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. $y = 75t$ (t in hours); 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) $y = \begin{cases} 0 & 0 \le x < 100 \\ (x/10) - 10 & 100 \le x \le 1000 \\ x - 910 & 1000 < x \end{cases}$

1.1.16. $y = \begin{cases} 0.15x & 0 \le x \le 19450 \\ 0.28x - 2528.50 & 19450 < x \le 47050 \\ 0.33x - 4881 & 47050 < x \le 97620 \end{cases}$

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) $(x+5)^2 + (y+6)^2 = 9$
(d) $x^2 + (y-3)^2 = 9$
(e) $x^2 + (y+3)^2 = 9$
(f) $(x-3)^2 + y^2 = 9$

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. $\{x \mid x \ge 3/2\}$

1.3.2. $\{x \mid x \ne -1\}$

1.3.3. $\{x \mid x \ne 1 \text{ and } x \ne -1\}$

1.3.4. $\{x \mid x < 0\}$

1.3.5. $\{x \mid x \in \mathbb{R}\}$, i.e., all x

1.3.6. $\{x \mid x \ge 0\}$

1.3.7. $\{x \mid h - r \le x \le h + r\}$

1.3.8. $\{x \mid x \ge 1 \text{ or } x < 0\}$

1.3.9. $\{x \mid -1/3 < x < 1/3\}$

1.3.10. $\{x \mid x \ge 0 \text{ and } x \ne 1\}$

1.3.11. $\{x \mid x \ge 0 \text{ and } x \ne 1\}$

1.3.12. $\mathbb{R}$

1.3.13. $\{x \mid x \ge 3\}$, $\{x \mid x \ge 0\}$

1.3.14. $A = x(500 - 2x)$, $\{x \mid 0 \le x \le 250\}$

1.3.15. $V = r(50 - \pi r^2)$, $\{r \mid 0 < r \le \sqrt{50/\pi}\}$

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. $-0.107526881,\ -0.11074197,$ $-0.1110741,\ \dfrac{-1}{3(3+\Delta x)} \to \dfrac{-1}{9}$

2.1.4. $\dfrac{3 + 3\Delta x + \Delta x^2}{1 + \Delta x} \to 3$

2.1.5. 3.31, 3.003001, 3.0000, $3 + 3\Delta x + \Delta x^2 \to 3$

2.1.6. m

2.2.1. 10, 25/2, 20, 15, 25, 35.

2.2.2. 5, 4.1, 4.01, 4.001, $4 + \Delta t \to 4$

2.2.3. $-10.29,\ -9.849,\ -9.8049,$ $-9.8 - 4.9\Delta t \to -9.8$

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

2.5.2. Yes; $M = 1$

2.5.3. Yes; $M = 1$

2.5.4. No

2.5.5. No

2.5.6. -0.5 or 1.3 or 3.2

2.5.7. 0.2 or 1.3

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. $6x^2 + 2x - 8$

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. $\displaystyle\sum_{k=1}^{n} k a_k x^{k-1}$

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. $\dfrac{\sqrt{625 - x^2}}{2\sqrt{x}} - \dfrac{x\sqrt{x}}{\sqrt{625 - x^2}}$

3.3.4. $\dfrac{-1}{x^{19}\sqrt{625 - x^2}} - \dfrac{20\sqrt{625 - x^2}}{x^{21}}$

3.3.5. $f' = 4(2x - 3),\ y = 4x - 7$

3.4.1. $\dfrac{3x^2}{x^3 - 5x + 10} - \dfrac{x^3(3x^2 - 5)}{(x^3 - 5x + 10)^2}$

3.4.2. $\dfrac{2x + 5}{x^5 - 6x^3 + 3x^2 - 7x + 1} - \dfrac{(x^2 + 5x - 3)(5x^4 - 18x^2 + 6x - 7)}{(x^5 - 6x^3 + 3x^2 - 7x + 1)^2}$

3.4.3. $\dfrac{1}{2\sqrt{x}\sqrt{625 - x^2}} + \dfrac{x^{3/2}}{(625 - x^2)^{3/2}}$

3.4.4. $\dfrac{-1}{x^{19}\sqrt{625 - x^2}} - \dfrac{20\sqrt{625 - x^2}}{x^{21}}$

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. $\dfrac{1}{4\sqrt{x}(5 - \sqrt{x})^{3/2}}$

3.5.9. $6 + 18x$

3.5.10. $\dfrac{2x + 1}{1 - x} + \dfrac{x^2 + x + 1}{(1 - x)^2}$

3.5.11. $-1/\sqrt{25 - x^2} - \sqrt{25 - x^2}/x^2$

3.5.12. $\dfrac{1}{2}\left(\dfrac{-169}{x^2} - 1\right) \Big/ \sqrt{\dfrac{169}{x} - x}$

