**Solutions to Intermediate and College Algebra by Rhodes**

**Section 1.1**

|  |  |
| --- | --- |
| 1. 202. -213. 1054. -55. 186. -37. 65/2 = 32.58. -369. $\frac{-539}{208}≈-2.591$10. 13/311. 8112. $\sqrt{60}=2\sqrt{15}$ $≈7.746$13. -214. -1/315. -1 | 16. 4017. 6718. $\sqrt{39}-10 ≈-3.755$19. 4.7 x 10520. 1.512 x 10921. 3.41 x 10-622. 6 x 10-423. 0.000015424. 3900025. 400026. -0.000002127. 2,050,000,000 = 2.05 $×$ $10^{9}$28A. 55103400 ft3 B. 412173432 gallons or 4.1217 x 108 gallons29A. 1.112228 x 1013 B. $35421.27 per person |

**Section 1.2**

|  |  |
| --- | --- |
| 1. x = 32. x = -13/33. x = 17/2 = 8.54. x = 805. x = -3/86. x = 17/8 | 7. x = 7/58. x = $-\frac{108}{55} ≈ $-1.9649. No solution10. t = -48/1911. x = -1/4 = -0.2512. All real numbers or infinite number of solutions |

|  |  |
| --- | --- |
| H (hours) | D (in miles) |
| 0 | 250 |
| 1 | 195 |
| 2 | 140 |
| 3 | 85 |

13A. B. D = 250 – 55h C. yes; because D = 250 – 55(3) = 85 miles

14A. 159/14 $≈$ 11.357 gallons B. 392 miles

15A. 675 people B. During 2001

16. x = -1

17. x = 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -2 | 0 | 2 | 4 | 6 |
| 2x+5 | 1 | 5 | 9 | 13 | 17 |

18. x = -2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -3 | -2 | -1 | 0 | 1 |
| 2-3(5x+4) | 35 | 20 | 5 | -10 | -25 |

|  |  |
| --- | --- |
| 19. x = -120. x = 521. x = 022. y = 2x – 523. L = $\frac{A-2w^{2}}{4w}=\frac{A}{4w}-\frac{w}{2}$ | 24. t = $\frac{A-P}{Pr}$ = $\frac{A}{Pr}-\frac{1}{r}$25. x > 4 (4, ∞)26. x ≥ 6 [6, ∞)27. x > -2 (-2, ∞)28. x ≤ 5/6 (-∞, 5/6] |
| 29. -1 < x ≤ 7 (-1, 7]30. -9/2 < x < -19/6 (-9/2, -19/6)31. x > 5 (5, ∞)32. x ≥ -5/2 $\left[-\frac{5}{2}, \infty )\right.$ | 33. x < 334. x $\leq $ 0.2535. x < 2-2024**(****]**36. (-2, 4]  |

37. a. x = 2.5, b. x = 1, c. $x>2$, d. $x\leq 0$ 38. a. x = 6, b. x > -3, c. $x\leq -6$

39. a. x = 6, b. x < 6

**Section 1.3**

|  |  |
| --- | --- |
| x | y  |
| 0 | 3 |
| 6 | 0 |
| -2 | 4 |
| 8 | -1 |

|  |  |
| --- | --- |
| x | y  |
| 0 | -1 |
| 2 | 3 |
| -2 | -5 |
| -1 | -3 |

1. 2.

|  |  |
| --- | --- |
| x | y  |
| 0 | 4 |
| 8/3 | 0 |
| 2 | 1 |
| 4 | -2 |

|  |  |
| --- | --- |
| x | y  |
| 0 | 1 |
| 1/2 | 0 |
| 4 | -7 |
| 5 | -9 |

3. 4.

|  |  |
| --- | --- |
| x | y  |
| 0 | 4 |
| -8 | 0 |
| -4 | 2 |
| 8 | 8 |

5.

6A. Approximately 50 students B. 12 minutes C. at least 25 students

7A. $3.90 B. $2.70 C. 1975 and later

 D. 1990 to 1991 E. about 50 or 60 cents

8A. y = 2/3 x – 3

B. Horizontal intercept or x-intercept: (9/2, 0)

 Vertical intercept or y – intercept: (0, -3) C. Window: $\left[-5, 5, 1\right]×[-5, 5, 1]$



9. L- intercept: (45, 0); W-intercept: (0, 30); Window: [0, 45, 4] $×$ [0, 35, 5]

10. x-intercept: (-8, 0); y-intercept: (0, 6); Standard Window

11. c-intercept: (700, 0); P-intercept: (0, 200); Window: [0, 800, 100] $×$ [0, 250, 50]

12. x-intercept: (1/10, 0); y-intercept: (0, 2/35); Window: [0, 1, 0.1] $×$ [0, 0.1, 0.01]

13A. At 4°C, the ant speed is 0.

 B. [0, 30, 5] x [0, 5, 1]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 3 | 7 | 12 | 21 |
| y | -.51 | .057 | 1.2 | 2.63 | 5.2 |

14A.

B. [0, 22, 5] x [ -2, 7, 1]

15A. R = 35 – 0.6w B. 29.6 lbs

 C. (58.33, 0) After 58 1/3 weeks, the rice is gone.

 D. (0, 35) At 0 weeks, there is 35 pounds of rice. E. [0, 60, 10]$ ×$ [0,40,5]

16A. 200 B. 51.25°F C. Yes. At 60°, the cricket chirps 80 times per minute.

 D. (40, 0) At 40°F, the crickets don’t chirp.

 E. (0, -160) No, negative chirps is unreasonable.

 F. [0, 100, 10] x [0, 250, 25]

 G.

17A.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| t | 0 | 1 | 3 | 4.5 | 6.25 |
| V | 25000 | 21500 | 14500 | 9250 | 3125 |

 B. [0, 8, 1] x [0, 25000, 5000]

|  |  |
| --- | --- |
| 0 | 65 |
| 5 | 95 |
| 8 | 113 |

18A.

 B. T = 65 + 6h C. h = 4.167 hours or around 10:10 am

D. Window: [0, 12, 2] $×$ [0, 150, 25]

**Section 1.4**

1. F = 35 + 54.99m

 (0, 35) Initial fee is $35 for 0 months.

 (-0.64, 0) Not reasonable, negative months.

2. D = -350 + 15m

 (0, -350) He starts at 350 feet below sea level.

 (23.33, 0) After 23.33 minutes, he is at the surface (0 feet below sea level).

3. B = 50 – 0.75w

 (0, 50) He has 50 pounds at week 0.

 (66.67, 0) After approximately 66.67 weeks, the rice is gone.

4. W = 7.50h

 (0, 0) If he works 0 hours, he makes $0.

5A. F = 2.70 + .23(t-1) where t is in 1/10 of a mile B. F = $13.97

 C. t = 37 or 3.7 miles D. t = 113.2 or 11.32 miles

6A. W = 250 + 0.07s B. W = $509 C. s = $5000

7A. C = 750 + 32y; C = 900+18y B. approximately 10.71 years

8A. A = P + 0.175P = 1.0175 P B. $7631.25 C. $982.80

9A.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a | -500 | 0 | 1000 | 2000 | 3000 | 4000 | 5000 |
| B | 213 | 212 | 210 | 208 | 206 | 204 | 202 |

 B. B = 212-0.002a C. [-500, 5000, 500] x [200, 215, 1] D. a > 4000; (4000, ∞)

10A. times in minutes when plan B is cheaper; t: time in minutes

 B. Plan A: 0.20t

 Plan B: 9.99 + 0.16t

 C. t > 249.75 minutes

**Section 1.5**

|  |  |
| --- | --- |
| 1A. yes B. no2A. no B. yes C. no3. yes4. yes | 5. no6. yes7. no8. no |

9A. -23 B. 289 C. 5h6 – 8h2 + 1 D. 5t3 – 8t – 2

10A. 3 B. $\frac{n+2}{2n-1}$ C. $\frac{2g+1}{4g-3}$ + 1=$\frac{6g-2}{4g-3}$ D. 3$\left(\frac{a+1}{2a-3}\right)=\frac{3a+3}{2a-3}$

11A. 68 B. 12 C. 3a2 – 5a – 11 D. 3x2 + 6xh – 5x + 3h2 – 5h

12A. -1 B. 9 C. t = 2

13A. -1 B. 3 C. -1.5 D. -2.5

14A. 7x + 6 B. 5x – 8 C. 253 D. $\frac{6x-1}{x+7}$

 E. 6x + 41 F. -6

15A. 22 B. x2 – 2x – 7 C. 2x3 + 7x2 D. $\frac{x^{2}}{2x+7}$

 E. 81 F. 2x2 + 7

16A. -3 B. -5.5 C. -18 D. -1.75 E. -4

17A. -6 B. -2 C. 45 D. 1

18A. S(3) = 4000 After 3 weeks, there are $4000 in sales.

