 9.7.13. π
 9.7.14. 80 mph: 90.8 to 95.3 N
 90 mph: 114.9 to 120.6 N
 100.9 mph: 144.5 to 151.6 N
 9.8.2. $\mu = 1/c$, $\sigma = 1/c$
 9.8.3. $\mu = (a+b)/2$, $\sigma = (a-b)^2/12$
 9.8.4. 7/2
 9.8.5. 21/2
 9.8.9. $r = 6$

- 9.9.1. $(22\sqrt{22} - 8)/27$
 9.9.2. $\ln(2) + 3/8$
 9.9.3. $a + a^3/3$
 9.9.4. $\ln((\sqrt{2} + 1)/\sqrt{3})$
 9.9.6. $3/4$
 9.9.7. ≈ 3.82
 9.9.8. ≈ 1.01
 9.9.9. $\sqrt{1+e^2} - \sqrt{2} + \frac{1}{2} \ln\left(\frac{\sqrt{1+e^2}-1}{\sqrt{1+e^2}+1}\right) + \frac{1}{2} \ln(3+2\sqrt{2})$
 9.10.1. $8\pi\sqrt{3} - \frac{16\pi\sqrt{2}}{3}$
 9.10.3. $\frac{730\pi\sqrt{730}}{27} - \frac{10\pi\sqrt{10}}{27}$
 9.10.4. $\pi + 2\pi e + \frac{1}{4}\pi e^2 - \frac{\pi}{4e^2} - \frac{2\pi}{e}$
 9.10.6. $8\pi^2$
 9.10.7. $2\pi + \frac{8\pi^2}{3\sqrt{3}}$
 9.10.8. $a > b$: $2\pi b^2 + \frac{2\pi a^2 b}{\sqrt{a^2 - b^2}} \arcsin(\sqrt{a^2 - b^2}/a)$,
 $a < b$: $2\pi b^2 + \frac{2\pi a^2 b}{\sqrt{b^2 - a^2}} \ln\left(\frac{b}{a} + \frac{\sqrt{b^2 - a^2}}{a}\right)$
 10.1.2. $\theta = \arctan(3)$
 10.1.3. $r = -4 \csc \theta$
 10.1.4. $r = \sec \theta \csc^2 \theta$
 10.1.5. $r = \sqrt{5}$
 10.1.6. $r^2 = \sin \theta \sec^3 \theta$
 10.1.7. $r \sin \theta = \sin(r \cos \theta)$
 10.1.8. $r = 2/(\sin \theta - 5 \cos \theta)$
 10.1.9. $r = 2 \sec \theta$
 10.1.10. $0 = r^2 \cos^2 \theta - r \sin \theta + 1$
 10.1.11. $0 = 3r^2 \cos^2 \theta - 2r \cos \theta - r \sin \theta$
 10.1.12. $r = \sin \theta$
 10.1.21. $(x^2 + y^2)^2 = 4x^2 y - (x^2 + y^2)y$
 10.1.22. $(x^2 + y^2)^{3/2} = y^2$
 10.1.23. $x^2 + y^2 = x^2 y^2$
 10.1.24. $x^4 + x^2 y^2 = y^2$
 10.2.1. $(\theta \cos \theta + \sin \theta)/(-\theta \sin \theta + \cos \theta)$,
 $(\theta^2 + 2)/(-\theta \sin \theta + \cos \theta)^3$
 10.2.2. $\frac{\cos \theta + 2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta - \sin \theta}$,
 $\frac{3(1 + \sin \theta)}{(\cos^2 \theta - \sin^2 \theta - \sin \theta)^3}$
 10.2.3. $(\sin^2 \theta - \cos^2 \theta)/(2 \sin \theta \cos \theta)$,