3.5.13. $\dfrac{3x^2 - 2x + 1/x^2}{2\sqrt{x^3 - x^2 - (1/x)}}$

3.5.14. $\dfrac{300x}{(100 - x^2)^{5/2}}$

3.5.15. $\dfrac{1 + 3x^2}{3(x + x^3)^{2/3}}$

3.5.16. $\left(4x(x^2 + 1) + \dfrac{4x^3 + 4x}{2\sqrt{1 + (x^2 + 1)^2}}\right) \Big/ 2\sqrt{(x^2 + 1)^2 + \sqrt{1 + (x^2 + 1)^2}}$

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. $6x(2x - 4)^3 + 6(3x^2 + 1)(2x - 4)^2$

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. $y = \dfrac{20 + 2\sqrt{5}}{5\sqrt{4 + \sqrt{5}}}x + \dfrac{3\sqrt{5}}{5\sqrt{4 + \sqrt{5}}}$

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. $\dfrac{\sin x}{2\sqrt{x}} + \sqrt{x}\cos x$

4.4.3. $-\dfrac{\cos x}{\sin^2 x}$

4.4.4. $\dfrac{(2x + 1)\sin x - (x^2 + x)\cos x}{\sin^2 x}$

4.4.5. $\dfrac{-\sin x \cos x}{\sqrt{1 - \sin^2 x}}$

4.5.1. $\cos^2 x - \sin^2 x$

4.5.2. $-\sin x \cos(\cos x)$

4.5.3. $\dfrac{\tan x + x\sec^2 x}{2\sqrt{x}\tan x}$

4.5.4. $\dfrac{\sec^2 x(1 + \sin x) - \tan x \cos x}{(1 + \sin x)^2}$

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. $\dfrac{\sec\theta \tan\theta}{(1 + \sec\theta)^2} = \dfrac{\sin\theta}{(\cos\theta + 1)^2}$

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. $y = \sqrt{3}x/2 + 3/4 - \sqrt{3}\pi/6$

4.5.16. $y = 8\sqrt{3}x + 4 - 8\sqrt{3}\pi/3$

4.5.17. $y = 3\sqrt{3}x/2 - \sqrt{3}\pi/4$

4.5.18. $\pi/6+2n\pi$, $5\pi/6+2n\pi$, any integer n

4.6.1. x/y

4.6.2. $-(2x+y)/(x+2y)$

4.6.3. $(2xy-3x^2-y^2)/(2xy-3y^2-x^2)$

4.6.4. $\sin(x)\sin(y)/(\cos(x)\cos(y))$

4.6.5. $-\sqrt{y}/\sqrt{x}$

4.6.6. $(y\sec^2(x/y)-y^2)/(x\sec^2(x/y)+y^2)$

4.6.7. $(y-\cos(x+y))/(\cos(x+y)-x)$

4.6.8. $-y^2/x^2$

4.6.9. 1

4.6.12. $y=2x\pm 6$

4.6.13. $y=x/2\pm 3$

4.6.14. $(\sqrt{3},2\sqrt{3})$, $(-\sqrt{3},-2\sqrt{3})$, $(2\sqrt{3},\sqrt{3})$, $(-2\sqrt{3},-\sqrt{3})$

4.6.15. $y=7x/\sqrt{3}-8/\sqrt{3}$

4.6.16. $y=(-y_1^{1/3}x+y_1^{1/3}x_1+x_1^{1/3}y_1)/x_1^{1/3}$

4.6.17. $(y-y_1)=\dfrac{(x_1-2x_1^3-2x_1y_1^2)}{(y_1+2y_1^3+2y_1x_1^2)}(x-x_1)$

4.7.1. 1

4.7.2. 1/6

4.7.3. $-\infty$

4.7.4. 1/16

4.7.5. 1/3

4.7.6. 0

4.7.7. 3/2

4.7.8. $-1/4$

4.7.9. -3

4.7.10. 1/2

4.7.11. 0

4.7.12. -1

4.7.13. $-1/2$

4.7.14. 5

4.7.15. ∞

4.7.16. ∞

4.7.17. 2/7

4.7.18. 2

4.7.19. $-\infty$

4.7.20. 0

4.7.21. ∞

4.7.22. 1/2

4.7.23. 0

4.7.24. 1/2

4.7.25. 5

4.7.26. $2\sqrt{2}$

4.7.27. $-1/2$

4.7.28. 2

4.7.29. 0

4.7.30. ∞

4.7.31. 0

4.7.32. 3/2

4.7.33. ∞

4.7.34. 5

4.7.35. $-1/2$

4.7.36. does not exist

4.7.37. ∞

4.7.38. $y=1$ 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 $x=0$

5.1.13. Local min of 1 at every point of $[0,1]$, local max of 1 at every point of $(0,1)$.

5.1.16. 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. $r=5$ cm, $h=40/\pi$ cm, $h/r=8/\pi$