 B. Between weeks 5 and 11.

 C. Week 8, $12500

19A. July, 74°, T(7) = 74

 B. approximately 43; In April, the average high temperature is 43°.

 C. January-March and November-December

20. f(x) = $\sqrt{x}$; g(x) = 3x2 + 4

21. f(x) = x5; g(x) = x2 + x + 1

22. f(x) = $\left|x\right|$; g(x) = 2x – 1

23. f(x) = 5x; g(x) = 3x + 1

24. f(x) = $\frac{1}{x^{2}}$; g(x) = 2x + 3

25. f(x) = $\frac{x+1}{x}$; g(x) = x2

26. A. 4a + 4h + 7 B. 4h C. 4

27. A. a2 + 2ah + a + h2 = h B. 2ah + h2 + h C. 2a + h + 1

28. A. $\frac{1}{a+h}$ B. $\frac{-h}{a^{2}+ah}$ C. $\frac{-1}{a^{2}+ah}$

29. A. a3 + 3a2h + 3ah2 + h3 – 1 B. 3a2h + 3ah2 + h3 C. 3a2 + 3ah + h2

30. (f ◦ g)(x)=$\frac{1}{^{1}/\_{x}-2}$; Domain: x ≠ 0, x ≠ ½

31. (f ◦ g)(x) = $\left(\sqrt{x}\right)^{3}$ + 3; Domain: x ≥ 0

**Unit 2**

**Section 2.1**

|  |  |
| --- | --- |
| 1. 3.5 miles per gallon2. $3.59 per gallon3. $15 per month4. m = 35. m = 06. m = -3/47. m = -$50 per month8. m = 89. m = 150 people per year10. m = -30 ft/min | 11. m = $12/hour12. m = 13/613. m = 5/314. m is undefined15. m = 016. m = -17/9 or m $≈-1.89$17. C18. A19. D20. B |

**Section 2.2**

|  |  |
| --- | --- |
| 1. y = -7x – 12. y = 2/7 x + 23. y – 1 = -5/2(x - 3) or y = -5/2 x + 17/24. y = 2/5 x + 27/55. y = -5/6 x + 36. y = 47. x = 38. y = 59. y = -2x + 1 | 10. y = ½ x + 411. y – 2 = ¾ (x – 1)12. y – 3 = -5/2(x – 1)13. m = 20h + 3014. f = -3/2 s + 7515. h = -30t + 12016. y = 25x17. y = 2/3x + 1218. P – 21 = -21/26(t - 2002) |

19A. m = $8.50 per pound; Candy costs $8.50 per pound.

 B. (0, 4) It costs $4 for 0 pounds.

 C. C = 8.50p + 4

20A. m = 0.09 Median age increases by 0.09 years per year.

 B. (0, -147.1) Negative years does not make sense.

21A. m = -1°/200 ft The temperature decreases by 1° for every 200 ft above sea level.

 B. (0, 80) The temperature at sea level is 80°.

 C. T = -1/200 A + 80

22. C

23. B

24. C

25A. III B. II C. I D. IV

|  |  |
| --- | --- |
| 200 | 200 |
| 500 | 350 |
| 1000 | 600 |

26A.

 B. C = 100 + 0.50N

 C. see graph

 D. [0, 1500, 250] x [ 0, 800, 100]

|  |  |
| --- | --- |
| 27. y = 5x + 128. y = -1/2 x – 229. y = -3 | 30. y = -4x +931. y = x + 1132. x = -6 |

**Section 2.3**

**Answers may vary.**

1. 2.

 Points: (10, 35) (25, 48) Points: (4, 10) (14, 30)

 I – 35 = 13/15(E – 10) D – 10 = 2(m – 4)

3. 4.

 Points: (5, 60) (25, 90) Points: (0, 24) (2500, 2)

 T – 60 = 3/2 (H – 5) c = -11/1250m + 24

5 – 8. Answers will vary.

9. K = 5/9 F + 255.222

10

8

12

14

B

70

50

P

60

10. Points: (11, 60) (14, 70)

 P – 60 = 10/3 (B – 11)

11A. scatterplot

11B.

11C. 3.5 lbs. per in in height

11D. -90.91. No, negative height doesn't make sense.

11E. at 61 inches the weight could be 122.8 lbs.

12A.

12B. The graph does not appear to be linear.

**Section 2.4**

|  |  |
| --- | --- |
| 1A. x = 3 B. x ≥ 32A. x = -3 B. x = 3 C. x > 63A. x = 2 B. x < 2 4. x $≈$ 2.825. x = -3 | 6. x = -47. x = -68. x ≤ 29. x > 5.6 |

10A.

|  |  |  |
| --- | --- | --- |
| Amount of Product | Company A Profit | Company B Profit |
| 20,000 | 1500 | 800 |
| 45,000 | 4000 | 5000 |

 B. A C. B D. 30000 units, $2000 profit E. more than 30000 units

11A. Scatter plot

**Section 2.5**

1.  2. 

3.  4. 

5.  6. 

7.  8. 

9.  10. 

11. y > x + 1 12. y ≤ x – 1

13. y ≥ -2x – 1 14. y > -x – 2

15. 0.75x + 0.60y ≥ 25, x ≥ 0, y ≥ 0 16. S + C ≤ 150, 297S + 412C ≥ 55000, S ≥ 0, C ≥ 0

  

**Section 2.6**

|  |  |
| --- | --- |
| 1. (4, -1/2)2. (-2, 1)3. (1, -1)4. (-2, 0)5. (2, -5) | 6. (-1, 1)7. (5/7, -26/7)8. (28/19, -13/19)9. 1991 |

10. 7N + 4P = 6.40 ; 2N + 19P = 5.40

 N = 0.80, P = 0.20 Notebooks are $0.80 and pens are$0.20.

