

Complete Solutions Manual

Elementary Technical Mathematics

TWELFTH EDITION

Dale Ewen

Parkland Community College

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Chapter 1: Basic Concepts

Section 1.1: Review of Basic Operations

1. 3255
2. 10,793
3. 1454
4. 579
5. 795,776
6. 4,845,000
7. 5164
8. 3298
9. 26,008
10. 130,130
11. 2820
12. 50,124
13. 4195Ω
14. 8615Ω
15. The sum of the lengths is 224 feet, so 224 studs are required.
16. $24 \text{ ft} - 4 \text{ ft} - 5 \text{ ft} - 7 \text{ ft} = 8 \text{ ft}$
17. 39 ft
18. $125 \text{ ft}^3 - 78 \text{ ft}^3 = 47 \text{ ft}^3$
19. Input: 1925 cm^3
Output: 1425 cm^3
 $1925 \text{ cm}^3 - 1425 \text{ cm}^3 = 500 \text{ cm}^3$
20. yes; $31 \text{ hr} + 2 \text{ hr} + 3 \text{ hr} + 2 \text{ hr} + 3 \text{ hr} = 41 \text{ hr}$
21. 27,216
22. 1,699,922
23. 18,172,065
24. 486,400
25. 35,360,000
26. 122,440,800
27. 1809
28. 61,747 r 1
29. 389
30. 434 r 24
31. 844 r 40
32. 1566 r 80
33. $31 \text{ mi/gal} \times 16 \text{ gal} = 496 \text{ mi}$
34. $65 \text{ L} \times 12 \text{ km/L} = 780 \text{ km}$
35. $1300 \text{ cm}^3 \div 4 = 325 \text{ cm}^3$
36. $1274 \text{ mi} \div 49 \text{ gal} = 26 \text{ mi/gal}$
37. $2340 \text{ km} \div 180 \text{ L} = 13 \text{ km/L}$
38. $\$13/4 \text{ ft} \times 20 \text{ ft} = \65
39. $\$516 \div 6 \text{ h} = \$86/\text{h}$
40. $\$596 \div 4 = \149
41. $125 \text{ mi/h} \times 4 \text{ h} = 500 \text{ mi}$
42. $500 \text{ ft/min} \times 15 \text{ min} = 7500 \text{ ft}$
43. $5 \times 18 \text{ ft} = 90 \text{ ft}$
 $42 \times 15 \text{ ft} = 630 \text{ ft}$
 $158 \times 12 \text{ ft} = 1896 \text{ ft}$
 $105 \times 10 \text{ ft} = 1050 \text{ ft}$
 $79 \times 8 \text{ ft} = 632 \text{ ft}$
 $87 \times 6 \text{ ft} = \underline{522 \text{ ft}}$
Total = 4820 ft
44. There are 112 boards in the order.
 $36 \times 12 \text{ ft} = 432 \text{ ft}$
 $28 \times 10 \text{ ft} = 280 \text{ ft}$
 $36 \times 8 \text{ ft} = 288 \text{ ft}$
 $12 \times 16 \text{ ft} = \underline{192 \text{ ft}}$
Total = 1192 ft
45. First draftperson:
 $8 \times 30 \times 80 = 19,200 \text{ drawings}$
Second draftperson:
 $8 \times 30 \times 120 = 28,800 \text{ drawings}$
Difference:
 $28,800 - 19,200 = 9600 \text{ drawings}$
46. $5232 \text{ ft} \div 12 \text{ ft} = 436$

47. Horizontal position:

$$17 \text{ ft } 5 \text{ in.} = 17 \text{ ft} \times 12 \text{ in./ft} + 5 \text{ in.} \\ = 209 \text{ in.}$$

$$209 \text{ in.} - 75 \text{ in.} = 134 \text{ in.}$$

$$134 \text{ in.} \div 2 = 67 \text{ in. from either corner}$$

Center of window:

$$10 \text{ ft} = 10 \text{ ft} \times 12 \text{ in./ft} = 120 \text{ in.}$$

$$\frac{5}{8} \times 120 \text{ in.} = 75 \text{ in. above floor}$$

Bottom of window:

$$75 \text{ in.} - 54 \text{ in.} \div 2 = 75 \text{ in.} - 27 \text{ in.} \\ = 48 \text{ in. above floor}$$

$$51. \text{ a. } \frac{856 \text{ lb} + 754 \text{ lb} + 1044 \text{ lb} + 928 \text{ lb} + 888 \text{ lb} + 734 \text{ lb} + 953 \text{ lb} + 891 \text{ lb}}{8} = \frac{7048 \text{ lb}}{8 \text{ days}} = 881 \text{ lb/day}$$

$$\text{b. } \frac{4320 \text{ lb}}{36 \text{ days}} = 120 \text{ lb/day}; \quad \frac{120 \text{ lb/day}}{8 \text{ steers}} = 15 \text{ lb/day/steer}$$

$$52. \text{ Number of bales} = 6 \times 110 \times 15 = 9900$$

$$\text{Weight of bales} = \frac{9900 \times 80 \text{ lb}}{2000 \text{ lb/ton}} = 396 \text{ tons}$$

$$53. \quad \frac{92,480 \text{ lb}}{32 \text{ lb/bu}} = 2890 \text{ bu}$$

$$\frac{2890 \text{ bu}}{34 \text{ acre}} = 85 \text{ lb/acre}$$

$$54. \quad 15 \text{ tons} \times 2000 \text{ lb/ton} = 30,000 \text{ lb}$$

$$\frac{30,000 \text{ lb}}{500 \text{ lb}} = 60 \text{ bales}$$

$$55. \quad \$175,000 - \$300 = \$172,000$$

$$\frac{\$172,000}{10} = \$17,200$$

$$56. \quad \frac{400 \text{ gal}}{10 \text{ gal}} = 40$$

$$40 \times 2 \text{ lb} = 80 \text{ lb}$$

$$57. \quad 30 \text{ ft} \times 12 \text{ in./ft} = 360 \text{ in.}$$

$$360 \text{ in.} - 2 \times 5 \text{ in.} = 350 \text{ in.}$$

$$350 \text{ in.} \div 10 \text{ in.} = 35$$

One additional daylily is required at the end of the planting so $35 + 1 = 36$ daylilies are needed in total.

$$58. \quad 7 \times 75 \times 3 = 1575 \text{ lb}$$

$$48. \quad 260 \text{ acres} \times 165 \text{ bu/acre} = 42,900 \text{ bu}$$

$$49. \quad \frac{6864 \text{ bu}}{156 \text{ acre}} = 44 \text{ bu/acre}$$

$$50. \quad \frac{12,000,000 \text{ bu}}{2035 \text{ bu/car}} = 5897 \text{ cars}$$

$$59. \quad I = \frac{E}{R} = \frac{220}{44} = 5 \text{ A}$$

$$60. \quad I = \frac{E}{R} = \frac{48}{24} = 2 \text{ A}$$

$$61. \quad E = IR = (2)(12) = 24 \text{ V}$$

$$62. \quad E = IR = (2)(24) = 48 \text{ V}$$

$$63. \quad 220 \times 4 \text{ oz} = 880 \text{ oz}$$

$$64. \quad 3 \times 60 \text{ mg} = 180 \text{ g} \\ 180 \text{ g} \div 30 \text{ g} = 6 \text{ tablets}$$

$$65. \quad 800 \text{ mg} \div 800 \text{ mg} = 4 \text{ tablets}$$

$$66. \quad 2 \times 5 \text{ g} = 10 \text{ g}$$

$$67. \quad 14 \text{ ft } 6 \text{ in.} - 4 \times (2 \text{ ft } 6 \text{ in.}) - 3 \times (1 \text{ ft}) \\ = 14 \text{ ft } 6 \text{ in.} - 10 \text{ ft} - 3 \text{ ft} \\ = 1 \text{ ft } 6 \text{ in.} \\ (1 \text{ ft } 6 \text{ in.}) \div 2 \\ = 18 \text{ in.} \div 2 \\ = 9 \text{ in.}$$

68. The outer dimension of the back wall is
 $17 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 4 \text{ in.} = 208 \text{ in.}$ long and
 $8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$ high so there would be
 $\frac{96 \text{ in.}}{8 \text{ in.}} = 12$ rows of $\frac{208 \text{ in.}}{16 \text{ in.}} = 13$ blocks, for
 a total of $2 \times 12 \times 13 = 312$ blocks for both
 walls. The outer dimensions of the side walls
 must fit inside the bricks of the back and front
 walls, so the side wall is
 $12 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 8 \text{ in.} - 2 \times 4 \text{ in.} = 144 \text{ in.}$ long
 and $8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$ high so there would
 be $\frac{96 \text{ in.}}{8 \text{ in.}} = 12$ rows of $\frac{144 \text{ in.}}{16 \text{ in.}} = 9$ blocks,
 for a total of $2 \times 9 \times 12 = 216$ blocks for both
 walls. A total of $312 + 216 = 528$ blocks are
 needed.