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. $\left(\dfrac{\sqrt{3}}{6}\right)\times\left(\dfrac{\sqrt{3}}{6}+\dfrac{1}{2}\right)\times\left(\dfrac{1}{4}-\dfrac{\sqrt{3}}{12}\right)$

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 $k\le 2/\pi$ the ratio is $(2-k\pi)/4$; if $k\ge 2/\pi$, 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. $h=\dfrac{750}{\pi}\left(\dfrac{2\pi^2}{750^2}\right)^{1/3}$, $r=\left(\dfrac{750^2}{2\pi^2}\right)^{1/6}$

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. $\pi\sqrt{2}/36$ ft^3/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. $-\cos(2x)/2+k$

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. $(5x+1)^3/15+C$

7.2.6. $(x-6)^3/3+C$

7.2.7. $2x^{5/2}/5+C$

7.2.8. $-4/\sqrt{x}+C$

7.2.9. $4t-t^2+C$, $t<2$; $t^2-4t+8+C$, $t\ge 2$

7.2.10. 87/2

7.2.11. 2

7.2.12. $3^4/4$

7.2.13. $2^6/6-1/6$

7.2.14. x^2-3x

7.2.15. $2x(x^4-3x^2)$

7.2.16. $\tan(x^2)$

7.2.17. $2x\tan(x^4)$

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. $A = 18$, $B = 44/3$, $C = 10/3$

7.4.1. $-(1-t)^{10}/10 + C$

7.4.2. $x^5/5 + 2x^3/3 + x + C$

7.4.3. $(x^2+1)^{101}/202 + C$

7.4.4. $-3(1-5t)^{2/3}/10 + C$

7.4.5. $(\sin^4 x)/4 + C$

7.4.6. $-(100-x^2)^{3/2}/3 + C$

7.4.7. $-2\sqrt{1-x^3}/3 + C$

7.4.8. $\sin(\sin \pi t)/\pi + C$

7.4.9. $1/(2\cos^2 x) = (1/2)\sec^2 x + C$

7.4.10. $-\ln|\cos x| + C$

7.4.11. 0

7.4.12. $\tan^2(x)/2 + C$

7.4.13. 1/4

7.4.14. $-\cos(\tan x) + C$

7.4.15. 1/10

7.4.16. $\sqrt{3}/4$

7.4.17. $(27/8)(x^2-7)^{8/9} + C$

7.4.18. $-(3^7+1)/14$

7.4.19. 0

7.4.20. $f(x)^2/2$

8.1.1. $8\sqrt{2}/15$

8.1.2. 1/12

8.1.3. 9/2

8.1.4. 4/3

8.1.5. $2/3 - 2/\pi$

8.1.6. $3/\pi - 3\sqrt{3}/(2\pi) - 1/8$

8.1.7. 1/3

8.1.8. $10\sqrt{5}/3 - 6$

8.1.9. 500/3

8.1.10. 2

8.1.11. 1/5

8.1.12. 1/6

8.2.1. $1/\pi$, $5/\pi$

8.2.2. 0, 245

8.2.3. 20, 28

8.2.4. $(3-\pi)/(2\pi)$, $(18 - 12\sqrt{3} + \pi)/(4\pi)$

8.2.5. 10/49 meters, 20/49 seconds

8.2.6. 45/98 meters, 30/49 seconds

8.2.7. 25000/49 meters, 1000/49 seconds

8.2.8. $s(t) = \cos t$, $v(t) = -\sin t$, maximum distance is 1, maximum speed is 1

8.2.9. $s(t) = -\sin(\pi t)/\pi^2 + t/\pi$, $v(t) = -\cos(\pi t)/\pi + 1/\pi$, maximum speed is $2/\pi$

8.2.10. $s(t) = t^2/2 - \sin(\pi t)/\pi^2 + t/\pi$, $v(t) = t - \cos(\pi t)/\pi + 1/\pi$

8.2.11. $s(t) = t^2/2 + \sin(\pi t)/\pi^2 - t/\pi$, $v(t) = t + \cos(\pi t)/\pi - 1/\pi$