11A. 3B + 2E = 7.45; 2B + 3E = 6.45

 B. E = 0.89, B = 1.89 $5.56 is the amount returned.

12. (2, -1/2) intersection point

13. $7500

14. 37.5°, 52.5°

15. 8 inches by 12 inches

16. 1.3 liters of water and 0.2 liters of hydrogen peroxide

17. 90.9 pounds of dog food A and 409.1 pounds of dog food B

18. $25000, $50000

19. $5600, $18000

20. No solution; inconsistent; independent

21. Infinite solutions; consistent; dependent

22. x = -5/3, y = -1/3; consistent, independent

23. x = 21/11, y = 26/11; consistent, independent

24. x = -1, y = 2, z = -7

25. a = 8, b = -7, c = 4

**Unit 3**

**Section 3.1**

|  |  |
| --- | --- |
| 1. D = {0, 1, 2, 3, 4}; R = {7, 9, 11, 13, 15}2. D = {SE US, NE US, MW US, SW US, W US};  R = {2 business days, 3 business days, 4 business days}3. D = [0, ∞); R = {23, 39, 99}4. D = {-1, 3, 4, 8, 10}; R = {-1, -7, 5, 11}5. D = [0, 10]; R = [0, 13]6. D = [Birth, 8]; R = [20, 55]7. D = [0, 12]; R = [0,90]8. D = [1990, 2009]; R = [3.9, 7.8]9. D = [-5, 5]; R = [-2, 2]10. D = [0, 1.00]; R = {.01, .02, .03, .04, .05} | 11. D = (-∞, ∞); R = [-2, ∞)12. D = [-2.5, 3]; R = [-4.5, 8]13. D = [0, 27]; R = [10, 450]14. D = (-∞, ∞); R = (-∞, ∞)15. D = (-∞, ∞); R = [-1, ∞)16. D = all reals except x = -3; R = all reals except 017. D = all reals except -2 and 1; R = all reals except 018. D = [-5/2, ∞); R = [0, ∞)19. D = [-5, 5]; R = [0, 5]20. R = [-117, 28]21. R = [-1.125, 20]  |

**Section 3.2**

1A. 6.25 B. -2, 2 C. -2.8, 2.8

2A. 0.4 B. x = -0.3 C. (0, 0.5]

3A. -8 B. x = 2 C. x ≤ 1.6

4. y = $\sqrt{x}$ 5. y = $\frac{1}{x}$

6. y = $\sqrt[3]{x}$ 7. y = x2

8. y = |x| 9. y = 

10. even 11. neither

12. odd 13. even

14. odd 15. neither

16. even 17. neither

18. neither 19. odd

20. even 21. neither

22. Symmetric to horizontal and vertical axes

23. Symmetric to horizontal axis

24. Symmetric to origin

25. Symmetric to vertical axis

**Section 3.3**

|  |  |
| --- | --- |
| 1. shift 3 left2. shift down 53. shift 1 right, 7 down4. reflect, shift 4 up5. stretch by 2, shift left 66. shrink by ½ , shift down 27. reflect, stretch by 3, shift 5 right, shift 1 up8. shrink by 0.3, shift 4 left, shift 8 up9. y = 2x + 1 | 10. y = $\frac{1}{x+1}$11. y = x2 – 412. y = -(x – 3)313. y = 2$\sqrt{x}$14. y = $\frac{1}{(x+2)^{2}}-2$15. y = $-\sqrt{x-2}+1$16. y = $2\sqrt[3]{x+2}+1$ |

17.  18. 

19.  20. 

21.  22. 

23.  24. 

25. shifted up 2, y = f(x) + 2 26. Stretched by 2, y = 2f(x)

27. Reflected and shifted down 1, y = –f(x) – 1

28A. Center (0, 0); radius is 5 B. Center (0, 0); radius is $\sqrt{70}$

29A. Center (3, 0); radius is 6 B. Center (-4, 2); radius is 10



30. (x – 1)2 + (y + 2)2 = 16

31. (x + 3)2 + (y + 1)2 = 4

32. (x – 9)2 + (x – 2)2 = 25

33. (x + 3)2 + (y + 5)2 = 81

**Section 3.4**

1.  2. 

3.  4. 

5.  6. 

7. $f\left(x\right)=\left\{\begin{array}{c}x^{2}, x<2\\-1, x\geq 2\end{array}\right.$ 8. $f\left(x\right)=\left\{\begin{array}{c}x^{2}, x<0\\2, 0\leq x\leq 3\\4-x,x>3\end{array}\right.$

9. $f\left(x\right)=\left\{\begin{array}{c}39, 0<x\leq 1\\41, 1<x\leq 2\\43, 2<x\leq 3\\45, 3<x\leq 4\\47, 4<x\leq 5\\49, 5<x\leq 6\\ \end{array}\right.$ 10. $f\left(x\right)=\left\{\begin{array}{c}-x-3, x<-3\\x+3, -3\leq x\leq 0\\-2x+3, 0<x<3\\x-6, x\geq 3\end{array}\right.$

11. S(A) =  D=[ 1, ∞); R= {$0, $7.50, $10, $17, $22}

12. $P\left(b\right)=\left\{\begin{array}{c}15, 0\leq b\leq 500\\0.03b, b>500\end{array}\right.$

**Section 3.5**

1. B 2. A

3. A 4. B

5A. II B. I C. IV D. III

6A. II B. IV C. I D. III



7. 8.

9. 10.

11. 12.



13. 14.

15. -3 16. 0.32 17. 32

18. 3 19.  20. 

21. -2.37, the temperature is falling at an average rate of 2.37 degrees Fahrenheit per hour.

22A. 20π sq. inches per inch B. 32π sq. inches per inch

23. -3 feet per second

24A. 2.9667 million/year B. -1.5 million/year C. 1.34 million/year

**Section 3.6**

|  |  |
| --- | --- |
| 1. neither2. direct3. inverse4. direct5. neither6. neither7. inverse; decreasing and undefined when x = 08. direct; increasing and includes (0, 0)9. neither; does not have (0,0) but increasing10. neither; is not increasing or decreasing11. y = 150/x2; 37.5; 1012. y = 3$\sqrt{x}$ ; 3; 100/9 or 11 $\frac{1}{9}$13. y = 28/x; 14; 11.214. y = 3/4x3; 6; 1015. S = 0.07p; $5000016. V = 1.75W; 12.25 cups17. C = 0.058w**Section 3.7**1. Macintosh HD:Users:jphelps:Desktop:Homework 1.png3. **Macintosh HD:Users:jphelps:Desktop:homework 3.png** | 18. W = 0.787h3; 199 pounds19. C = 64s; $23296020. h = 130/t21. f = 10/L; f = 1 $\frac{2}{3} or $1.67 pounds of pressure22. v = 9.8t; v = 78.4 m/sec23. f = 5.625gh3; f = 486024. W = 0.225AV; V = 30mph25. V = $\frac{1}{3}$ HA; V = 153 ft326. E = $\frac{55}{144}$ mv2; E = 154.7 ergs27. $a=\frac{972bc}{d^{2}}$; a = 129628. $V=\frac{15.33T}{P}$ ; V = 138 cm329. $L=\frac{324D^{4}}{H^{2}}$; L = 324 metric tons30. $F=\frac{100rm}{t^{2}}$; F = 43750 dynes2. Macintosh HD:Users:jphelps:Desktop:homework 372.png4. Macintosh HD:Users:jphelps:Desktop:homework 4.png |
| 5. Macintosh HD:Users:jphelps:Desktop:homework 5.png7. **Macintosh HD:Users:jphelps:Desktop:homework 7.png** | 6. Macintosh HD:Users:jphelps:Desktop:Homework 6.png8. Macintosh HD:Users:jphelps:Desktop:homework 8.png |

**Unit 4**

**Section 4.1**

1. $\sqrt{20}$ 2. $\sqrt{90}$

3. 0.776 4. 6.494

5. yes

6. A. This answer is for the question that is 12:30 PM instead of AM. B. 90.14 miles apart

 C. (West 37.5 miles, North 25 miles)

 (0, 50)

(-75, 0)

Car A (0, -50)

Car B (0, 0)

7. (4, 3) 8. (-4, 2.5)

9. (1988, 347) In 1988, the average daily jail population was 347 thousand people.

10. (1988, 2617.5) In 1988, the federal deficit was 2617.5 billion dollars.