69. $8 \text{ ft} - 3 \times (10 \text{ in.}) - 2 \times (1 \text{ ft } 2 \text{ in.})$
 $= 96 \text{ in.} - 3 \times 10 \text{ in.} - 2 \times 14 \text{ in.}$
 $= 96 \text{ in.} - 30 \text{ in.} - 28 \text{ in.}$
 $= 38 \text{ in.}$
 $38 \text{ in.} \div 2$
 $= 19 \text{ in.}$

Section 1.2: Order of Operations

- $8 - 3(4 - 2)$
 $= 8 - 3(2)$
 $= 8 - 6$
 $= 2$
- $(8 + 6)4 + 8$
 $= (14)4 + 8$
 $= 56 + 8$
 $= 64$
- $(8 + 6) - (7 - 3)$
 $= 14 - 4$
 $= 10$
- $4 \times (2 \times 6) + (6 + 2) \div 4$
 $= 4 \times 12 + 8 \div 4$
 $= 48 + 2$
 $= 50$
- $2(9 + 5) - 6 \times (13 + 2) \div 9$
 $= 2(14) - 6 \times 15 \div 9$
 $= 28 - 90 \div 9$
 $= 28 - 10$
 $= 18$
- $5(8 \times 9) + (13 + 7) \div 4$
 $= 5(72) + 20 \div 4$
 $= 5(72) + 20 \div 4$
 $= 360 + 5$
 $= 365$

70. $2 \times 30 \text{ gal} = 60 \text{ gal}$
 $60 \text{ gal} \div 5 \text{ gal/drum} = 12 \text{ drums}$
 Order size = 12 drums - 8 drums
 $= 4 \text{ drums}$
71. $2500 \div 1000 = 2.5$
 $2.5 \times 8540 \text{ bd ft} = 213,500 \text{ bd ft}$
72. $2 \text{ lb} \times \frac{\$520}{2000 \text{ lb}} = \$0.52/\text{lb}$
73. $50 + 125 + 110 + 35 = 320$ seats
74. a. $125 \div 11 = 11 \text{ r } 4$ so 12 beef loins are
 required.
 b. Each beef loin has two end cuts, so
 $2 \times 12 = 24$ end cuts are available.
75. $2 \times 90 + 3 \times 4 + 2 \times 4 = 180 + 12 + 8 = 200$
 items.
76. Number of tables = $10 + 12$
 $= 22$
 Tables per server = $22 \div 6$
 $= 3 \text{ r } 4$
 Servers needed = 4
77. a. $\$131 + \$152 + \$128 = \411
 b. $\$411 \div 3 = \137

$$\begin{aligned} 7. \quad & 27 + 13 \times (7 - 3)(12 + 6) \div 9 \\ & = 27 + 13 \times (4)(18) \div 9 \\ & = 27 + 52(18) \div 9 \\ & = 27 + 936 \div 9 \\ & = 27 + 104 \\ & = 131 \end{aligned}$$

$$\begin{aligned} 8. \quad & 123 - 3(8 + 9) + 17 \\ & = 123 - 3(17) + 17 \\ & = 123 - 51 + 17 \\ & = 89 \end{aligned}$$

$$\begin{aligned} 9. \quad & 16 + 4(7 + 8) - 3 \\ & = 16 + 4(15) - 3 \\ & = 16 + 60 - 3 \\ & = 73 \end{aligned}$$

$$\begin{aligned} 10. \quad & (18 + 17)(12 + 9) - (7 \times 16)(4 + 2) \\ & = (35)(21) - (112)(6) \\ & = 735 - 672 \\ & = 63 \end{aligned}$$

$$\begin{aligned} 11. \quad & 9 - 2(17 - 15) + 18 \\ & = 9 - 2(2) + 18 \\ & = 9 - 4 + 18 \\ & = 23 \end{aligned}$$

$$\begin{aligned} 12. \quad & (9 + 7)5 + 13 \\ & = (16)5 + 13 \\ & = 80 + 13 \\ & = 93 \end{aligned}$$

$$\begin{aligned} 13. \quad & (39 - 18) - (23 - 18) \\ & = 21 - 5 \\ & = 16 \end{aligned}$$

$$\begin{aligned} 14. \quad & 5(3 \times 7) + (8 + 4) \div 3 \\ & = 5(21) + 12 \div 3 \\ & = 105 + 4 \\ & = 109 \end{aligned}$$

$$\begin{aligned} 15. \quad & 3(8 + 6) - 7(13 + 3) \div 14 \\ & = 3(14) - 7(16) \div 14 \\ & = 42 - 112 \div 14 \\ & = 42 - 8 \\ & = 34 \end{aligned}$$

$$\begin{aligned} 16. \quad & 6(4 \times 5) + (15 + 9) \div 6 \\ & = 6(20) + 24 \div 6 \\ & = 120 + 4 \\ & = 124 \end{aligned}$$

$$\begin{aligned} 17. \quad & 42 + 12(9 - 3)(12 + 13) \div 30 \\ & = 42 + 12(6)(25) \div 30 \\ & = 42 + 72(25) \div 30 \\ & = 42 + 1800 \div 30 \\ & = 42 + 60 \\ & = 102 \end{aligned}$$

$$\begin{aligned} 18. \quad & 228 - 4 \times (7 + 6) - 8(6 - 2) \\ & = 228 - 4 \times 13 - 8(4) \\ & = 228 - 52 - 32 \\ & = 144 \end{aligned}$$

$$\begin{aligned} 19. \quad & 38 + 9 \times (8 + 4) - 3(5 - 2) \\ & = 38 + 9 \times 12 - 3(3) \\ & = 38 + 108 - 9 \\ & = 137 \end{aligned}$$

$$\begin{aligned} 20. \quad & (19 + 8)(4 + 3) \div 21 + (8 \times 15) \div (4 \times 3) \\ & = (27)(7) \div 21 + 120 \div 12 \\ & = 189 \div 21 + 10 \\ & = 9 + 10 \\ & = 19 \end{aligned}$$

$$\begin{aligned} 21. \quad & 27 - 2 \times (18 - 9) - 3 + 8(43 - 15) \\ & = 27 - 2 \times 9 - 3 + 8(28) \\ & = 27 - 18 - 3 + 224 \\ & = 230 \end{aligned}$$

$$\begin{aligned}
 22. \quad & 6 \times 8 \div 2 \times 8 \div 12 + 6 \\
 & = 48 \div 2 \times 8 \div 12 + 6 \\
 & = 24 \times 8 \div 12 + 6 \\
 & = 192 \div 12 + 6 \\
 & = 16 + 6 \\
 & = 24
 \end{aligned}$$

$$\begin{aligned}
 23. \quad & 12 \times 9 \div 18 \times 64 \div 8 + 7 \\
 & = 108 \div 18 \times 64 \div 8 + 7 \\
 & = 6 \times 64 \div 8 + 7 \\
 & = 384 \div 8 + 7 \\
 & = 48 + 7 \\
 & = 55
 \end{aligned}$$

$$\begin{aligned}
 24. \quad & 18 \div 6 \times 24 \div 4 \div 6 \\
 & = 3 \times 24 \div 4 \div 6 \\
 & = 72 \div 4 \div 6 \\
 & = 18 \div 6 \\
 & = 3
 \end{aligned}$$

$$\begin{aligned}
 25. \quad & 7 + 6(3 + 2) - 7 - 5(4 + 2) \\
 & = 7 + 6(5) - 7 - 5(6) \\
 & = 7 + 30 - 7 - 30 \\
 & = 0
 \end{aligned}$$

$$\begin{aligned}
 26. \quad & 5 + 3(7 \times 7) - 6 - 2(4 + 7) \\
 & = 5 + 3(49) - 6 - 2(11) \\
 & = 5 + 147 - 6 - 22 \\
 & = 124
 \end{aligned}$$

$$\begin{aligned}
 27. \quad & 3 + 17(2 \times 2) - 67 \\
 & = 3 + 17(4) - 67 \\
 & = 3 + 68 - 67 \\
 & = 4
 \end{aligned}$$

$$\begin{aligned}
 28. \quad & 8 - 3(9 - 2) \div 21 - 7 \\
 & = 8 - 3(7) \div 21 - 7 \\
 & = 8 - 21 \div 21 - 7 \\
 & = 8 - 1 - 7 \\
 & = 0
 \end{aligned}$$

$$\begin{aligned}
 29. \quad & 28 - 4(2 \times 3) + 4 - (16 \times 8) \div (4 \times 4) \\
 & = 28 - 4(6) + 4 - 128 \div 16 \\
 & = 28 - 24 + 4 - 8 \\
 & = 0
 \end{aligned}$$

$$\begin{aligned}
 30. \quad & 6 + 4(9 + 6) + 8 - 2(7 + 3) - (3 \times 12) \div 9 \\
 & = 6 + 4(15) + 8 - 2(10) - 36 \div 9 \\
 & = 6 + 60 + 8 - 20 - 4 \\
 & = 50
 \end{aligned}$$

$$\begin{aligned}
 31. \quad & 24 / (6 - 2) + 4 \times 3 - 15 / 3 \\
 & = 24 / 4 + 12 - 5 \\
 & = 6 + 12 - 5 \\
 & = 13
 \end{aligned}$$

$$\begin{aligned}
 32. \quad & (36 - 6) / (5 + 10) + (16 - 1) / 3 \\
 & = 30 / 15 + 15 / 3 \\
 & = 2 + 5 \\
 & = 7
 \end{aligned}$$

$$\begin{aligned}
 33. \quad & 3 \times 15 \div 9 + (13 - 5) / 2 \times 4 - 2 \\
 & = 45 \div 9 + 8 / 2 \times 4 - 2 \\
 & = 5 + 4 \times 4 - 2 \\
 & = 5 + 16 - 2 \\
 & = 19
 \end{aligned}$$