8.3.5. $8\pi/3$

8.3.6. $\pi/30$

8.3.7. $\pi(\pi/2 - 1)$

8.3.8. (a) $114\pi/5$ (b) $74\pi/5$ (c) 20π (d) 4π

8.3.9. 16π, 24π

8.3.11. $\pi h^2(3r-h)/3$

8.3.13. 2π

8.4.1. $2/\pi$; $2/\pi$; 0

8.4.2. 4/3

8.4.3. $1/A$

8.4.4. $\pi/4$

8.4.5. $-1/3$, 1

8.4.6. $-4\sqrt{1224}$ ft/s; $-8\sqrt{1224}$ ft/s

8.5.1. $\approx 5,305,028,516$ N-m

8.5.2. $\approx 4,457,854,041$ N-m

8.5.3. $367,500\pi$ N-m

8.5.4. $49000\pi + 196000/3$ N-m

8.5.5. 2450π N-m

8.5.6. 0.05 N-m

8.5.7. 6/5 N-m

8.5.8. 3920 N-m

8.5.9. 23520 N-m

8.5.10. 12740 N-m

9.5.3. $\dfrac{-1}{1+x^2}$

9.5.5. $\dfrac{2x}{\sqrt{1-x^4}}$

9.5.6. $\dfrac{e^x}{1+e^{2x}}$

9.5.7. $-3x^2\cos(x^3)/\sqrt{1-\sin^2(x^3)}$

9.5.8. $\dfrac{2}{(\arcsin x)\sqrt{1-x^2}}$

9.5.9. $-e^x/\sqrt{1-e^{2x}}$

9.5.10. 0

9.5.11. $\dfrac{(1+\ln x)x^x}{\ln 5(1+x^{2x})\arctan(x^x)}$

9.6.2. ∞, ∞, 1, 0

10.1.1. $x/2 - \sin(2x)/4 + C$

10.1.2. $-\cos x + (\cos^3 x)/3 + C$

10.1.3. $3x/8 - (\sin 2x)/4 + (\sin 4x)/32 + C$

10.1.4. $(\cos^5 x)/5 - (\cos^3 x)/3 + C$

10.1.5. $\sin x - (\sin^3 x)/3 + C$

10.1.6. $x/8 - (\sin 4x)/32 + C$

10.1.7. $(\sin^3 x)/3 - (\sin^5 x)/5 + C$

10.1.8. $-2(\cos x)^{5/2}/5 + C$

10.1.9. $\tan x - \cot x + C$

10.1.10. $(\sec^3 x)/3 - \sec x + C$

10.2.1. $-\ln|\csc x + \cot x| + C$

10.2.2. $-\csc x \cot x/2 - (1/2)\ln|\csc x + \cot x| + C$

10.2.3. $x\sqrt{x^2-1}/2 - \ln|x + \sqrt{x^2-1}|/2 + C$

10.2.4. $x\sqrt{9+4x^2}/2 + (9/4)\ln|2x + \sqrt{9+4x^2}| + C$

10.2.5. $-(1-x^2)^{3/2}/3 + C$

10.2.6. $\arcsin(x)/8 - \sin(4\arcsin x)/32 + C$

10.2.7. $\ln|x + \sqrt{1+x^2}| + C$

10.2.8. $(x+1)\sqrt{x^2+2x}/2 - \ln|x + 1 + \sqrt{x^2+2x}|/2 + C$

10.2.9. $-\arctan x - 1/x + C$

10.2.10. $2\arcsin(x/2) - x\sqrt{4-x^2}/2 + C$

10.2.11. $\arcsin(\sqrt{x}) - \sqrt{x}\sqrt{1-x} + C$

10.2.12. $(2x^2+1)\sqrt{4x^2-1}/24 + C$

10.3.1. $\cos x + x\sin x + C$

10.3.2. $x^2\sin x - 2\sin x + 2x\cos x + C$

10.3.3. $(x-1)e^x + C$

10.3.4. $(1/2)e^{x^2} + C$

10.3.5. $(x/2) - \sin(2x)/4 + C = (x/2) - (\sin x\cos x)/2 + C$

10.3.6. $x\ln x - x + C$

10.3.7. $(x^2\arctan x + \arctan x - x)/2 + C$

10.3.8. $-x^3\cos x + 3x^2\sin x + 6x\cos x - 6\sin x + C$

10.3.9. $x^3\sin x + 3x^2\cos x - 6x\sin x - 6\cos x + C$

10.3.10. $x^2/4 - (\cos^2 x)/4 - (x\sin x\cos x)/2 + C$

10.3.11. $x/4 - (x\cos^2 x)/2 + (\cos x\sin x)/4 + C$

10.3.12. $x\arctan(\sqrt{x}) + \arctan(\sqrt{x}) - \sqrt{x} + C$