11. (x – 8)2 + (y + 2)2 = 149 12. (x + 2)2 + (y + 2)2 = 34

**Section 4.2**

|  |  |
| --- | --- |
| 1. x122. x-2y113. 564. m3n35. d-26. h-1013. x2y-914. 125x-215. $\frac{1}{18x^{5}y}$16. x4y-617. 72d-518. 64x6y9 | 7. 2c118. u4v9. w1810. x2011. 27y312. -8x18y619. y20. $\frac{y^{6}}{64x^{8}}$21. $\frac{-3z^{5}}{5}$22. $\frac{-8g}{27h^{8}}$ |

**Section 4.3**

|  |  |
| --- | --- |
| 1A. 2 B. 1/5 2A. 1 B. 1/93A. 2 B. not real4A. 1/10 B. 815A. h1/3 B. p1/26A. m5/4 B. w37A. x-1/8 B. x-2/78A. $\sqrt[3]{x^{2}}$ B. $\sqrt[7]{x^{4}}$9A. $\frac{1}{\sqrt{y}}$ B. $\frac{1}{\sqrt[5]{t^{3}}}$10A. $\sqrt[4]{n}$ B. $\sqrt{c^{5}}$ | 11A. $\sqrt[4]{(2h)^{3}}$ B. 4$\sqrt{x^{5}}$12A. x6y-10/3 B. 55/4x-14/313A. x6y-2 B. 125c3d-6/514A. 8x2y9 B. ½ x-1/6y-4/915A. $x^{\frac{4}{3}}y^{-\frac{3}{2}}$ B. ½ x-5/2y1/216A. 3cd-3/2 B. 64g2h1/217A. x4/3y-1/2 B. $\frac{1}{18x^{11/5}y^{3/2}}$18A. 9d-4/5 B. -4x2/3y19A.$ x^{-\frac{7}{6}}y^{-2}$ B. x1/3y19/3 |

**Section 4.4**

|  |  |
| --- | --- |
| 1. m42. 2y3$\sqrt{y}$3. x2y54. 3x3$\sqrt{2}$5. x46. y5$\sqrt[3]{y}$7. 2m3$\sqrt[3]{2}$8. x2y$\sqrt[3]{x^{2}z}$9. 8y910. x2$\sqrt[3]{75}$11. 6x2y4$\sqrt{5x}$12. 3b$\sqrt[3]{2b^{2}}$13. 4x3y$\sqrt{3y}$14. 2g5h215. m3n16. 2xy$\sqrt[4]{2xy^{3}}$17. g4h$\sqrt[5]{h^{2}}$ | 18. g2h2$\sqrt[6]{g^{3}}$19. 6$\sqrt{10}$20. $\frac{5\sqrt{2}}{4}$21. 8$\sqrt{t}$22. 8$\sqrt{5}-2\sqrt[3]{5}$23. 3x2$y\sqrt[3]{x^{2}}$24. 3x2$\sqrt{x}$25. -6$\sqrt[4]{2x}$26. 3x3y$\sqrt{2x}$27. 0.63228. 4.005529. $\frac{\sqrt{10}}{5}$30. $\frac{3\sqrt{7}}{7}$31. 2$\sqrt[3]{2}$32. $\frac{\sqrt[3]{75}}{5}$ |
|  |  |

33A. B. 32.9mph or 33mph C. 176.04 feet

|  |  |
| --- | --- |
| d | s |
| 23 | 23.5 |
| 50 | 34.6 |
| 75 | 42.4 |

**Section 4.5**

|  |  |
| --- | --- |
| 1. x = 252. x = 543. x = 33/47. x = -69/28. x = 89. d = 24110. x = -15811. No solution12. b = 26113. x = 1.732 14. x = $\pm \sqrt{\frac{46}{5}}$ | 4. No solution5. x = -8 6. m = -5815. t = $\pm \frac{1}{2}$16. w = 12-1/317. t = 40018. x = 32/5 = 1.5519. h = 342, -344 20. d = -11.40621. x = 126/25 = 5.04 22. No solution |

23A. 122 people B. 24.7 days

24A. 2.84 miles B. 154.14 miles

25A. T = 9.62 sec B. T = 7.45 sec C. L = 7.3 feet

26A. v = 2.21 m/s B. v = 2.89 m/s C. L = 0.74 m

27A. $148 B. $72 C. $50.67 D. 1988 E. 2001

28A.  scale=20 B. 87.27 grams C. 18.8 hours D. 58.5 hours

29A. k=202.17 B. H(m) = 202.17m-1/4 C.

100

 5000

 D. 40 bpm E. 68 bpm F. 0.713 kg

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 4 | 6 |
| 7.22 | 6.68 | 6.19 | 5.92 |

30A. k = 7.22 B.

31A. k = 0.158; d = 0.158$\sqrt{t}$ B. 2.12 cm C. 250.36 min or 4.17 hours

**Section 4.6**

1. D 2. C 3. 3 4. 4 5. 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Terms | Coefficient | Degree | Degree of poly |
| 6A. | 2x3, -4x2, 7 | 2, -4, 7 | 3, 2, 0 | 3 |
| B. | 3x3y, 6x2y3, 2x3, 4x2y2 | 3, 6, 2, 4 | 4, 5, 3, 4 | 5 |
| C. | -0.5x3y, 5x2y3 | -0.5, 5 | 4, 5 | 5 |
| D. | 7y, 2 | 7, 2 | 1, 0 | 1 |
| E. | ½ x4y8 | ½ | 12 | 12 |

7A. trinomial B. none C. binomial D. binomial E. monomial

8. binomial, 4

9. monomial, 0

10. 5, 3x5 – 7x4 + 5x3 + 4x2 – 8x + 1

11. -4x5 + 2x4 + 3x3 + 7x2 – 2x + 12

12A. 15x + 5 B. 6x – 18

13A. 4x2 – 14x + 1 B. 4x2 – 5x – 4

14A. 12x2 + 11x + 2 B. 5x2 – 10x

15A. 12x2y + 4xy + 12y2 B. 9x2y + 2y + 3x +4y2

|  |  |
| --- | --- |
| 16. 8x5 + 20x417. 20x3 + 5x2 – 40x18. 6x2 – 11x – 719. 2x3 + 8x2 + 4x + 1620. 10x2 – 3x – 2721. 6x4 + 13x2 – 522. 3x3+ 10x2 + 5x – 423. 6x3 + 13x2 – x + 1024. 10x4 – x3 – 19x2 + 14x – 825. 18x2 – 9xy + 2y226. x + 4 + 2x-1 27. 2 + 10x-1 + 5x-228. 2x2 + 20/3 x + 429. ½ x + 10 + 6x-1 – ½ x-230. x + 4 - $\frac{10}{x+2}$31. 3x + 8 + $\frac{10}{x-1}$ | 32. 4x – 14 + $\frac{45}{x+3}$33. 6x + 13 + $\frac{15}{x-2}$34. x2 – 4x + 2 + $\frac{1}{x+1}$35. x + 3 - $\frac{4}{x+2}$36. x2 – 2x + 3 + $\frac{5}{x-1}$37. 5x – 17 + $\frac{54}{x+3}$38. 3x + 7 + $\frac{5}{x-2}$ 38. 2x2 – 2x – 5 + $\frac{8}{x+1}$39. -1940. -741. -14442. 35 |

**Section 4.7**

|  |  |
| --- | --- |
| 1. 9i2. 3i3. -204. 18i5. -5 -5i6. 7 – 8i7. -5 + 6i8. 4 – 2i9. 26 – 7i10. 53 + 5i11. -11 + 78i12. -3 – 28i | 13. 10 + 40i14. -10 + 8i 15. 3416. 5317. -3 – 3i18. -16/25 + 37/25 i19. -17/10 + 9/10 i20. 23/29 – 14/29 i21. –*i*22. *i*23. -124. 1 |

**Unit 5**

**Section 5.1**

|  |  |
| --- | --- |
| x | F-1(x) |
| 2 | -1 |
| 5 | 0 |
| -3 | 1 |
| 7 | 2 |
| 1 | 3 |

|  |  |
| --- | --- |
| x | F-1(x) |
| 0 | 2 |
| -1 | 4 |
| -2 | 7 |
| 0 | 9 |
| -1 | 12 |

1. 2.