 $-1/(4 \sin^3 \theta \cos^3 \theta)$
 10.2.4. $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$, $\frac{2}{(\cos^2 \theta - \sin^2 \theta)^3}$
 10.2.5. undefined
 10.2.6. $\frac{2 \sin \theta - 3 \sin^3 \theta}{3 \cos^3 \theta - 2 \cos \theta}$,
 $\frac{3 \cos^4 \theta - 3 \cos^2 \theta + 2}{2 \cos^3 \theta (3 \cos^2 \theta - 2)^3}$
 10.3.1. 1
 10.3.2. $9\pi/2$
 10.3.3. $\sqrt{3}/3$
 10.3.4. $\pi/12 + \sqrt{3}/16$
 10.3.5. $\pi a^2/4$
 10.3.6. $41\pi/2$
 10.3.7. $2 - \pi/2$
 10.3.8. $\pi/12$
 10.3.9. $3\pi/16$
 10.3.10. $\pi/4 - 3\sqrt{3}/8$
 10.3.11. $\pi/2 + 3\sqrt{3}/8$
 10.3.12. 1

- 10.3.13. $3/2 - \pi/4$
 10.3.14. $\pi/3 + \sqrt{3}/2$
 10.3.15. $\pi/3 - \sqrt{3}/4$
 10.3.16. $4\pi^3/3$
 10.3.17. π^2
 10.3.18. $5\pi/24 - \sqrt{3}/4$
 10.3.19. $7\pi/12 - \sqrt{3}$
 10.3.20. $4\pi - \sqrt{15}/2 - 7 \arccos(1/4)$
 10.3.21. $3\pi^3$
 10.4.6. $x = t - \frac{\sin(t)}{2}$, $t = 1 - \frac{\cos(t)}{2}$
 10.4.7. $x = 4 \cos t - \cos(4t)$,
 $y = 4 \sin t - \sin(4t)$
 10.4.8. $x = 2 \cos t + \cos(2t)$,
 $y = 2 \sin t - \sin(2t)$
 10.4.9. $x = \cos t + t \sin t$,
 $y = \sin t - t \cos t$
 10.5.1. There is a horizontal tangent at all multiples of π .
 10.5.2. $9\pi/4$
 10.5.3. $\int_0^{2\pi} \frac{1}{2} \sqrt{5 - 4 \cos t} dt$
 10.5.4. Four points:
 $\left(\frac{-3 - 3\sqrt{5}}{4}, \pm \sqrt{\frac{5 - \sqrt{5}}{8}}\right)$,
 $\left(\frac{-3 + 3\sqrt{5}}{4}, \pm \sqrt{\frac{5 + \sqrt{5}}{8}}\right)$
 10.5.5. $11\pi/3$
 10.5.6. $32/3$
 10.5.7. 2π
 10.5.8. $16/3$
 10.5.9. $(\pi/2, 1)$
 10.5.10. $5\pi^3/6$
 10.5.11. $2\pi^2$
 10.5.12. $(2\pi\sqrt{4\pi^2 + 1} + \ln(2\pi + \sqrt{4\pi^2 + 1}))/2$
 11.1.1. 1
 11.1.3. 0
 11.1.4. 1
 11.1.5. 1
 11.1.6. 0
 11.2.1. $\lim_{n \rightarrow \infty} n^2/(2n^2 + 1) = 1/2$
 11.2.2. $\lim_{n \rightarrow \infty} 5/(2^{1/n} + 14) = 1/3$
 11.2.3. If $\sum_{n=1}^{\infty} \frac{3}{n}$ converges so does $\frac{1}{3} \sum_{n=1}^{\infty} \frac{3}{n} = \sum_{n=1}^{\infty} \frac{1}{n}$, but the latter in fact diverges.