10.3.13. $2\sin(\sqrt{x}) - 2\sqrt{x}\cos(\sqrt{x}) + C$

10.3.14. $\sec x\csc x - 2\cot x + C$

10.4.1. $-\ln|x-2|/4 + \ln|x+2|/4 + C$

10.4.2. $-x^3/3 - 4x - 4\ln|x-2| + 4\ln|x+2| + C$

10.4.3. $-1/(x+5) + C$

10.4.4. $-x - \ln|x-2| + \ln|x+2| + C$

10.4.5. $-4x + x^3/3 + 8\arctan(x/2) + C$

10.4.6. $(1/2)\arctan(x/2 + 5/2) + C$

10.4.7. $x^2/2 - 2\ln(4+x^2) + C$

10.4.8. $(1/4)\ln|x+3| - (1/4)\ln|x+7| + C$

10.4.9. $(1/5)\ln|2x-3| - (1/5)\ln|1+x| + C$

10.4.10. $(1/3)\ln|x| - (1/3)\ln|x+3| + C$

10.5.1. T,S: 4 ± 0

10.5.2. T: 9.28125 ± 0.281125; S: 9 ± 0

10.5.3. T: 60.75 ± 1; S: 60 ± 0

10.5.4. T: 1.1167 ± 0.0833; S: 1.1000 ± 0.0167

10.5.5. T: 0.3235 ± 0.0026; S: 0.3217 ± 0.000065

10.5.6. T: 0.6478 ± 0.0052; S: 0.6438 ± 0.000033

10.5.7. T: 2.8833 ± 0.0834; S: 2.9000 ± 0.0167

10.5.8. T: 1.1170 ± 0.0077; S: 1.1114 ± 0.0002

10.5.9. T: 1.097 ± 0.0147; S: 1.089 ± 0.0003

10.5.10. T: 3.63 ± 0.087; S: 3.62 ± 0.032

10.6.1. $\dfrac{(t+4)^4}{4} + C$

10.6.2. $\dfrac{(t^2-9)^{5/2}}{5} + C$

10.6.3. $\dfrac{(e^{t^2}+16)^2}{4} + C$

10.6.4. $\cos t - \dfrac{2}{3}\cos^3 t + C$

10.6.5. $\dfrac{\tan^2 t}{2} + C$

10.6.6. $\ln|t^2 + t + 3| + C$

10.6.7. $\dfrac{1}{8}\ln|1 - 4/t^2| + C$

10.6.8. $\dfrac{1}{25}\tan(\arcsin(t/5)) + C = \dfrac{t}{25\sqrt{25-t^2}} + C$

10.6.9. $\dfrac{2}{3}\sqrt{\sin 3t} + C$

10.6.10. $t\tan t + \ln|\cos t| + C$

10.6.11. $2\sqrt{e^t+1} + C$

10.6.12. $\dfrac{3t}{8} + \dfrac{\sin 2t}{4} + \dfrac{\sin 4t}{32} + C$

10.6.13. $\dfrac{\ln|t|}{3} - \dfrac{\ln|t+3|}{3} + C$

10.6.14. $\dfrac{-1}{\sin\arctan t} + C = -\sqrt{1+t^2}/t + C$

10.6.15. $\dfrac{-1}{2(1+\tan t)^2} + C$

10.6.16. $\dfrac{(t^2+1)^{5/2}}{5} - \dfrac{(t^2+1)^{3/2}}{3} + C$

10.6.17. $\dfrac{e^t\sin t - e^t\cos t}{2} + C$

10.6.18. $\dfrac{(t^{3/2}+47)^4}{6} + C$

10.6.19. $\dfrac{2}{3(2-t^2)^{3/2}} - \dfrac{1}{(2-t^2)^{1/2}} + C$

10.6.20. $\dfrac{\ln|\sin(\arctan(2t/3))|}{9} + C = \dfrac{\ln(4t^2) - \ln(9+4t^2)}{18} + C$

10.6.21. $\dfrac{(\arctan(2t))^2}{4} + C$

10.6.22. $\dfrac{3\ln|t+3|}{4} + \dfrac{\ln|t-1|}{4} + C$

10.6.23. $\dfrac{\cos^7 t}{7} - \dfrac{\cos^5 t}{5} + C$

10.6.24. $\dfrac{-1}{t-3} + C$

10.6.25. $\dfrac{-1}{\ln t} + C$

10.6.26. $\dfrac{t^2(\ln t)^2}{2} - \dfrac{t^2\ln t}{2} + \dfrac{t^2}{4} + C$

10.6.27. $(t^3 - 3t^2 + 6t - 6)e^t + C$

10.6.28. $\dfrac{5+\sqrt{5}}{10}\ln(2t + 1 - \sqrt{5}) + \dfrac{5-\sqrt{5}}{10}\ln(2t + 1 + \sqrt{5}) + C$