Yes, the inverse is a function No, the inverse is not a function

|  |  |
| --- | --- |
| Height | Time |
| 3 | 1 |
| 51 | 2 |
| 67 | 3 |
| 51 | 4 |

|  |  |
| --- | --- |
| t | g-1(t) |
| 11 | -1 |
| -7 | 3 |
| 1 | 5 |
| 5 | 8 |
| -1 | 10 |

3. 4. g-1(5) = 8

No, the inverse is not a function

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| d | 0.5 | 0.87 | 1.01 | 1.24 |
| t | 10 | 30 | 40 | 60 |

5.

6A. f-1(5) = -3; f-1(0) = 2; f-1(4) = 0, f-1(7) = 2 B. f-1(0) = -2 C. f-1(7) = 2

7. f-1(x) = $\frac{x-9}{4}$

8. g-1(x) = $\sqrt[7]{x-5}$

9. f-1(x) = $\sqrt[3]{\frac{x+11}{3}}$

10. h-1(t) = $\frac{t^{2}-5}{3}$

11. g-1(m) = 8m + 3

12. f-1(d) = $\frac{\left(d-1\right)^{4}}{81}$

13. h-1(x) = $\sqrt{\frac{x+5}{6}}$

14. Y-1(x) $\frac{4x^{3}+3}{2}$

15A. C(75) = 23.9; A temperature of 75°F is about 24°C.

 B. 82.4° C. F(C) = 9/5 C + 32 D. C-1(28) = 82.4°

16A. W(40) ≈ 83 After 40 hours, the bat weighs about 83 grams.

 B. W-1(80) = 46 Bat weighs 80 grams about 46 hours after its last meal.

|  |  |
| --- | --- |
| d | s |
| 20 | 22 |
| 35 | 29 |
| 80 | 44 |

|  |  |
| --- | --- |
| s | d |
| 22 | 20 |
| 29 | 35 |
| 44 | 80 |

17A. B.

 C. s-1(d) = d2/24 D. s-1(70) = 204; At 70mph, the stopping distance is 204 feet.

 E. s(70) = 41; At a stopping distance of 70 feet, the car was traveling at 41 mph.

18.  yes 19.  yes

20.  yes 21.  no

22.  yes 23.  no

24.  yes 25.  yes

26. 18, 19, 20, 22, 24, 25 27. $(f°f^{-1})(x)$=x; $\left(f^{-1} °f\right)\left(x\right)=x$

28. $(f°f^{-1})(x)$=x; $\left(f^{-1} °f\right)\left(x\right)=x$ 29. $(f°f^{-1})(x)$=x; $\left(f^{-1} °f\right)\left(x\right)=x$

30. Domain: $\left[0, \infty )\right.$ 31. Domain: $[-1,\infty )$

**Section 5.2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** |
| **20** | **60** | **180** | **540** | **1620** |

1A. B. P(t) = 20(3)t C.

D. P(1.5) = 103.92 E. 20(3)t = 1000; t = 3.561

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 5 | 10 | 15 | 20 |
| 35 | 140 | 560 | 2240 | 8960 |

2A. B. P(t) = 35(4)t/5 C. P(3) = 80.41

D. E. t = 3.786

3A. B.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 6 | 12 | 18 | 24 |
| 1 | 2 | 4 | 8 | 16 |

 C. P(t) = 1(2)t/6 D. P(8) = 2.52

 E. P(48) = 256

4A. P(t) = 1(2)t/5 B. P(86) = 150562.19

5A. T(t) = 125.91(1.14)t B. T(5) = $242.43 C. t = 6.626 years

6A. P(t) = 1001t/25 B. P(31) = 5254.6

7A. P(t) = 285(1.75)t B. P(9) = 43871.99

8A. P(t) = 5078(2)t/5 B. P(13) = 30787.23

9A. P(t) = 2.79(1.08)t/6 B. P(15) = $3.38; P(24) = $3.80

10A. P(t) = 40000(1.05)t B. P(30) = $172877.70

11. A(t) = 7000(1.039)t; A(3) = 7851.36; A(10) = 10262.51

12A. A(t) = 350$\left(1+\frac{.025}{2}\right)^{2t}$ B. A(5) = 396.29

13. A(t) = 2000$\left(1+\frac{.06}{365}\right)^{365t}$; A(1) = 2123.66; A(4) = 2542.45

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 |
| 25000 | 21250 | 18062.50 | 15353.13 | 13050.16 |

14A. B. V(t) = 25000(0.85)t

 C. D. V(3.5) = 14154.88 E. t = 4.265

15. P(t) = 150(1/2)t/15

16. P(t) = (1/2)t/5730; t = 9952.8

17A. P(t) = 70(1/2)t/200 B. t = 444.478

18. P(t) = (½ )t/7; P(40) = 0.019

19A. P(t) = 500(2/3)t/2 B. P(4) = 222.22 C. t = 12.458

**Section 5.3**

1.  2.  3. 

4.  5.  6. 

7.  8.  9. 

10. 

11A. f(x) = 2x + 3 B. f(x) = 3(2)x C. f(x) = -2x + 1 D. f(x) = 4(2)x

|  |  |
| --- | --- |
| 12. (0, 6.2) decreasing13. (0, 2) increasing14. (0, 2/3) increasing15. (0, 5/2) decreasing16. g(x) = 3(2.5)x17. f(x) = 32(1/2)x | 18. f(x) = 40(3/4)x/419. g(x) = 100(5)x/1020. f(x) = 3(1/4)x21. f(x) = 4(1/2)x22. f(x) = ½ (6)x23. f(x) = 2(5)x/2 |

24a. f(4) = 1296 b. f(3) – f(1) =210 c. f(a+h) = $6^{a+h}$ d. $\frac{f\left(a+h\right)-f(a)}{h}=\frac{6^{a+h}-6^{a}}{h}$

25a. f(2) = 65 b. 3f(2) = 195 c. f(a+h) = $2^{3a+3h}+1$ d. $\frac{f\left(a+h\right)-f(a)}{h}=\frac{2^{3a+3h}-2^{a}}{h}$

26. Neither

**Section 5.4**

|  |  |
| --- | --- |
| 1. log4(16) = 22. log5(125) = 33. log7(1) = 04. log2(1/2) = -1 | 5. log36(6) = ½6. logH­(d) = 47. logx(z) = y8. logm(3) = 7 |
| 9. 25 = 3210. 51 = 511. b3 = m12. p2 = 3013. 10n = t14. ev = 915. 6-4 = 6-416. 1001/2 = 1017. 1.27918. 2.47719. 3.80720. 4.71821. 3 22. 223. 324. ½25. 826. 7 | 27. 028. 429. 130. 1/331. $\frac{log⁡(22)}{log⁡(4)}$ = 2.2332. $\frac{log⁡(121)}{log⁡(6)}$ = 2.67733. $\frac{ln⁡(400)}{ln⁡(12)}$ = 2.41134. $\frac{ln⁡(18)}{ln⁡(3)}$ = 2.63135. $\frac{log⁡(37)}{log⁡(b)}$36. $\frac{ln⁡(g)}{ln⁡(f)}$37. 2.6438. 2.36739. 1.89240. 4.357 |

**Section 5.5**

|  |  |
| --- | --- |
| 1. x = 13/32. x = 73. x = 44. x = 15. x = 17/36. x = 47. x = 38. x = -59. x = 1.27710. x = 4.35811. x = 1.80712. x = 0.38913. x = -6.27614. x = -1.903 | 15. x = 1.54416. x = -3.14517. x = -0.52818. x = 15.27519. x = 0.99920. x = 30.54321. 2t/5 = 1000; t = 49.829 minutes22. t = 7.8 or 201523. t = 29.379 months24. t = 9.056 years25. t = 18.12 years; t = 28.715 years26. t = 3.802 years; t = 11.405 years27. t = 13.887 years28. t = 28.61 hours  |

**Section 5.6**

|  |  |
| --- | --- |
| 1. 72. 93. -24. 115. t6. 1/3 | 7. 128. 29. 610. x11. 1312. n |

13. 14.