$$\begin{aligned}
 34. \quad & 28 / 2 \times 7 - (6 + 10) / (6 - 2) \\
 & = 14 \times 7 - 16 / 4 \\
 & = 98 - 4 \\
 & = 94
 \end{aligned}$$

$$\begin{aligned}
 35. \quad & 10 + 4^2 \\
 & = 10 + 16 \\
 & = 26
 \end{aligned}$$

$$\begin{aligned}
 36. \quad & 4 + 2 \cdot 3^2 \\
 & = 4 + 2 \cdot 9 \\
 & = 4 + 18 \\
 & = 22
 \end{aligned}$$

$$\begin{aligned}
 37. \quad & \frac{3 \cdot 5 + 6 \cdot 8}{53 - 2 \cdot 5^2} \\
 & = \frac{15 + 48}{53 - 2 \cdot 25} \\
 & = \frac{63}{53 - 50} \\
 & = \frac{63}{3} \\
 & = 21
 \end{aligned}$$

$$\begin{aligned} 38. \quad & \frac{3 \cdot 4 + 2 \cdot 3}{42 - 20 \cdot 2 \cdot 1} \\ &= \frac{12 + 6}{42 - 40 \cdot 1} \\ &= \frac{18}{42 - 40} \\ &= \frac{18}{2} \\ &= 9 \end{aligned}$$

$$\begin{aligned} 39. \quad & \frac{20 + (2 \cdot 3)^2}{7 \cdot 2^3} \\ &= \frac{20 + 6^2}{7 \cdot 8} \\ &= \frac{20 + 36}{56} \\ &= \frac{56}{56} \\ &= 1 \end{aligned}$$

$$\begin{aligned} 40. \quad & \frac{(20 - 2 \cdot 5)^2}{3^3 - 2} \\ &= \frac{(20 - 10)^2}{27 - 2} \\ &= \frac{(10)^2}{25} \\ &= \frac{100}{25} \\ &= 4 \end{aligned}$$

$$\begin{aligned} 41. \quad & 6[3 + 2(2 + 5)] \\ &= 6[3 + 2(7)] \\ &= 6[3 + 14] \\ &= 6[17] \\ &= 102 \end{aligned}$$

$$\begin{aligned} 42. \quad & 5((4 + 6) + 2(5 - 2)) \\ &= 5((4 + 6) + 2(5 - 2)) \\ &= 5(10 + 2(3)) \\ &= 5(10 + 6) \\ &= 5(16) \\ &= 80 \end{aligned}$$

$$\begin{aligned} 43. \quad & 5 \times 2 + 3[2(5 - 3) + 4(4 + 2) - 3] \\ &= 10 + 3[2(2) + 4(6) - 3] \\ &= 10 + 3[4 + 24 - 3] \\ &= 10 + 3[25] \\ &= 10 + 75 \\ &= 85 \end{aligned}$$

$$\begin{aligned} 44. \quad & 3(10 + 2(1 + 3(2 + 6(4 - 2)))) \\ &= 3(10 + 2(1 + 3(2 + 6(2)))) \\ &= 3(10 + 2(1 + 3(2 + 12))) \\ &= 3(10 + 2(1 + 3(14))) \\ &= 3(10 + 2(1 + 42)) \\ &= 3(10 + 2(43)) \\ &= 3(10 + 86) \\ &= 3(96) \\ &= 288 \end{aligned}$$

Section 1.3: Area and Volume

$$\begin{aligned} 1. \quad & A = l \times w \\ & A = 12 \text{ yd} \times 8 \text{ yd} \\ &= 96 \text{ yd}^2 \end{aligned}$$

$$\begin{aligned} 2. \quad & A = l \times w \\ & A = 12 \text{ m} \times 8 \text{ m} \\ &= 96 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} 3. \quad & A = l \times w \\ & A = 4100 \text{ ft} \times 75 \text{ ft} \\ &= 307,500 \text{ ft}^2 \end{aligned}$$

$$\begin{aligned} 4. \quad & A = l \times w \\ & A = 12 \text{ mi} \times 22 \text{ mi} \\ &= 264 \text{ mi}^2 \end{aligned}$$

$$\begin{aligned}
 5. \quad A &= l \times w \\
 A &= 191 \text{ in.} \times 73 \text{ in.} \\
 &= 13,943 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 6. \quad 27 \text{ in.} \times 15 \text{ in.} &= 405 \text{ in}^2 \\
 15 \text{ in.} \times 18 \text{ in.} &= 270 \text{ in}^2 \\
 27 \text{ in.} \times 18 \text{ in.} &= 486 \text{ in}^2 \\
 27 \text{ in.} \times 18 \text{ in.} &= 486 \text{ in}^2 \\
 15 \text{ in.} \times 18 \text{ in.} &= \underline{270 \text{ in}^2} \\
 \text{Total} &= 1917 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 7. \quad \text{Area of outer rectangle: } 9 \text{ cm} \times 12 \text{ cm} &= 108 \text{ cm}^2 \\
 \text{Area of inner rectangle: } 6 \text{ cm} \times 4 \text{ cm} &= \underline{24 \text{ cm}^2} \\
 \text{Total area:} &= 84 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 8. \quad \text{Area of outer rectangle: } 8 \text{ in.} \times 8 \text{ in.} &= 64 \text{ in}^2 \\
 \text{Area of inner rectangle: } 5 \text{ in.} \times 5 \text{ in.} &= \underline{25 \text{ in}^2} \\
 \text{Total area:} &= 39 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 9. \quad \text{Area of left rectangle: } 8 \text{ in.} \times 3 \text{ in.} &= 24 \text{ in}^2 \\
 \text{Area of middle rectangle: } 2 \text{ in.} \times 6 \text{ in.} &= 12 \text{ in}^2 \\
 \text{Area of right rectangle: } 3 \text{ in.} \times 4 \text{ in.} &= \underline{12 \text{ in}^2} \\
 \text{Total area:} &= 48 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 10. \quad \text{Area of upper rectangle: } 2 \text{ in.} \times 6 \text{ in.} &= 12 \text{ in}^2 \\
 \text{Area of middle rectangle: } 6 \text{ in.} \times 2 \text{ in.} &= 12 \text{ in}^2 \\
 \text{Area of lower rectangle: } 2 \text{ in.} \times 6 \text{ in.} &= \underline{12 \text{ in}^2} \\
 \text{Total area:} &= 36 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 11. \quad \text{Area of upper rectangle: } 3 \text{ in.} \times 6 \text{ in.} &= 24 \text{ in}^2 \\
 \text{Area of lower rectangle: } 7 \text{ in.} \times 4 \text{ in.} &= \underline{28 \text{ in}^2} \\
 \text{Total area:} &= 52 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 12. \quad \text{Area of outer rectangle: } 30 \text{ cm} \times 30 \text{ cm} &= 900 \text{ cm}^2 \\
 \text{Area of squares: } 4 \times 5 \text{ cm} \times 5 \text{ cm} &= \underline{800 \text{ cm}^2} \\
 \text{Total area:} &= 800 \text{ cm}^2
 \end{aligned}$$

$$13. \quad \frac{48 \text{ in.} \times 36 \text{ in.}}{4 \text{ in.} \times 4 \text{ in.}} = \frac{1728 \text{ in}^2}{16 \text{ in}^2} = 108 \text{ tiles are needed.}$$

$$\begin{aligned}
 14. \quad \text{You must arrange the tiles so the 2 ft edges are along the 26 ft side, so there will be } \frac{26 \text{ ft}}{2 \text{ ft}} &= 13 \text{ tiles in that} \\
 \text{direction. There will be } \frac{24 \text{ ft}}{4 \text{ ft}} &= 6 \text{ tiles along the other edge of the ceiling, so there will be a total of} \\
 13 \times 6 &= 78 \text{ tiles.}
 \end{aligned}$$