11.1.1. 15/2

11.1.2. 5

11.1.3. 16/5

11.1.5. $\bar{x} = 45/28$, $\bar{y} = 93/70$

11.1.6. $\bar{x} = 0$, $\bar{y} = 4/(3\pi)$

11.1.7. $\bar{x} = 1/2$, $\bar{y} = 2/5$

11.1.8. $\bar{x} = 0$, $\bar{y} = 8/5$

11.1.9. $\bar{x} = 4/7$, $\bar{y} = 2/5$

11.1.10. $\bar{x} = \bar{y} = 1/5$

11.1.11. $\bar{x} = 0$, $\bar{y} = 28/(9\pi)$

11.1.12. $\bar{x} = \bar{y} = 28/(9\pi)$

11.1.13. $\bar{x} = 0$, $\bar{y} = 244/(27\pi) \approx 2.88$

11.2.1. ∞

11.2.2. 1/2

11.2.3. diverges

11.2.4. diverges

11.2.5. 1

11.2.6. diverges

11.2.7. 2

11.2.8. diverges

11.2.9. $\pi/6$

11.2.10. diverges, 0

11.2.11. diverges, 0

11.2.12. diverges, no CPV

11.2.13. π

11.2.14. 80 mph: 90.8 to 95.3 N-m
90 mph: 114.9 to 120.6 N-m
100.9 mph: 144.5 to 151.6 N-m

11.3.2. $\mu = 1/c$, $\sigma = 1/c$

11.3.3. $\mu = (a+b)/2$, $\sigma = \dfrac{(b-a)}{2\sqrt{3}}$

11.3.4. 7/2

11.3.5. 21/2

11.3.9. $r = 6$

11.4.1. $(22\sqrt{22} - 8)/27$

11.4.2. $\ln(2) + 3/8$

11.4.3. $a + a^3/3$

11.4.4. $\ln((\sqrt{2}+1)/\sqrt{3})$

11.4.6. 3/4

11.4.7. ≈ 3.82

11.4.8. ≈ 1.01

11.4.9. $\sqrt{1+e^2} - \sqrt{2} + 1 - \ln(\sqrt{1+e^2} + 1) + \ln(\sqrt{2}+1)$

11.5.1. $8\pi\sqrt{3} - \dfrac{16\pi\sqrt{2}}{3}$

11.5.3. $\dfrac{730\pi\sqrt{730}}{27} - \dfrac{10\pi\sqrt{10}}{27}$

11.5.4. $\pi + 2\pi e + \dfrac{1}{4}\pi e^2 - \dfrac{\pi}{4e^2} - \dfrac{2\pi}{e}$

11.5.6. $8\pi^2$

11.5.7. $2\pi + \dfrac{8\pi^2}{3\sqrt{3}}$

11.5.8. $a > b$: $2\pi b^2 + \dfrac{2\pi a^2 b}{\sqrt{a^2-b^2}}\arcsin(\sqrt{a^2-b^2}/a)$,

$a < b$: $2\pi b^2 + \dfrac{2\pi a^2 b}{\sqrt{b^2-a^2}}\ln\left(\dfrac{b}{a} + \dfrac{\sqrt{b^2-a^2}}{a}\right)$

12.1.2. $\theta = \arctan(3)$

12.1.3. $r = -4\csc\theta$

12.1.4. $r^3\cos\theta\sin^2\theta = 1$

12.1.5. $r = \sqrt{5}$

12.1.6. $r^2 = \sin\theta\sec^3\theta$

12.1.7. $r\sin\theta = \sin(r\cos\theta)$

12.1.8. $r = 2/(\sin\theta - 5\cos\theta)$

12.1.9. $r = 2\sec\theta$

12.1.10. $0 = r^2\cos^2\theta - r\sin\theta + 1$

12.1.11. $0 = 3r^2\cos^2\theta - 2r\cos\theta - r\sin\theta$

12.1.12. $r = \sin\theta$

12.1.21. $(x^2+y^2)^2 = 4x^2y - (x^2+y^2)y$

12.1.22. $(x^2+y^2)^{3/2} = y^2$

12.1.23. $x^2 + y^2 = x^2y^2$

12.1.24. $x^4 + x^2y^2 = y^2$

12.2.1. $(\theta\cos\theta + \sin\theta)/(-\theta\sin\theta + \cos\theta)$, $(\theta^2+2)/(-\theta\sin\theta + \cos\theta)^3$

12.2.2. $\dfrac{\cos\theta + 2\sin\theta\cos\theta}{\cos^2\theta - \sin^2\theta - \sin\theta}$, $\dfrac{3(1+\sin\theta)}{(\cos^2\theta - \sin^2\theta - \sin\theta)^3}$