15.  16. 

|  |  |
| --- | --- |
| 17. log3(7) + 6log3(x)18. 2loga(x) + 3loga(y)19. 2[ln(m) + ln(n)]20. 4logb(x+3) + 5logb(y+6)21. ½ log6(3) + ½ log6(x) – log6(y)22. log2(4) + log2(t) – log2(r)23. 1/3 (ln(x) – ln(y))24. log(g) – 5 log(h)25. $log\_{b}\left(\frac{z}{w}\right)$26. $log\_{b}\left(\frac{x^{2}}{y}\right)$27. log4(x2w3) | 28. $log\_{3}\sqrt{xp}$29. $log\_{b}\left(\frac{xd}{w}\right)$30. $log\_{b}\left(\frac{x^{3}y}{\sqrt[4]{z}}\right)$31. x = 2/1532. x = 501/9833. x = 1 34. x = 50/735.A. f(65) = 71.03 B. 1947 C. 75.336.A. 20.6 decibels B. 89.5 decibels37.A. 79.82% B. 73.9 inches38. $(f°f^{-1})(x)$=x; $\left(f^{-1} °f\right)\left(x\right)=x$ |

**Section 5.7**

|  |  |
| --- | --- |
| 1A. 1050.63 B. 1218.40 C. 22.2462A. 5254.73 B. 5256.363. 35526.774. 3194.115. 8.85%; 8.66%6. 8.15%; 7.83% | 7. P = 63940(1.051)t8. C = 0.97(1.0528)t9. $1276.9210. A = 125(0.7)t11a. T = 150(1.17)t b. 150 c. 721 turtles12. V = 33430(0.88)t |

13A. T = 182.4(0.9845)t B.

C. 182.4°

D. 35 minutes

E. 10 minutes

14. (5, 4000), (8, 24000) ; f(x) = 202(6)x/3 or f(x) = 202(1.817)x

15. (5, 30), (7, 130); f(t) = 0.767(2.082)t

**Section 6.1**

|  |  |
| --- | --- |
| 1. 7x(x – 3)2. 3x(2x2 – 4x + 5)3. 4x2 (2x + 1)4. (t + 9)(t – 9)5. (y + 3)(y2 – 3y + 9)6. (4h-1)(16h2 + 4h + 1)7. 3(x + 3)(x – 3)8. (2d + 5)(2d – 5)9. (x + 2)(x + 4)10. x(x + 3)11. (x + 3)(x – 2)12. (x – 4)(x + 3)13. (x + 4)(x + 2)14. (x + 7)(x + 8)15. (x – 1)(x – 3)16. (x – 3)(x + 1)17. (x + 4)(x – 4)18. (x + 8)(x + 10)19. (x – 6)(x – 1)20. (x + 9)(x + 8)21. x(x – 9) 22. (x + 6)(x + 2)23. -7(5x – 9)24. –(4x – 7)(x – 9)25. -2(5x – 2)(6x – 1)26. (x – 2)(4x – 7)27. (3x + 1)(x + 2)28. (x + 7)(x – 7)29. x2 + 49 or unfactorable30. 3x2(x2 + 3) | 31. x2 + 2x – 6 or unfactorable32. (x – 24)(x + 3)33. 4(x + 1)234. $7x^{2}+5x-56 $or unfactorable35. (x2 - 9)(x2 – 1) = (x + 3)(x – 3)(x + 1)(x -1)36. (3x - 2)(11x + 7)37. (4x + 5)(x2 + 7)38. (x2 + 7)(x + 2)39. (3x2 + 7)(x – 2)40. 2(x – 1)(3x2 – 5)41. 5(2x + 1)(x + 3)42. (3x – 1)(2x + 1)43. (t – 2)(4t + 3) 44. (3y + 1)(y + 4)45. (2m – 3)(4m + 1)46. (4k – 5)(2k + 3)47. (3a + 7)(a + 1)48. (2a – 5)(a – 6)49. (4x – 1)(2x – 3)50. 2 (r + 1)(7r + 1)51. (a – 2)(5a + 3)52. (3p – 2)(5p + 3)53. (4r – 3)(r + 1)54. (4s + 5)(3s – 1)55. (2q + 3)(3q + 7)56. 3(p + 2)(3p – 4)57. (3r – 5)(r + 2)58. (3x + 4)(2x – 3)59. (5x + 2y)(25x2 – 10xy + 4y2)60. 5(n – 2)(n2 + 2n + 4) |
|  |  |

**Section 6.2**

|  |  |
| --- | --- |
| 1. x = -1.6, x = 2.22. x = 1.8, x = -5.83. x = 2.61, x = -1.2774. x = 22.808, x = 2.1925. x = 1.338, x = -4.6716. x = 1.766, x = -2.2667. x = -5, x = -48. x = -2, x = 19. x = -6, x = 210. x = 3, x = -311. x = $\pm \sqrt{2}$12. x = $\pm \frac{\sqrt{14}}{2}$13. x = 1, x = -314. x = $\frac{\pm \sqrt{10}+1}{3}$15. x = 5/2, x = -1/316. x = 5, x = -1/317. x = 5, x = 718. x = -2/3, x = -719. x = 8 ± 2$\sqrt{26}$20. x = $\frac{-5\pm \sqrt{35}i}{2}$ | 21. $x=\frac{-6\pm \sqrt{23}}{2}$22. x = x = 5/2, x = -1/323. x =$ \frac{1\pm \sqrt{13}}{4}$24. x =$ \frac{-5\pm \sqrt{31}i}{4}$25. x =$ \frac{-7\pm \sqrt{157}}{6}$26. x =$ \frac{-9\pm 5\sqrt{5}}{2}$27. x = $\frac{-1\pm \sqrt{2}}{2}$28. x =$ \pm \sqrt{\frac{17}{3}}$29. x = 1, x = 730. x = ½ ± $\frac{\sqrt{15}}{6}i$31. x = ± 3/232. x =$ \frac{9\pm \sqrt{21}}{10}$33. x = ±2, x = $\pm \sqrt{\frac{1}{2}}$34. x = $\pm \sqrt{\frac{-1\pm \sqrt{61}}{6}}$35. x = ¼, x = 936. x = $\left(\frac{5\pm \sqrt{33}}{2}\right)^{2}$ |