15. Area of ceiling: $12 \text{ ft} \times 16 \text{ ft} = 192 \text{ ft}^2$
Area of left/right walls: $2 \times 8 \text{ ft} \times 12 \text{ ft} = 192 \text{ ft}^2$
Area of front/back walls: $2 \times 8 \text{ ft} \times 16 \text{ ft} = \underline{256 \text{ ft}^2}$
Total area: $= 640 \text{ ft}^2$
Twenty rooms will be $20 \times 640 \text{ ft}^2 = 12,800 \text{ ft}^2$ so $12,800 \text{ ft}^2 \div 640 \text{ ft}^2 = 32$ gallons of paint will be needed.
16. Since the area of a sheet of drywall is $4 \text{ ft} \times 8 \text{ ft} = 32 \text{ ft}^2$ $12,800 \text{ ft}^2 \div 32 \text{ ft}^2 = 400$ pieces of drywall will be needed.
17. a. $A = l \times w$
 $A = 24 \text{ ft} \times 45 \text{ ft}$
 $= 1080 \text{ ft}^2$
Value $= 1080 \text{ ft}^2 \times \$110/\text{ft}^2$
 $= \$118,800$
- b. Area of upper rectangle: $24 \text{ ft} \times 85 \text{ ft} = 2040 \text{ ft}^2$
Area of lower rectangle: $19 \text{ ft} \times 16 \text{ ft} = \underline{304 \text{ ft}^2}$
Total area: $= 2344 \text{ ft}^2$
Value $= 2344 \text{ ft}^2 \times \$110/\text{ft}^2 = \$257,840$
18. Area of upper rectangle: $28 \text{ ft} \times 75 \text{ ft} = 2100 \text{ ft}^2$
Area of lower left rectangle: $16 \text{ ft} \times 26 \text{ ft} = 416 \text{ ft}^2$
Area of lower right rectangle: $12 \text{ ft} \times 24 \text{ ft} = \underline{288 \text{ ft}^2}$
Total area: $= 2804 \text{ ft}^2$
Value $= 2804 \text{ ft}^2 \times \$90/\text{ft}^2 = \$252,360$
19. $V = l \times w \times h$
 $V = 3 \text{ m} \times 4 \text{ m} \times 8 \text{ m}$
 $= 96 \text{ m}^3$
20. $V = l \times w \times h$
 $V = 10 \text{ ft} \times 20 \text{ ft} \times 8 \text{ ft}$
 $= 1600 \text{ ft}^3$
21. Volume of upper box: $6 \text{ cm} \times 4 \text{ cm} \times 5 \text{ cm} = 120 \text{ cm}^3$
Volume of lower box: $6 \text{ cm} \times 20 \text{ cm} \times 5 \text{ cm} = \underline{600 \text{ cm}^3}$
Total Volume: $= 720 \text{ cm}^3$
22. Volume of left box: $3 \text{ cm} \times 3 \text{ cm} \times 18 \text{ cm} = 162 \text{ cm}^3$
Volume of right box: $6 \text{ cm} \times 15 \text{ cm} \times 3 \text{ cm} = \underline{270 \text{ cm}^3}$
Total Volume: $= 432 \text{ cm}^3$
23. Volume of left box: $5 \text{ in.} \times 6 \text{ in.} \times 40 \text{ in.} = 1200 \text{ in}^3$
Volume of middle box: $25 \text{ in.} \times 6 \text{ in.} \times 10 \text{ in.} = 1500 \text{ in}^3$
Volume of right box: $5 \text{ in.} \times 6 \text{ in.} \times 40 \text{ in.} = \underline{1200 \text{ in}^3}$
Total Volume: $= 3900 \text{ in}^3$

24. Volume of left box: $8 \text{ ft} \times 8 \text{ ft} \times 20 \text{ ft} = 1280 \text{ ft}^3$
 Volume of middle box: $32 \text{ ft} \times 8 \text{ ft} \times 8 \text{ ft} = 2048 \text{ ft}^3$
 Volume of right box: $8 \text{ ft} \times 20 \text{ ft} \times 15 \text{ ft} = \underline{2400 \text{ ft}^3}$
 Total Volume: $= 5728 \text{ ft}^3$

25. $V = l \times w \times h$
 $V = 10 \text{ cm} \times 12 \text{ cm} \times 5 \text{ cm}$
 $= 600 \text{ cm}^3$

26. $V = l \times w \times h$
 $V = 20 \text{ ft} \times 10 \text{ ft} \times 8 \text{ ft}$
 $= 1600 \text{ ft}^3$

27. $V = l \times w \times h$
 $V = 8 \text{ in.} \times 20 \text{ in.} \times 72 \text{ in.}$
 $= 11,520 \text{ in}^3$

28. $V = l \times w \times h$
 $V = 16 \text{ in.} \times 20 \text{ in.} \times 1 \text{ in.}$
 $= 320 \text{ in}^3$

29. $V = l \times w \times h$
 $V = 3 \text{ ft} \times 5 \text{ ft} \times 2 \text{ ft}$
 $= 30 \text{ ft}^3$

30. $V = l \times w \times h$
 $V = 14 \text{ in.} \times 16 \text{ in.} \times 4 \text{ in.}$
 $= 896 \text{ in}^3$

31. $V = l \times w \times h$
 $V = 15 \text{ ft} \times 12 \text{ ft} \times 2 \text{ ft}$
 $= 360 \text{ ft}^3$

So, the cement will weigh
 $360 \text{ ft}^3 \times 193 \text{ lb/ft}^3 = 69,480 \text{ lb.}$

32. $V = l \times w \times h$
 $V = 5 \text{ ft} \times 6 \text{ ft} \times 5 \text{ ft}$
 $= 150 \text{ ft}^3$

So, the coal will weigh
 $150 \text{ ft}^3 \times 40 \text{ lb/ft}^3 = 6000 \text{ lb}$ which is
 $6000 \text{ lb} \div 2000 \text{ lb} = 3 \text{ tons.}$

33. $V = l \times w \times h$
 $V = 8 \text{ ft} \times 5 \text{ ft} \times 6 \text{ ft}$
 $= 240 \text{ ft}^3$

So, the water will weigh
 $240 \text{ ft}^3 \times 62 \text{ lb/ft}^3 = 14,880 \text{ lb.}$

34. $V = l \times w \times h$
 $V = 9 \text{ ft} \times 6 \text{ ft} \times 4 \text{ ft}$
 $= 216 \text{ ft}^3$

So, the gasoline will weigh
 $216 \text{ ft}^3 \times 42 \text{ lb/ft}^3 = 9072 \text{ lb.}$

35. $V = l \times w \times h$
 $V = 100 \text{ ft} \times 50 \text{ ft} \times 10 \text{ ft}$
 $= 50,000 \text{ ft}^3$

So, the cost of heating the space will be
 $50,000 \text{ ft}^3 \div 1000 \text{ ft}^3 \times \$55 = \$2750.$

36. The remaining area is
 $113 \text{ ft} \times 90 \text{ ft} = 10170 \text{ ft}^2$ so there could be
 $10170 \text{ ft}^2 \div 4000 \text{ ft}^2 = 2 \text{ r } 2170$ or 2 stores.

37. a. The height of the cardboard sheet would
 be $16 \text{ in.} + 9 \text{ in.} = 25 \text{ in.}$ and the width would
 be $4 \times 9 \text{ in.} + 1 \text{ in.} = 37 \text{ in.}$

b. The area of the cardboard sheet would be
 $25 \text{ in.} \times 37 \text{ in.} = 925 \text{ in}^2.$

c. The total area of cardboard removed
 would be $1 \text{ in.} \times 9 \text{ in.} = 9 \text{ in}^2.$

38. The volume of the box is
 $16 \text{ in.} \times 9 \text{ in.} \times 9 \text{ in.} = 1296 \text{ in}^3$ so
 $1296 \text{ in}^3 - 450 \text{ in}^3 = 846 \text{ in}^3$ of peanuts are
 required.

39. $V = l \times w \times h$
 $V = 4 \text{ ft} \times 4 \text{ ft} \times 8 \text{ ft}$
 $= 128 \text{ ft}^3$

$$\begin{aligned}40. \quad A &= l \times w \\ A &= 125 \text{ ft} \times 24 \text{ ft} \\ &= 3000 \text{ ft}^2\end{aligned}$$

$$\begin{aligned}V &= l \times w \times h \\ V &= 125 \text{ ft} \times 24 \text{ ft} \times 12 \text{ ft} \\ &= 36,000 \text{ ft}^3\end{aligned}$$

$$\begin{aligned}41. \quad 8 \text{ ft} \times 12 \text{ in./ft} &= 96 \text{ in.} \\ 24 \text{ ft} \times 12 \text{ in./ft} &= 288 \text{ in.}\end{aligned}$$

$$\begin{aligned}V &= l \times w \times h \\ &= 96 \text{ in.} \times 288 \text{ in.} \times 3 \text{ in.} \\ &= 82,944 \text{ in}^3\end{aligned}$$

$$1 \text{ ft}^3 = 1728 \text{ in}^3, \text{ so } \frac{82,944 \text{ in}^3}{1728 \text{ in}^3} = 48 \text{ ft}^3 \text{ of}$$

mulch are needed.

Section 1.4: Formulas

$$\begin{aligned}1. \quad W &= fd \\ W &= (30)(20) \\ &= 600\end{aligned}$$

$$\begin{aligned}2. \quad W &= fd \\ W &= (17)(9) \\ &= 153\end{aligned}$$

$$\begin{aligned}3. \quad W &= fd \\ W &= (1125)(10) \\ &= 11,250\end{aligned}$$

$$\begin{aligned}4. \quad W &= fd \\ W &= (203)(27) \\ &= 5481\end{aligned}$$

$$\begin{aligned}5. \quad W &= fd \\ W &= (176)(326) \\ &= 57,376\end{aligned}$$

$$\begin{aligned}6. \quad W &= fd \\ W &= (2400)(120) \\ &= 288,000\end{aligned}$$

$$\begin{aligned}7. \quad f &= ma \\ f &= (1600)(24) \\ &= 38,400\end{aligned}$$

$$\begin{aligned}42. \quad 4 \text{ ft} \times 12 \text{ in./ft} &= 48 \text{ in.} \\ 8 \text{ ft} \times 12 \text{ in./ft} &= 96 \text{ in.} \\ 48 \text{ in.} \times 96 \text{ in.} &= 4608 \text{ in}^2 \\ 4 \text{ in.} \times 4 \text{ in.} &= 16 \text{ in}^2 \\ \frac{4608 \text{ in}^2}{16 \text{ in}^2} &= 288 \text{ containers}\end{aligned}$$