12.2.3. $(\sin^2\theta - \cos^2\theta)/(2\sin\theta\cos\theta)$, $-1/(4\sin^3\theta\cos^3\theta)$

12.2.4. $\dfrac{2\sin\theta\cos\theta}{\cos^2\theta - \sin^2\theta}$, $\dfrac{2}{(\cos^2\theta - \sin^2\theta)^3}$

12.2.5. undefined

12.2.6. $\dfrac{2\sin\theta - 3\sin^3\theta}{3\cos^3\theta - 2\cos\theta}$, $\dfrac{3\cos^4\theta - 3\cos^2\theta + 2}{2\cos^3\theta(3\cos^2\theta - 2)^3}$

12.3.1. 1

12.3.2. $9\pi/2$

12.3.3. $\sqrt{3}/3$

12.3.4. $\pi/12 + \sqrt{3}/16$

12.3.5. πa^2

12.3.6. $41\pi/2$

12.3.7. $2 - \pi/2$

12.3.8. $\pi/12$

12.3.9. $3\pi/16$

12.3.10. $\pi/4 - 3\sqrt{3}/8$

12.3.11. $\pi/2 + 3\sqrt{3}/8$

12.3.12. $1/2$

12.3.13. $3/2 - \pi/4$

12.3.14. $\pi/3 + \sqrt{3}/2$

12.3.15. $\pi/3 - \sqrt{3}/4$

12.3.16. $4\pi^3/3$

12.3.17. π^2

12.3.18. $5\pi/24 - \sqrt{3}/4$

12.3.19. $7\pi/12 - \sqrt{3}$

12.3.20. $4\pi - \sqrt{15}/2 - 7\arccos(1/4)$

12.3.21. $3\pi^3$

12.4.6. $x = t - \dfrac{\sin(t)}{2}$, $y = 1 - \dfrac{\cos(t)}{2}$

12.4.7. $x = 4\cos t - \cos(4t)$, $y = 4\sin t - \sin(4t)$

12.4.8. $x = 2\cos t + \cos(2t)$, $y = 2\sin t - \sin(2t)$

12.4.9. $x = \cos t + t\sin t$, $y = \sin t - t\cos t$

12.5.1. There is a horizontal tangent at all multiples of π.

12.5.2. $9\pi/4$

12.5.3. $\displaystyle\int_0^{2\pi} \frac{1}{2}\sqrt{5 - 4\cos t}\,dt$

12.5.4. Four points:
$\left(\dfrac{-3-3\sqrt{5}}{4}, \pm 5\sqrt{\dfrac{5-\sqrt{5}}{8}}\right)$,
$\left(\dfrac{-3+3\sqrt{5}}{4}, \pm 5\sqrt{\dfrac{5+\sqrt{5}}{8}}\right)$

12.5.5. $11\pi/3$

12.5.6. $32/3$

12.5.7. 2π

12.5.8. $16/3$

12.5.9. $(\pi/2, 1)$

12.5.10. $5\pi^3/6$

12.5.11. $2\pi^2$

12.5.12. $(2\pi\sqrt{4\pi^2+1} + \ln(2\pi + \sqrt{4\pi^2+1}))/2$

13.1.1. 1

13.1.3. 0

13.1.4. 1

13.1.5. 1

13.1.6. 0

13.2.1. $\lim\limits_{n\to\infty} n^2/(2n^2+1) = 1/2$

13.2.2. $\lim\limits_{n\to\infty} 5/(2^{1/n}+14) = 1/3$

13.2.3. $\sum_{n=1}^{\infty}\frac{1}{n}$ diverges, so $\displaystyle\sum_{n=1}^{\infty} 3\frac{1}{n}$ diverges