**Section 6.3**

|  |
| --- |
| 1. (0, -25), (5, 0), (-5, 0)2. (0, 28) (-7, 0)(-4 , 0)3. (0, -3), (1, 0), (-3/2, 0)4. (0, 5), (5/2, 0), (1, 0)5. (0, 20), (5/3, 0), (1, 0)6. (0, 40), (-2, 0), (-10, 0)7. (0, 3)8. (0, 1), ($\frac{7\pm \sqrt{41}}{4}, 0)$9. (0, -11)10. (0, 22)11. (-7, -2); x = -712. (-5, 3); x = -513. (3, -1); x = 314. (-1, -9); x = -115. (-6, -2); (0, -74); no x-intercepts16. (-2, -9); (0, 3); (-2 ±$ \sqrt{3}, 0)$17. (3, -4); (0, -1); (3 ±$ \sqrt{12}, 0)$18. (-5, -8); (0, -33); no x-intercepts19.  (-5, 2); (0, 27);no x-intercepts20.  (7, -8); (0, 90);(5, 0), (9,0)21.  (1, -5); (0, -11/2); no x-intercepts22.  (-3, -9); (0, -18);no x-intercepts23. a > 0, b ≠ 0, c < 024. a < 0, b ≠ 0, c > 025. a > 0, b ≠ 0, c = 026. a < 0, b = 0, c < 027. Concave down, (0, 11), vertex off y-axis28. concave up, (0, 1), vertex on y-axis29. concave up, (0, -5), vertex off y-axis30. concave down, (0, 3), vertex off y-axis31. vertex (0, -5) intercepts (0, -5), (± $\frac{\sqrt{5}}{2},0)$32. vertex (-1/12, -121/24), intercepts (0, -5), (5/6, 0), (-1, 0)33. vertex (-3, -3) intercepts (0, 0), (-6, 0)34. vertex (2, 7) intercepts (0, 3), ($\frac{4\pm \sqrt{28}}{2},0)$35.a. (0, 4) b. (4, 0) (-1, 0) c. (3/2, 25/4) d. down e. standard f. 36.a. (0, 4) b. $\left(\frac{4\pm \sqrt{8}}{2},0\right)$ c. (2, -4) d. up e. stretched f. 37.a. (0, -1) b. (-3$\pm \sqrt{11}, 0)$ c. (-3, -11/2) d. up e. shrunk f. 38. f(x) = (x + 6)2 – 3139. f(x) = (x + 7/2)2 – 89/440. f(x) = 3(x – 2)2 + 541. f(x) = 2(x + 5)2 – 61 |

**Section 6.4**

1. y = x2 + 2x – 15; y = 2(x2 + 2x – 15)

2. y = x2 – 7x + 12; y = 6(x2 – 7x + 12)

3. y = -(x2 + 3x – 4); y = -3(x2 + 3x – 4)

4. y = -(x2  - 2x – 24); y = -1/2 (x2 – 2x – 24)

5. y = -1/8 (x2 + 3x – 28)

6. y = 3/10 (x2 + 7x + 10)

7. y = 2/21 (x2 – x – 42)

8. y = 5/49 (2x2 + 5x – 3)

9. y = -2/5 (x2 – 2x – 24)

10. y = 2(x + 2)(x – 3)

11. y = ½ (x2 – 4x + 3)

12. y = -(x2 + 5x + 4)

13. y = -2(x – 3)2 + 1

14. y = 1.5(x + 2)2 – 3

15. y = (x – 4)2 + 2

16. y = - ½ (x + 2)2 + 5

17. y = ¼ (x + 4)(x – 5)

18. y = 1/3 (x + 1)2 – 2

19. y = 16/3 (x – ½)2 – 5

20. y = -3/16 (x + 3)2 – 5

21. y = 2/3x2 – 16/3 x + 10

22. y = -0.4x2 + 0.8x + 3.2

23. y = 2x2 – x + 4

24. y = 2/3x2 + 5/3x + 1

25. y = -3/2x2 + ½ x + 2

26. using first 3 points y = -16x2 + 1821

27. using first 3 points (with a and c approximated) y = $.21x^{2}+1.25x+41.7; $131.67

28. using first 3 points C = 0.0035v2 – 0.295v + 12.2

29. h = -23/15000 (x – 150)2 + 38

30. h = -4.9(t – 1.5)2 + 11.025

31. h = -0.006(x – 1)2 + 11.5

**Section 6.5**

|  |  |
| --- | --- |
| 1. increasing (-∞, 7);decreasing (7, ∞); maximum = 52. decreasing (-∞, -11);increasing (-11, ∞); minimum = -83. decreasing (-∞, 5/6);increasing (5/6, ∞); minimum = 95/124. increasing (-∞, -7/4);decreasing (-7/4, ∞); maximum = 57/85. L = 7.31 ft; W = 12.31 ft6. 7.204 hours7A. 4.146 sec B. Never C. (0, 4.146)8A. 2.993 sec B. 3.189 sec C. (0, 1.53) D. 1.53 sec, 13.48m9. T = 1/2°C10. t = 4.33 sec11. t = 4.9 seconds to hit the ground; maximum height of 186 ft after 1.5 sec12A. minimum area = 0 B. 3 x 9 meters13. W = 50/3 yds; L = 25 yds14A. 85.73 ft B. 0.857 inch15A. H(50) = 125.319 horsepower B. 63.18 mph16A. 500 tennis balls, -$2300 B. less than 50017. 1100 units18. 40 items |  |

19. 2.367 sec

20. 72 ft x 160 ft

21. x = 3 ft; y = 14 ft

22. W = 20; L = 30 yds

23. Base = 8 ft; Height = 5 ft

24. 6 ft by 15 ft

25A. 50 by 200 or 100 by 100 B. 11250 ft2 (75 by 150 ft)

26A. Not possible B. 31250 ft2 (125 by 250 ft)

**Section 6.6**

1a. Between 0 and 2.165 seconds b. Between 3.317 and 4.146 seconds

2a. Between 3.028 and 3.189 seconds b. Between .473 and 2.588 seconds

3. Between -2 and 4.89 degrees Celsius

4. Between .946 and 3.304 seconds

5. The diameter needs to be between 6.187 and 6.654 inches.

6. Less than 1009.9 tennis balls

7. Between 20 and 67 items

8. He is between 7.74 and 8.61 feet from the diving board. He enters the water at 8.61 feet.

9. As long as the width is less than 50 feet (with the corresponding length = 300 – 2w) and the length is greater than 100 feet (with the corresponding length = 300 – 2w).

**Section 7.1**

|  |  |
| --- | --- |
| 1. $\frac{4}{x+7}$ 2. $\frac{x-7}{x-8}$3. 4x4. $\frac{5}{3(x-4)}$5. $\frac{x-7}{3(x+4)}$6. $\frac{x^{3}y}{2}$7. $\frac{5}{6d^{2}}$ | 8. $\frac{1}{2g}$9. $\frac{(h+1)(h+2)}{3h(h-1)}$10. $\frac{10\left(j-1\right)^{n-2}}{j}$11. $\frac{(t+3)(t-3)}{t(t-9)}$12. $\frac{v-1}{4(v+1)}$13. $\frac{5}{6}$14. $\frac{x(x+1)}{4}$ |
| 15. $\frac{y+1}{y-3)(y+5)}$16. $\frac{5(x-1)}{2(2x+1)}$17. 21/218. 1/919. $\frac{a-7}{a+3}$20. $\frac{(3x+5)(x+1)}{4}$21. $\frac{-14}{m-4}$22. $\frac{15p+4}{p-1}$23. $\frac{5x+10}{x+2}=5$24. $\frac{-t-2}{t}$25. $\frac{x-3y}{xy}$26. $\frac{15p-11}{p(p-1)}$ | 27. $\frac{2a^{2}-4a+9}{6a}$28. $\frac{-4m+31}{(m-4)(m+1)}$29. $\frac{-tx-3ty}{(x-y)(x+y)}$30. $\frac{2c+4d}{c^{2}d}$31. $\frac{-m+1}{(m-2)(m+3)}$32. $\frac{21g+1}{2g(3g-2)}$33. $\frac{2x^{2}+xy+y^{2}}{\left(x+y\right)^{2}(x-y)}$34. $\frac{2x^{2}-x+5}{(x+3)(x-3)(x+1)}$35. $\frac{-3y-7}{(y+3)(y+4)}$36. $\frac{-13}{15(t-5)}$ |