 11.2.4. $-3/2$
 11.2.5. 11
 11.3.1. diverges
 11.3.2. diverges
 11.3.3. converges
 11.3.4. converges
 11.3.5. converges
 11.3.6. converges
 11.3.7. diverges
 11.3.8. converges
 11.3.9. $N = 5$
 11.3.10. $N = 10$
 11.3.11. $N = 1687$
 11.3.12. any integer greater than e^{200}
 11.4.1. converges
 11.4.2. converges

- 11.4.3. diverges
 11.4.4. converges
 11.4.5. 0.90
 11.4.6. 0.95
 11.5.1. converges
 11.5.2. converges
 11.5.3. converges
 11.5.4. diverges
 11.5.5. diverges
 11.5.6. diverges
 11.5.7. converges
 11.5.8. diverges
 11.5.9. converges
 11.5.10. diverges
 11.6.1. converges absolutely
 11.6.2. diverges
 11.6.3. converges conditionally
 11.6.4. converges absolutely
 11.6.5. converges conditionally
 11.6.6. converges absolutely
 11.6.7. diverges
 11.6.8. converges conditionally
 11.7.5. converges
 11.7.6. converges
 11.7.7. converges
 11.7.8. diverges
 11.8.1. $R = 1$, $I = (-1, 1)$
 11.8.2. $R = \infty$, $I = (-\infty, \infty)$
 11.8.3. $R = e$, $I = (-e, e)$
 11.8.4. $R = e$, $I = (2 - e, 2 + e)$
 11.8.5. $R = 0$, converges only when $x = 2$
 11.8.6. $R = 1$, $I = [-6, -4]$
 11.9.1. the alternating harmonic series
 11.9.2. $\sum_{n=0}^{\infty} (n+1)x^n$
 11.9.3. $\sum_{n=0}^{\infty} (n+1)(n+2)x^n$
 11.9.4. $\sum_{n=0}^{\infty} \frac{(n+1)(n+2)}{2} x^n$, $R = 1$
 11.9.5. $C + \sum_{n=0}^{\infty} \frac{-1}{(n+1)(n+2)} x^{n+2}$
 11.10.1. $\sum_{n=0}^{\infty} (-1)^n x^{2n}/(2n)!$, $R = \infty$
 11.10.2. $\sum_{n=0}^{\infty} x^n/n!$, $R = \infty$
 11.10.3. $\sum_{n=0}^{\infty} (-1)^n \frac{(x-5)^n}{5^{n+1}}$, $R = 5$
 11.10.4. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-1)^n}{n}$, $R = 1$
 11.10.5. $\ln(2) + \sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-2)^n}{n2^n}$, $R = 2$
 11.10.6. $\sum_{n=0}^{\infty} (-1)^n (n+1)(x-1)^n$, $R = 1$
 11.10.7. $1 + \sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{n!2^n} x^n = 1 + \sum_{n=1}^{\infty} \frac{(2n-1)!}{2^{2n-1}(n-1)!n!} x^n$, $R = 1$
 11.10.8. $x + x^3/3$
 11.10.9. $\sum_{n=0}^{\infty} (-1)^n x^{4n+1}/(2n)!$
 11.10.10. $\sum_{n=0}^{\infty} (-1)^n x^{n+1}/n!$

- 11.11.1. $1 - \frac{x^2}{2} + \frac{x^4}{24} - \frac{x^6}{720} + \cdots + \frac{x^{12}}{12!}$
 11.11.2. 1000; 8
 11.11.3. $x + \frac{x^3}{3} + \frac{2x^5}{15}$, error ± 1.27 .
 11.12.1. diverges
 11.12.2. converges
 11.12.3. converges
 11.12.4. diverges
 11.12.5. diverges
 11.12.6. diverges
 11.12.7. converges
 11.12.8. converges
 11.12.9. converges
 11.12.10. converges
 11.12.11. converges
 11.12.12. converges
 11.12.13. converges
 11.12.14. converges
 11.12.15. converges
 11.12.16. converges
 11.12.17. diverges
 11.12.18. $(-\infty, \infty)$
 11.12.19. $(-3, 3)$
 11.12.20. $(-3, 3)$
 11.12.21. $(-1, 1)$
 11.12.22. radius is 0—it converges only when $x = 0$
 11.12.23. $(-\sqrt{3}, \sqrt{3})$
 11.12.24. $(-\infty, \infty)$
 11.12.25. $\sum_{n=0}^{\infty} \frac{(\ln(2))^n}{n!} x^n$
 11.12.26. $\sum_{n=0}^{\infty} \frac{(-1)^n}{n+1} x^{n+1}$
 11.12.27. $\sum_{n=0}^{\infty} \frac{2}{2n+1} x^{2n+1}$
 11.12.28. $1 + x/2 + \sum_{n=2}^{\infty} (-1)^{n+1} \frac{1 \cdot 3 \cdot 5 \cdots (2n-3)}{2^n n!} x^n$
 11.12.29. $\sum_{n=0}^{\infty} (-1)^n x^{2n}$
 11.12.30. $\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} x^{2n+1}$
 11.12.31. $\pi = \sum_{n=0}^{\infty} (-1)^n \frac{4}{2n+1}$