$$\begin{aligned}8. \quad P &= \frac{V^2}{R} \\ P &= \frac{(120)^2}{24} \\ &= \frac{14,400}{24} \\ &= 600\end{aligned}$$

$$\begin{aligned}9. \quad I &= \frac{E}{R} \\ I &= \frac{120}{15} \\ &= 8\end{aligned}$$

$$\begin{aligned}10. \quad d &= vt \\ d &= (372)(18) \\ &= 6696\end{aligned}$$

$$\begin{aligned}11. \quad P &= IE \\ P &= (29)(173) \\ &= 5017\end{aligned}$$

$$\begin{aligned}12. \quad W &= IEt \\ W &= (11)(95)(46) \\ &= 48,070\end{aligned}$$

$$13. \quad A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(10 \text{ in.})(8 \text{ in.}) \\ = 40 \text{ in}^2$$

$$14. \quad A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(36 \text{ cm})(20 \text{ cm}) \\ = 360 \text{ cm}^2$$

$$15. \quad A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(54 \text{ ft})(30 \text{ ft}) \\ = 810 \text{ ft}^2$$

$$16. \quad A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(188 \text{ m})(220 \text{ m}) \\ = 20,680 \text{ m}^2$$

$$17. \quad A = lw$$

$$A = (8 \text{ m})(7 \text{ m}) \\ = 56 \text{ m}^2$$

$$18. \quad A = lw$$

$$A = (24 \text{ in.})(15 \text{ in.}) \\ = 360 \text{ in}^2$$

$$19. \quad A = lw$$

$$A = (36 \text{ ft})(18 \text{ ft}) \\ = 648 \text{ ft}^2$$

$$20. \quad A = lw$$

$$A = (250 \text{ cm})(120 \text{ cm}) \\ = 30,000 \text{ cm}^2$$

$$25. \quad V = lwh$$

$$V = (25 \text{ cm})(15 \text{ cm})(12 \text{ cm}) \\ = 4500 \text{ cm}^3$$

$$26. \quad V = lwh$$

$$V = (48 \text{ in.})(24 \text{ in.})(96 \text{ in.}) \\ = 110,592 \text{ in}^3$$

$$21. \quad A = \left(\frac{a+b}{2}\right)h$$

$$A = \left(\frac{7 \text{ ft} + 9 \text{ ft}}{2}\right)(4 \text{ ft}) \\ = \left(\frac{16 \text{ ft}}{2}\right)(4 \text{ ft}) \\ = (8 \text{ ft})(4 \text{ ft}) \\ = 32 \text{ ft}^2$$

$$22. \quad A = \left(\frac{a+b}{2}\right)h$$

$$A = \left(\frac{30 \text{ in.} + 50 \text{ in.}}{2}\right)(24 \text{ in.}) \\ = \left(\frac{80 \text{ in.}}{2}\right)(24 \text{ in.}) \\ = (40 \text{ in.})(24 \text{ in.}) \\ = 960 \text{ in}^2$$

$$23. \quad A = \left(\frac{a+b}{2}\right)h$$

$$A = \left(\frac{96 \text{ cm} + 24 \text{ cm}}{2}\right)(30 \text{ cm}) \\ = \left(\frac{120 \text{ cm}}{2}\right)(30 \text{ cm}) \\ = (60 \text{ cm})(30 \text{ cm}) \\ = 1800 \text{ cm}^2$$

$$24. \quad A = \left(\frac{a+b}{2}\right)h$$

$$A = \left(\frac{450 \text{ m} + 750 \text{ m}}{2}\right)(250 \text{ m}) \\ = \left(\frac{1200 \text{ m}}{2}\right)(250 \text{ m}) \\ = (600 \text{ m})(250 \text{ m}) \\ = 150,000 \text{ m}^2$$

$$27. \quad v = v_0 + gt$$

$$v = 12 + (32)(5) \\ = 172$$

$$28. \quad Q = CV$$

$$Q = (12)(2500) \\ = 30,000$$

$$\begin{aligned} 29. \quad I &= \frac{E}{Z} \\ I &= \frac{240}{15} \\ &= 16 \end{aligned}$$

$$\begin{aligned} 30. \quad P &= I^2 R \\ P &= (4)^2 (2000) \\ &= 32,000 \end{aligned}$$

Section 1.5: Prime Factorization

1. a. $1+5=6$ is divisible by 3, so 15 is divisible by 3.
b. 15 is not divisible by 4.
2. a. $2+8=10$ is not divisible by 3, so 28 is not divisible by 3.
b. 28 is divisible by 4.
3. a. $9+6=15$ is divisible by 3, so 96 is divisible by 3.
b. 96 is divisible by 4.
4. a. $1+7+2=10$ is not divisible by 3, so 172 is not divisible by 3.
b. 172 is divisible by 4.
5. a. $7+8=15$ is divisible by 3, so 78 is divisible by 3.
b. 78 is not divisible by 4.
6. a. $6+7+5=18$ is divisible by 3, so 675 is divisible by 3.
b. 675 is not divisible by 4.
7. 53 is prime
8. $57=3 \cdot 19$ is not prime
9. $93=3 \cdot 31$ is not prime
10. $121=11 \cdot 11$ is not prime
11. $16=2 \cdot 2 \cdot 2 \cdot 2$ is not prime
12. $123=3 \cdot 41$ is not prime
13. $39=3 \cdot 13$ is not prime
14. $87=3 \cdot 29$ is not prime
15. 458 is even, so it is divisible by 2.
16. 12,746 is even, so it is divisible by 2.
17. 315,817 is odd, so it is not divisible by 2.
18. 877,778 is even, so it is divisible by 2.
19. 1367 is odd, so it is not divisible by 2.
20. 1205 is odd, so it is not divisible by 2.
21. $3+8+7=18$ is divisible by 3, so 387 is divisible by 3.
22. $1+2+5+4=12$ is divisible by 3, so 1254 is divisible by 3.
23. $4+5+3+1+2+8=23$ is not divisible by 3, so 453,128 is not divisible by 3.
24. $1+7+8+2+1+3=22$ is not divisible by 3, so 178,213 is not divisible by 3.
25. $2+1+8+7+4+5=27$ is divisible by 3, so 218,745 is divisible by 3.
26. $1+5+6+9+0=21$ is divisible by 3, so 15,690 is divisible by 3.
27. 70 ends in 0, so it is divisible by 5.
28. 145 ends in 5, so it is divisible by 5.
29. 366 does not end in 0 or 5, so it is not divisible by 5.
30. 56,665 ends in 5, so it is divisible by 5.
31. 63,227 does not end in 0 or 5, so it is not divisible by 5.
32. 14,601 does not end in 0 or 5, so it is not divisible by 5.
33. 56 is even, so it is divisible by 2.
34. $4+2=6$ is divisible by 3, so 42 is divisible by 3.
35. $2+1+8=11$ is not divisible by 3, so 218 is not divisible by 3.
36. 375 ends in 5, so it is divisible by 5.
37. 528 does not end in 0 or 5, so it is not divisible by 5.
38. $2+1+8+4=15$ is divisible by 3, so 2184 is divisible by 3.
39. $1+9+8=18$ is divisible by 3, so 198 is divisible by 3.

40. $2 + 2 + 3 + 6 = 13$ is not divisible by 3, so 2236 is not divisible by 3.
41. 1,820,670 is even, so it is divisible by 2.
42. 2,817,638 is even, so it is divisible by 2.
43. 7,215,720 ends in 0, so it is divisible by 5.
44. $5 + 2 + 7 + 5 + 3 + 4 + 3 = 29$ is not divisible by 3, so 5,275,343 is not divisible by 3.
45. $2 \cdot 2 \cdot 5$
46. $2 \cdot 3 \cdot 3$
47. $2 \cdot 3 \cdot 11$
48. $2 \cdot 3 \cdot 5$
49. $2 \cdot 2 \cdot 3 \cdot 3$
50. $5 \cdot 5$
51. $3 \cdot 3 \cdot 3$
52. 59 is prime
53. $51 = 3 \cdot 17$
54. $56 = 2 \cdot 2 \cdot 2 \cdot 7$
55. $42 = 2 \cdot 3 \cdot 7$
56. $63 = 3 \cdot 3 \cdot 7$
57. $120 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$
58. $72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$
59. $171 = 3 \cdot 3 \cdot 19$
60. $360 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$
61. $105 = 3 \cdot 5 \cdot 7$
62. $78 = 2 \cdot 3 \cdot 13$
63. $252 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$
64. $444 = 2 \cdot 2 \cdot 3 \cdot 37$