13.2.4. $-3/2$

13.2.5. 11

13.2.6. 20

13.2.7. $3/4$

13.2.8. $3/2$

13.2.9. $3/10$

13.3.1. diverges

13.3.2. diverges

13.3.3. converges

13.3.4. converges

13.3.5. converges

13.3.6. converges

13.3.7. diverges

13.3.8. converges

13.3.9. $N = 5$

13.3.10. $N = 10$

13.3.11. $N = 1687$

13.3.12. any integer greater than e^{200}

13.4.1. converges

13.4.2. converges

13.4.3. diverges

13.4.4. converges

13.4.5. 0.90

13.4.6. 0.95

13.5.1. converges

13.5.2. converges

13.5.3. converges

13.5.4. diverges

13.5.5. diverges

13.5.6. diverges

13.5.7. converges

13.5.8. diverges

13.5.9. converges

13.5.10. diverges

13.6.1. converges absolutely

13.6.2. diverges

13.6.3. converges conditionally

13.6.4. converges absolutely

13.6.5. converges conditionally

13.6.6. converges absolutely

13.6.7. diverges

13.6.8. converges conditionally

13.7.5. converges

13.7.6. converges

13.7.7. converges

13.7.8. diverges

13.8.1. $R = 1$, $I = (-1, 1)$

13.8.2. $R = \infty$, $I = (-\infty, \infty)$

13.8.3. $R = e$, $I = (-e, e)$

13.8.4. $R = e$, $I = (2-e, 2+e)$

13.8.5. $R = 0$, converges only when $x = 2$

13.8.6. $R = 1$, $I = [-6, -4]$

13.9.1. the alternating harmonic series

13.9.2. $\displaystyle\sum_{n=0}^{\infty}(n+1)x^n$

13.9.3. $\displaystyle\sum_{n=0}^{\infty}(n+1)(n+2)x^n$

13.9.4. $\displaystyle\sum_{n=0}^{\infty}\frac{(n+1)(n+2)}{2}x^n$, $R = 1$

13.9.5. $\displaystyle C + \sum_{n=0}^{\infty}\frac{-1}{(n+1)(n+2)}x^{n+2}$

13.10.1. $\displaystyle\sum_{n=0}^{\infty}(-1)^n x^{2n}/(2n)!$, $R = \infty$

13.10.2. $\displaystyle\sum_{n=0}^{\infty} x^n/n!$, $R = \infty$

13.10.3. $\displaystyle\sum_{n=0}^{\infty}(-1)^n\frac{(x-5)^n}{5^{n+1}}$, $R = 5$

13.10.4. $\displaystyle\sum_{n=1}^{\infty}(-1)^{n-1}\frac{(x-1)^n}{n}$, $R = 1$

13.10.5. $\displaystyle\ln(2) + \sum_{n=1}^{\infty}(-1)^{n-1}\frac{(x-2)^n}{n2^n}$, $R = 2$

13.10.6. $\displaystyle\sum_{n=0}^{\infty}(-1)^n(n+1)(x-1)^n$, $R = 1$

13.10.7. $\displaystyle 1 + \sum_{n=1}^{\infty}\frac{1\cdot 3\cdot 5\cdots(2n-1)}{n!2^n}x^n = 1 + \sum_{n=1}^{\infty}\frac{(2n-1)!}{2^{2n-1}(n-1)!\,n!}x^n$, $R = 1$

13.10.8. $x + x^3/3$

13.10.9. $\displaystyle\sum_{n=0}^{\infty}(-1)^n x^{4n+1}/(2n)!$

13.10.10. $\displaystyle\sum_{n=0}^{\infty}(-1)^n x^{n+1}/n!$

13.11.1. $1 - \dfrac{x^2}{2} + \dfrac{x^4}{24} - \dfrac{x^6}{720} + \cdots + \dfrac{x^{12}}{12!}$

13.11.2. 1000; 8

13.11.3. $x + \dfrac{x^3}{3} + \dfrac{2x^5}{15}$, error ± 1.32.

13.12.1. diverges

13.12.2. converges

13.12.3. converges

13.12.4. diverges

13.12.5. diverges

13.12.6. diverges

13.12.7. converges

13.12.8. converges

13.12.9. converges

13.12.10. converges

13.12.11. converges

13.12.12. converges

13.12.13. converges

13.12.14. converges

13.12.15. converges

13.12.16. converges

13.12.17. diverges

13.12.18. $(-\infty, \infty)$

13.12.19. $(-3, 3)$

13.12.20. $(-3, 3)$

13.12.21. $(-1, 1)$

13.12.22. radius is 0—it converges only when $x = 0$

13.12.23. $(-\sqrt{3}, \sqrt{3})$

13.12.24. $(-\infty, \infty)$

13.12.25. $\displaystyle\sum_{n=0}^{\infty}\frac{(\ln(2))^n}{n!}x^n$

13.12.26. $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n}{n+1}x^{n+1}$

13.12.27. $\displaystyle\sum_{n=0}^{\infty}\frac{2}{2n+1}x^{2n+1}$

13.12.28. $\displaystyle 1 + x/2 + \sum_{n=2}^{\infty}(-1)^{n+1}\frac{1\cdot 3\cdot 5\cdots(2n-3)}{2^n n!}x^n$

13.12.29. $\displaystyle\sum_{n=0}^{\infty}(-1)^n x^{2n}$

13.12.30. $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n}{2n+1}x^{2n+1}$

13.12.31. $\displaystyle\pi = \sum_{n=0}^{\infty}(-1)^n\frac{4}{2n+1}$