**Section 7.2**

|  |  |
| --- | --- |
| 1A. x= 5 B. x = 12A. x = -3 B. x = 1 C. x = -1.53. x = 1.14. x = -1.6365. x = -13/56. c = -11/8 7. x = 6, x = -28. No solution9. x = -1610. x = 39/711. t = 2.5712. x = 3.7313. $\frac{12}{8}=\frac{20}{x}$; x = 13.3 days14. $\frac{6}{4}=\frac{15}{x}$ ; x = 10 days15. $\frac{15}{3}=\frac{L}{4}$ ; L = 20 liters16. $\frac{2.5}{7}=\frac{98.6-65}{s}$ ; s = 94 seconds17. $\frac{17}{2}=\frac{P}{5}$ ; P = 42.5 hours18. $\frac{80}{1}=\frac{w}{30}$ ; w = 2400 words19. $\frac{8.7}{1000}=\frac{D}{28142/906}$ ; D = 2,448,371 deaths20. $\frac{15}{400}=\frac{D}{1000}; $D = 37.5 or 38 parts21. $\frac{18}{12}=\frac{I}{1}$ ; I = 1.5 inches | 22. $\frac{22}{30}=\frac{100}{m}$ ; m = 2 hours 16 minutes23. $\frac{1}{8}=\frac{w}{32}$ ; w = 4 women24. $\frac{280}{D}=\frac{45}{405}$ ; D = 2520 total deer25. $\frac{5}{2.99}=\frac{P}{8.50}$ ; P = 14.2 pounds26. $\frac{3+x}{5+x}=\frac{7}{9}$ ; x = 427. $\frac{1}{6}+\frac{1}{4}=\frac{1}{T}$ ; T = 2.4 hours28. $\frac{1}{8}-\frac{1}{10}=\frac{1}{T}$ ; T = 40 hours29. $\frac{1}{S}+\frac{1}{16}=\frac{1}{9}$ ; S = 20.57 hours30. $\frac{1}{P}+\frac{1}{P+3}=\frac{1}{2}$ ; P = 3 hours31. $\frac{1}{12}+\frac{1}{15}=\frac{1}{T}$ ; T = 6.67 hours32. $\frac{1}{1}-\frac{1}{2}=\frac{1}{T}$ ; T = 2 minutes33. $\frac{1}{6.5}-\frac{1}{8.25}=\frac{1}{T}$ ; T = 30.64 minutes34. $\frac{1}{5}-\frac{1}{4}=\frac{1}{T}$ ; No the water is draining faster than it is being filled.35. $\frac{1}{6}+\frac{1}{5}=\frac{1}{T}$ ; T = 2.727 hours36. $\frac{1}{2}+\frac{1}{2.5}=\frac{1}{T}$ ; T = 1.11 hours37. 16.67 miles38. $\frac{250}{R}=\frac{420}{R+30}$ ; 44km/h (Jody) 74 km/h (James)39. $\frac{440}{R-16}=\frac{600}{R}$ ; R = 60 km/h (empty) 44 km/h (loaded) |

**Section 7.3**

1A. x = 0, x = ½ B. y = 0 C. (-4, 0) D. 

2A. x = -1/2, x = 1 B. y = 2 C. (0, -4) D. 

3A. x = 4, x = -4(hole) B. y = 0 C. (0, -1/4) D. 

4A. x = -1, x = 2 B. y = 0 C. (0, 5/2), (5, 0) D. 

5A. x = 3 B. y = x + 3 C. (0, 4/3) D. 

6A. x = 1, x = 2 B. y = 0 C. (0, -3) D. 

7A. x = -2 B. y = 1 C. (0, 2)(-4, 0) D. 

8A. x = 3 B. y = 1/3x + 1 C. (1,0), (-1, 0), (0, 1/9) D. 

9A. C = 750 + 92(15) = 2130 annual cost = $142/year B. AC = $\frac{750+92x}{x}$

C.  D. x = 0, y = 92

E. The annual cost approaches $92/year as time increases. F. AC = $152/year; No

10A. AC = $141.22 per year B. AC = $\frac{560+79x}{x}$ C. 

D. y = 79, x = 0 E. The annual cost approaches $79 per year as time increases.

11A.  B. At 18 minutes, 13.76 mc/mL

C. Concentration increases for the first 18 minutes, then decreases rapidly at first then more slowly.

D. y = 0, The concentration approaches 0mc/mL as time passes.

12A. (30, 3.33), (55, 1.818), (65, 1.538) B. T = 100/s

C.  D. As the speed increases, the time decreases.

13A. C = $\frac{80+6s}{s}$ B. 

14A. [0, 100) B. $117, 857;$275000 C. 

D. 64.5% E. P = 100 It is impossible to remove 100% of the ore.

15A. A = $\frac{25000+15n}{n}$ B.  C. 3571 calculators

D. A =15 Average cost approaches $15 per calculator as the number of calculators produced increases.

**Section 7.4**

|  |  |
| --- | --- |
| 1. D = 5; LC = -112. D = 6; LC = 93. D = 4; LC = -84. D = 6; LC = -115. D = 4; LC = -26. D = 7; LC = 17. ↑↓ 8. ↑↑ | 9. ↓↓10. ↓↓11. ↓↓ 12. ↓↑13. (0, -5), (4, 0), (8,0)14. (0, 0), (3, 0), (5, 0)15. (-1, 0), (2, 0), (5, 0) |

16.  17.  18. 

19.  20.  21. 

22. 

23. y = (x+2)2(x – 4)

24. y = -x(x+3)(x – 4)2

25. y = -x(x + 3)(x + 1)(x – 3)

26. y = x(x + 2)(x + 1)(x – 3)

27. y = x(x + 3)(x + 1)2

28. y = -(x + 3)(x + 1)3 (x – 1)

29. (x-3)(x-2)(x-1)2(x+3)

30. (x-5)(x-3)(x-2)(x+3)

31. (x-5)(x-2)(x+4)

32. (x-5)(x-2)(x+2)2

33. (x+1)(2x+5)(3x-2) or 6(x+1)(x+5/2)(x-2/3)

**Section 7.5**

1A. x = -4 B. (-4, 0) C. (-∞, -4) U (0, ∞)

2A. no solution B. (-∞, 1) C. (1, ∞)

3A. x = -1 B. (-∞, -2) U (-1, 1) C. (-2, -1) U (1, ∞)

4A. x = -3, x=1, x=2 B. (-∞, -3) U (1, 2) C. (-3, 1) U (2, ∞)

5A. x = -2, x=0, x=1, x=3 B. (-2, 0) U (1, 3) C. (-∞, -2) U (0, 1) U (3, ∞)

6A. x= -4, x = -2, x = 0, x= 1, x= 3 B. (-4, -2) U (0, 1) U (3, ∞) C. (-∞, -4) U (-2, 0) U (1, 3)

7A. x = -1, x=4 B. (-1, 5) C. (-∞, -1)U(5, ∞)

8A. x = 1, x = 2 B. (-∞, 1)U(2, ∞) C. (1, 2)

9A. x = 3, x = 5 B. (3, 5) C. (-∞, 3)U(5, ∞)

10A. x = -1/3, x = 13/3 B. (-∞, -1/3)U(13/3, ∞) C. (-1/3, 13/3)

11. (1, 5)

12. (-∞, -4)U(3, ∞)

13. [1/2, 2]

14. (-∞, ∞)

15. (-∞, -1) U(0, 1)

16. (-2, 0) U (1, ∞)

17. [-2, 1)

18. (-3, 1) U (3,∞)

19. (-2, -2/3)

20. (-∞, -5/2]U[15/2, ∞)

21. (-12, 20)

22. (-∞, -1) U (1, 5/2)

23. (-∞, -2) U (2, ∞)

24. (-∞, 5)

25. (-3, 0) U (1, ∞)

26. (-∞, -10]U[1, ∞)

27. (-5/2, 2/3)

28. (-∞, -3/2] U[-1, 5]

29. (-∞,5/2]U[25/2, ∞)

30. (-∞, 1) U (4, ∞)

31. (-8,-6)

32. no solution

33. Between 0.295 and 2.766 seconds

34. Never

35. More than 7.97 feet

36.A. $\left|x-37500\right|=2570$ B. [34930, 40070]