Unit 1A Review

1. 241
2. 1795
5. $3 \times 12 \text{ ft} = 36 \text{ ft}$
 $8 \times 8 \text{ ft} = 64 \text{ ft}$
 $9 \times 10 \text{ ft} = 90 \text{ ft}$
 $12 \times 6 \text{ ft} = \underline{72 \text{ ft}}$
 Total = 262 ft
6. $14,244 \text{ lb} \div 56 \text{ lb} = 254 \text{ bu}$
7. $6 + 2(5 \times 4 - 2)$
 $= 6 + 2(20 - 2)$
 $= 6 + 2(18)$
 $= 6 + 23$
 $= 42$
10. Area of left rectangle: $24 \text{ in.} \times 11 \text{ in.} = 264 \text{ in}^2$
 Area of middle rectangle: $15 \text{ in.} \times 11 \text{ in.} = 165 \text{ in}^2$
 Area of right rectangle: $10 \text{ in.} \times 7 \text{ in.} = \underline{70 \text{ in}^2}$
 Total area: $= 499 \text{ in}^2$
11. $V = lwh$
 $V = (15 \text{ ft})(8 \text{ ft})(6 \text{ ft})$
 $= 720 \text{ ft}^3$
3. 2,711,279
4. 620
8. $3^2 + 12 \div 3 - 2 \times 3$
 $= 9 + 4 - 6$
 $= 7$
9. $12 + 2[3(8 - 2) - 2(3 + 1)]$
 $= 12 + 2[3(6) - 2(4)]$
 $= 12 + 2[18 - 8]$
 $= 12 + 2[10]$
 $= 12 + 20$
 $= 32$
12. $d = vt$
 $d = (45)(4)$
 $= 180$

$$\begin{aligned}13. \quad I &= \frac{E}{R} \\ I &= \frac{120}{12} \\ &= 10\end{aligned}$$

$$\begin{aligned}14. \quad A &= \frac{1}{2}bh \\ A &= \frac{1}{2}(40)(15) \\ &= 300\end{aligned}$$

$$15. \quad 51 = 3 \cdot 17 \text{ is not prime.}$$

$$16. \quad 47 \text{ is prime.}$$

$$17. \quad 1 + 9 + 5 = 15 \text{ is divisible by 3, so 195 is not divisible by 3.}$$

$$18. \quad 821 \text{ does not end in 0 or 5, so it is not divisible by 5.}$$

$$19. \quad 40 = 2 \cdot 2 \cdot 2 \cdot 5$$

$$20. \quad 135 = 3 \cdot 3 \cdot 3 \cdot 5$$

Section 1.6: Introduction to Fractions

$$1. \quad \frac{12}{28} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 7} = \frac{3}{7}$$

$$2. \quad \frac{9}{12} = \frac{3 \cdot 3}{2 \cdot 2 \cdot 3} = \frac{3}{4}$$

$$3. \quad \frac{36}{42} = \frac{2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 3 \cdot 7} = \frac{6}{7}$$

$$4. \quad \frac{12}{18} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 3 \cdot 3} = \frac{2}{3}$$

$$5. \quad \frac{9}{48} = \frac{3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{16}$$

$$6. \quad \frac{8}{10} = \frac{2 \cdot 2 \cdot 2}{2 \cdot 5} = \frac{4}{5}$$

$$7. \quad \frac{13}{39} = \frac{13}{3 \cdot 13} = \frac{1}{3}$$

$$8. \quad \frac{24}{36} = \frac{2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{2}{3}$$

$$9. \quad \frac{48}{60} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{4}{5}$$

$$10. \quad \frac{72}{96} = \frac{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{4}$$

$$11. \quad \frac{9}{9} = 1$$

$$12. \quad \frac{15}{1} = 15$$

$$13. \quad \frac{0}{8} = 0$$

$$14. \quad \frac{6}{6} = 1$$

$$15. \quad \frac{9}{0} \text{ is undefined.}$$

$$16. \quad \frac{6}{8} = \frac{2 \cdot 3}{2 \cdot 2 \cdot 2} = \frac{3}{4}$$

$$17. \quad \frac{14}{16} = \frac{2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$$

$$18. \quad \frac{7}{28} = \frac{7}{2 \cdot 2 \cdot 7} = \frac{1}{4}$$

$$19. \quad \frac{27}{36} = \frac{3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$$

$$20. \quad \frac{15}{18} = \frac{3 \cdot 5}{2 \cdot 3 \cdot 3} = \frac{5}{6}$$

$$21. \quad \frac{12}{16} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{3}{4}$$

$$22. \quad \frac{9}{18} = \frac{3 \cdot 3}{2 \cdot 3 \cdot 3} = \frac{1}{2}$$

$$23. \quad \frac{20}{25} = \frac{2 \cdot 2 \cdot 5}{5 \cdot 5} = \frac{4}{5}$$

$$24. \quad \frac{12}{36} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{1}{3}$$

$$25. \quad \frac{12}{40} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 5} = \frac{3}{10}$$

$$26. \quad \frac{54}{72} = \frac{2 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$$

$$27. \quad \frac{112}{128} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$$

$$28. \quad \frac{330}{360} = \frac{2 \cdot 3 \cdot 5 \cdot 11}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5} = \frac{11}{12}$$

$$29. \frac{112}{144} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{7}{9}$$

$$30. \frac{525}{1155} = \frac{3 \cdot 5 \cdot 5 \cdot 7}{3 \cdot 5 \cdot 7 \cdot 11} = \frac{5}{11}$$

$$31. \frac{78}{5} = 15 \text{ r } 3 = 15\frac{3}{5}$$

$$32. \frac{11}{4} = 2 \text{ r } 3 = 2\frac{3}{4}$$

$$33. \frac{28}{3} = 9 \text{ r } 1 = 9\frac{1}{3}$$

$$34. \frac{21}{3} = 7 \text{ r } 0 = 7$$

$$35. \frac{45}{36} = \frac{5}{4} = 1 \text{ r } 1 = 1\frac{1}{4}$$

$$36. \frac{67}{16} = 4 \text{ r } 3 = 4\frac{3}{16}$$

$$37. \frac{57}{6} = \frac{19}{2} = 9 \text{ r } 1 = 9\frac{1}{2}$$

$$38. \frac{84}{9} = \frac{28}{3} = 9 \text{ r } 1 = 9\frac{1}{3}$$

$$39. 5\frac{15}{12} = 5\frac{5}{4} = 5 + \left(1\frac{1}{4}\right) = 6\frac{1}{4}$$

$$40. 2\frac{70}{16} = 2\frac{35}{8} = 2 + \left(4\frac{3}{8}\right) = 6\frac{3}{8}$$

$$41. 3\frac{5}{6} = \frac{(3 \times 6) + 5}{6} = \frac{23}{6}$$

$$42. 6\frac{3}{4} = \frac{(6 \times 4) + 3}{4} = \frac{27}{4}$$

$$43. 2\frac{1}{8} = \frac{(2 \times 8) + 1}{8} = \frac{17}{8}$$

$$44. 5\frac{2}{3} = \frac{(5 \times 3) + 2}{3} = \frac{17}{3}$$

$$45. 1\frac{7}{16} = \frac{(1 \times 16) + 7}{16} = \frac{23}{16}$$

$$46. 4\frac{1}{2} = \frac{(4 \times 2) + 1}{2} = \frac{9}{2}$$

$$47. 6\frac{7}{8} = \frac{(6 \times 8) + 7}{8} = \frac{55}{8}$$

$$48. 8\frac{1}{5} = \frac{(8 \times 5) + 1}{5} = \frac{41}{5}$$

$$49. 10\frac{3}{5} = \frac{(10 \times 5) + 3}{5} = \frac{53}{5}$$

$$50. 12\frac{5}{6} = \frac{(12 \times 6) + 5}{6} = \frac{77}{6}$$

$$51. \frac{28}{6} = \frac{14}{3} = 4 \text{ r } 2 = 4\frac{2}{3} \text{ pies}$$

$$52. \text{ a. } 1\frac{1}{3} = \frac{(1 \times 3) + 1}{3} = \frac{4}{3} \text{ cups}$$

$$\text{ b. } \frac{15}{4} = 3 \text{ r } 3 = 3\frac{3}{4} \text{ cups}$$

$$\text{ c. } \frac{3}{2} = 1 \text{ r } 1 = 1\frac{1}{2} \text{ cups}$$

Section 1.7: Addition and Subtraction of Fractions

$$1. 16$$

$$2. 105$$

$$3. 210$$

$$4. 315$$

$$5. 48$$

$$6. 70$$

$$7. \frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$$

$$8. \frac{1}{2} + \frac{3}{8} = \frac{4}{8} + \frac{3}{8} = \frac{7}{8}$$

$$9. \frac{1}{16} + \frac{3}{32} = \frac{2}{32} + \frac{3}{32} = \frac{5}{32}$$

$$10. \frac{5}{6} + \frac{1}{18} = \frac{15}{18} + \frac{1}{18} = \frac{16}{18} = \frac{8}{9}$$

$$11. \frac{2}{7} + \frac{3}{28} = \frac{8}{28} + \frac{3}{28} = \frac{11}{28}$$

$$12. \frac{1}{9} + \frac{2}{45} = \frac{5}{45} + \frac{2}{45} = \frac{7}{45}$$

13. $\frac{3}{8} + \frac{5}{64} = \frac{24}{64} + \frac{5}{64} = \frac{29}{64}$

14. $\frac{3}{10} + \frac{7}{100} = \frac{30}{100} + \frac{7}{100} = \frac{37}{100}$

15. $\frac{1}{5} + \frac{3}{20} = \frac{4}{20} + \frac{3}{20} = \frac{7}{20}$

16. $\frac{3}{4} + \frac{3}{16} = \frac{12}{16} + \frac{3}{16} = \frac{15}{16}$

17. $\frac{4}{5} + \frac{1}{2} = \frac{8}{10} + \frac{5}{10} = \frac{13}{10} = 1\frac{3}{10}$

18. $\frac{2}{3} + \frac{4}{9} = \frac{6}{9} + \frac{4}{9} = \frac{10}{9} = 1\frac{1}{9}$

19. $\frac{1}{3} + \frac{1}{6} + \frac{3}{16} + \frac{1}{12} = \frac{16}{48} + \frac{8}{48} + \frac{9}{48} + \frac{4}{48} = \frac{37}{48}$

20. $\frac{3}{16} + \frac{1}{8} + \frac{1}{3} + \frac{1}{4} = \frac{9}{48} + \frac{6}{48} + \frac{16}{48} + \frac{12}{48} = \frac{43}{48}$

21. $\frac{1}{20} + \frac{1}{30} + \frac{1}{40} = \frac{6}{120} + \frac{4}{120} + \frac{3}{120} = \frac{13}{120}$

22. $\frac{1}{14} + \frac{1}{15} + \frac{1}{6} = \frac{15}{210} + \frac{14}{210} + \frac{35}{210}$
$$= \frac{64}{210}$$
$$= \frac{32}{105}$$

23. $\frac{3}{10} + \frac{1}{14} + \frac{4}{15} = \frac{63}{210} + \frac{15}{210} + \frac{56}{210}$
$$= \frac{134}{210}$$
$$= \frac{67}{105}$$

24. $\frac{5}{36} + \frac{11}{72} + \frac{5}{6} = \frac{10}{72} + \frac{11}{72} + \frac{60}{72} = \frac{81}{72} = \frac{9}{8} = 1\frac{1}{8}$

25. $\frac{7}{8} - \frac{3}{4} = \frac{7}{8} - \frac{6}{8} = \frac{1}{8}$

26. $\frac{9}{64} - \frac{2}{128} = \frac{18}{128} - \frac{2}{128} = \frac{16}{128} = \frac{1}{8}$

27. $\frac{4}{5} - \frac{3}{10} = \frac{8}{10} - \frac{3}{10} = \frac{5}{10} = \frac{1}{2}$

28. $\frac{7}{16} - \frac{1}{3} = \frac{21}{48} - \frac{16}{48} = \frac{5}{48}$

29. $\frac{9}{14} - \frac{3}{42} = \frac{27}{42} - \frac{3}{42} = \frac{24}{42} = \frac{4}{7}$

30. $\frac{8}{9} - \frac{5}{24} = \frac{64}{72} - \frac{15}{72} = \frac{49}{72}$

31. $\frac{9}{16} - \frac{13}{32} - \frac{1}{8} = \frac{18}{32} - \frac{13}{32} - \frac{4}{32} = \frac{1}{32}$

32. $\frac{7}{8} - \frac{2}{9} - \frac{1}{12} = \frac{63}{72} - \frac{16}{72} - \frac{6}{72} = \frac{41}{72}$

33. $2\frac{1}{2} = 2\frac{2}{4}$

$$4\frac{3}{4} = 4\frac{3}{4}$$

$$6\frac{5}{4} = 7\frac{1}{4}$$

34. $3\frac{5}{8} = 3\frac{5}{8}$

$$5\frac{3}{4} = 5\frac{6}{8}$$

$$8\frac{11}{8} = 9\frac{3}{8}$$

35. $3 = 2\frac{8}{8}$

$$\frac{3}{8} = \frac{3}{8}$$

$$2\frac{5}{8}$$

36. $8 = 7\frac{4}{4}$

$$5\frac{3}{4} = 5\frac{3}{4}$$

$$2\frac{1}{4}$$

37. $8\frac{3}{16} = 7\frac{19}{16}$

$$3\frac{7}{16} = 3\frac{7}{16}$$

$$4\frac{12}{16} = 4\frac{3}{4}$$

$$\begin{aligned}
 38. \quad 5\frac{3}{8} &= 5\frac{3}{8} \\
 2\frac{3}{4} &= 2\frac{6}{8} \\
 7\frac{9}{8} &= 8\frac{1}{8}
 \end{aligned}$$

$$\begin{aligned}
 39. \quad 7\frac{3}{16} &= 6\frac{19}{16} \\
 4\frac{7}{8} &= 4\frac{14}{16} \\
 2\frac{5}{16}
 \end{aligned}$$

$$\begin{aligned}
 40. \quad 8\frac{1}{4} &= 7\frac{20}{16} \\
 4\frac{7}{16} &= 4\frac{7}{16} \\
 3\frac{13}{16}
 \end{aligned}$$

$$\begin{aligned}
 41. \quad 3\frac{4}{5} &= 3\frac{36}{45} \\
 9\frac{8}{9} &= 9\frac{49}{45} \\
 12\frac{86}{45} &= 13\frac{41}{45}
 \end{aligned}$$

$$\begin{aligned}
 42. \quad 4\frac{5}{12} &= 4\frac{25}{60} \\
 6\frac{17}{20} &= 6\frac{51}{60} \\
 10\frac{76}{60} &= 10\frac{19}{15} = 11\frac{4}{15}
 \end{aligned}$$

$$\begin{aligned}
 43. \quad 3\frac{9}{16} + 4\frac{7}{12} + 3\frac{1}{6} \\
 = 3\frac{27}{48} + 4\frac{28}{48} + 3\frac{8}{48} \\
 = 10\frac{63}{48} = 10\frac{21}{16} = 11\frac{5}{16}
 \end{aligned}$$

$$\begin{aligned}
 44. \quad 5\frac{2}{5} + 3\frac{7}{10} + 4\frac{7}{15} \\
 = 5\frac{12}{30} + 3\frac{21}{30} + 4\frac{14}{30} \\
 = 12\frac{47}{30} = 13\frac{17}{30}
 \end{aligned}$$

$$\begin{aligned}
 45. \quad 16\frac{5}{8} - 4\frac{7}{12} - 2\frac{1}{2} \\
 = 16\frac{15}{24} - 4\frac{14}{24} - 2\frac{12}{24} \\
 = 15\frac{39}{24} - 4\frac{14}{24} - 2\frac{12}{24} \\
 = 9\frac{13}{24}
 \end{aligned}$$

$$\begin{aligned}
 46. \quad 12\frac{9}{16} - 3\frac{1}{6} + 2\frac{1}{4} \\
 = 12\frac{27}{48} - 3\frac{8}{48} + 2\frac{12}{48} \\
 = 14\frac{39}{48} - 3\frac{8}{48} \\
 = 11\frac{31}{48}
 \end{aligned}$$

$$\begin{aligned}
 47. \quad 712\frac{3}{4} \text{ ft} + 563 \text{ ft} + 961\frac{1}{2} \text{ ft} \\
 = 712\frac{3}{4} \text{ ft} + 563 \text{ ft} + 961\frac{2}{4} \text{ ft} \\
 = 2236\frac{5}{4} \text{ ft} = 2237\frac{1}{4} \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 48. \quad 3\frac{1}{4} \text{ ft} + 2\frac{3}{8} \text{ ft} + 3\frac{1}{8} \text{ ft} + 4\frac{3}{16} \text{ ft} \\
 = 3\frac{4}{16} \text{ ft} + 2\frac{6}{16} \text{ ft} + 3\frac{2}{16} \text{ ft} + 4\frac{3}{16} \text{ ft} \\
 = 12\frac{15}{16} \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 49. \quad \text{a.} \quad 2\frac{3}{8} \text{ ft} + 3\frac{7}{8} \text{ ft} \\
 = 5\frac{10}{8} \text{ ft} = 6\frac{2}{8} \text{ ft} = 6\frac{1}{4} \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 \text{b.} \quad 6\frac{1}{4} \text{ ft} - 4\frac{3}{4} \text{ ft} \\
 = 5\frac{5}{4} \text{ ft} - 4\frac{3}{4} \text{ ft} \\
 = 1\frac{2}{4} \text{ ft} = 1\frac{1}{2} \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 50. \quad \frac{1}{8} \text{ in.} - \frac{3}{32} \text{ in.} &= \frac{4}{32} \text{ in.} - \frac{3}{32} \text{ in.} \\
 &= \frac{1}{32} \text{ in.}
 \end{aligned}$$

$$\begin{aligned} 51. \quad & 13\frac{3}{4} \text{ gal} + 11\frac{2}{5} \text{ gal} + 10\frac{2}{5} \text{ gal} \\ &= 13\frac{15}{20} \text{ gal} + 11\frac{8}{20} \text{ gal} + 10\frac{8}{20} \text{ gal} \\ &= 34\frac{31}{20} \text{ gal} = 35\frac{11}{20} \text{ gal} \end{aligned}$$

$$\begin{aligned} 52. \quad & 50 \text{ gal} - 17\frac{1}{2} \text{ gal} - 20\frac{3}{8} \text{ gal} \\ &= 50 \text{ gal} - 17\frac{4}{8} \text{ gal} - 20\frac{3}{8} \text{ gal} \\ &= 50 \text{ gal} - 37\frac{7}{8} \text{ gal} \\ &= 49\frac{8}{8} \text{ gal} - 37\frac{7}{8} \text{ gal} \\ &= 12\frac{1}{8} \text{ gal} \end{aligned}$$

$$\begin{aligned} 53. \quad & 25\frac{1}{4} \text{ gal} - 23\frac{3}{4} \text{ gal} \\ &= 24\frac{5}{4} \text{ gal} - 23\frac{3}{4} \text{ gal} \\ &= 1\frac{2}{4} \text{ gal} = 1\frac{1}{2} \text{ gal} \end{aligned}$$

$$\begin{aligned} 54. \quad & 4\frac{1}{2} \text{ qt} + 4\frac{1}{4} \text{ qt} + 4\frac{3}{8} \text{ qt} \\ &= 4\frac{4}{8} \text{ qt} + 4\frac{2}{8} \text{ qt} + 4\frac{3}{8} \text{ qt} \\ &= 12\frac{9}{8} \text{ qt} = 13\frac{1}{8} \text{ qt} \end{aligned}$$

$$\begin{aligned} 55. \quad & \frac{1}{3} \text{ h} + \frac{1}{4} \text{ h} + \frac{1}{4} \text{ h} \\ &= \frac{4}{12} \text{ h} + \frac{3}{12} \text{ h} + \frac{3}{12} \text{ h} \\ &= \frac{10}{12} \text{ h} = \frac{5}{6} \text{ h} \end{aligned}$$

$$\begin{aligned} 60. \quad \text{a.} \quad & 3\frac{9}{32} \text{ in.} - 2\frac{5}{16} \text{ in.} \\ &= 3\frac{9}{32} \text{ in.} - 2\frac{10}{32} \text{ in.} \\ &= 2\frac{41}{32} \text{ in.} - 2\frac{10}{32} \text{ in.} \\ &= \frac{31}{32} \text{ in.} \end{aligned}$$

$$\begin{aligned} 56. \quad & 4 \text{ ft} - 3\frac{3}{4} \text{ ft} \\ &= 3\frac{4}{4} \text{ ft} - 3\frac{3}{4} \text{ ft} = \frac{1}{4} \text{ ft} \\ &4 \text{ ft} - 2\frac{1}{4} \text{ ft} \\ &= 3\frac{4}{4} \text{ ft} - 2\frac{1}{4} \text{ ft} = 1\frac{3}{4} \text{ ft} \\ &\frac{1}{4} \text{ ft} + 1\frac{3}{4} \text{ ft} \\ &= 1\frac{4}{4} \text{ ft} = 2 \text{ ft} \end{aligned}$$

$$\begin{aligned} 57. \quad & \frac{1}{3} \text{ ton} + \frac{3}{4} \text{ ton} + \frac{9}{16} \text{ ton} \\ &= \frac{16}{48} \text{ ton} + \frac{36}{48} \text{ ton} + \frac{27}{48} \text{ ton} \\ &= \frac{79}{48} \text{ ton} = 1\frac{31}{48} \text{ ton} \end{aligned}$$

$$\begin{aligned} 58. \quad & 6 \text{ lb} \times 16 \text{ oz/lb} = 96 \text{ oz} \\ &3\frac{1}{2} \text{ oz} + 33\frac{1}{8} \text{ oz} + 96 \text{ oz} + 10\frac{1}{3} \text{ oz} \\ &= 3\frac{12}{24} \text{ oz} + 33\frac{3}{24} \text{ oz} + 96 \text{ oz} + 10\frac{8}{24} \text{ oz} \\ &= 142\frac{23}{24} \text{ oz} \end{aligned}$$

$$\begin{aligned} 59. \quad & 10 \text{ in.} - \frac{3}{4} \text{ in.} - \frac{3}{4} \text{ in.} - \frac{1}{8} \text{ in.} - \frac{1}{8} \text{ in.} \\ &= 10 \text{ in.} - \frac{6}{8} \text{ in.} - \frac{6}{8} \text{ in.} - \frac{1}{8} \text{ in.} - \frac{1}{8} \text{ in.} \\ &= 10 \text{ in.} - \frac{14}{8} \text{ in.} \\ &= 9\frac{4}{4} \text{ in.} - 1\frac{3}{4} \text{ in.} = 8\frac{1}{4} \text{ in.} \end{aligned}$$

60. (continued)

$$\begin{aligned}
 \text{b. } & 2\frac{5}{16} \text{ in.} + 2\frac{1}{2} \text{ in.} + \frac{31}{32} \text{ in.} + 2\frac{3}{8} \text{ in.} + 3\frac{9}{32} \text{ in.} + 2\frac{3}{8} \text{ in.} + 2\frac{1}{2} \text{ in.} \\
 &= 2\frac{10}{32} \text{ in.} + 2\frac{16}{32} \text{ in.} + \frac{31}{32} \text{ in.} + 2\frac{12}{32} \text{ in.} + 3\frac{9}{32} \text{ in.} + 2\frac{12}{32} \text{ in.} + 2\frac{16}{32} \text{ in.} \\
 &= 13\frac{106}{32} \text{ in.} = 16\frac{10}{32} \text{ in.} = 16\frac{5}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{61. a. } & 5\frac{9}{16} \text{ in.} - 1\frac{1}{8} \text{ in.} - 1\frac{1}{8} \text{ in.} \\
 &= 5\frac{9}{16} \text{ in.} - 1\frac{2}{16} \text{ in.} - 1\frac{2}{16} \text{ in.} \\
 &= 3\frac{5}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } & 1\frac{1}{8} \text{ in.} + 2\frac{5}{32} \text{ in.} + 3\frac{5}{16} \text{ in.} + 2\frac{5}{32} \text{ in.} + 1\frac{1}{8} \text{ in.} + 7\frac{11}{16} \text{ in.} + 2\frac{1}{16} \text{ in.} + 4\frac{3}{8} \text{ in.} + 5\frac{1}{16} \text{ in.} \\
 &= 1\frac{4}{32} \text{ in.} + 2\frac{5}{32} \text{ in.} + 3\frac{10}{32} \text{ in.} + 2\frac{5}{32} \text{ in.} + 1\frac{4}{32} \text{ in.} + 7\frac{22}{32} \text{ in.} + 2\frac{2}{32} \text{ in.} + 4\frac{12}{32} \text{ in.} + 5\frac{2}{32} \text{ in.} \\
 &= 27\frac{66}{32} \text{ in.} = 29\frac{2}{32} \text{ in.} = 29\frac{1}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{62. a. } & 2\frac{1}{16} \text{ in.} + 2\frac{17}{32} \text{ in.} \\
 &= 2\frac{2}{32} \text{ in.} + 2\frac{17}{32} \text{ in.} \\
 &= 4\frac{19}{32} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } & 4\frac{19}{32} \text{ in.} + 1\frac{1}{8} \text{ in.} + \frac{27}{32} \text{ in.} + 2\frac{17}{32} \text{ in.} + 2 \text{ in.} + 1\frac{29}{32} \text{ in.} + 1\frac{9}{16} \text{ in.} \\
 &= 4\frac{19}{32} \text{ in.} + 1\frac{4}{32} \text{ in.} + \frac{27}{32} \text{ in.} + 2\frac{17}{32} \text{ in.} + 2 \text{ in.} + 1\frac{29}{32} \text{ in.} + 1\frac{18}{32} \text{ in.} \\
 &= 11\frac{114}{32} \text{ in.} = 14\frac{18}{32} \text{ in.} = 14\frac{9}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{63. a. } & 3\frac{1}{4} \text{ in.} - 1\frac{3}{8} \text{ in.} - 1\frac{5}{8} \text{ in.} \\
 &= 3\frac{1}{4} \text{ in.} - 2\frac{8}{8} \text{ in.} \\
 &= 3\frac{1}{4} \text{ in.} - 3 \text{ in.} = \frac{1}{4} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } & 3\frac{1}{4} \text{ in.} + \frac{15}{16} \text{ in.} + \frac{15}{16} \text{ in.} + 1\frac{7}{8} \text{ in.} + 1\frac{1}{4} \text{ in.} + \frac{13}{16} \text{ in.} + 1\frac{3}{8} \text{ in.} + 1\frac{7}{8} \text{ in.} \\
 &= 3\frac{4}{16} \text{ in.} + \frac{15}{16} \text{ in.} + \frac{15}{16} \text{ in.} + 1\frac{14}{16} \text{ in.} + 1\frac{4}{16} \text{ in.} + \frac{13}{16} \text{ in.} + 1\frac{6}{16} \text{ in.} + 1\frac{14}{16} \text{ in.} \\
 &= 7\frac{85}{16} \text{ in.} = 12\frac{5}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 64. \quad & 59\frac{9}{32} \text{ in.} - 19\frac{5}{8} \text{ in.} - 17\frac{13}{16} \text{ in.} \\
 &= 59\frac{9}{32} \text{ in.} - 19\frac{20}{32} \text{ in.} - 17\frac{26}{32} \text{ in.} \\
 &= 59\frac{9}{32} \text{ in.} - 36\frac{46}{32} \text{ in.} \\
 &= 59\frac{9}{32} \text{ in.} - 37\frac{14}{32} \text{ in.} \\
 &= 58\frac{41}{32} \text{ in.} - 37\frac{14}{32} \text{ in.} \\
 &= 21\frac{27}{32} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 65. \quad & 1\frac{3}{4} \text{ A} + 1\frac{1}{2} \text{ A} \\
 &= 1\frac{3}{4} \text{ A} + 1\frac{2}{4} \text{ A} \\
 &= 2\frac{5}{4} \text{ A} = 3\frac{1}{4} \text{ A}
 \end{aligned}$$

$$\begin{aligned}
 66. \quad & 2\frac{1}{4} \text{ A} + \frac{1}{8} \text{ A} + \frac{1}{16} \text{ A} \\
 &= 2\frac{4}{16} \text{ A} + \frac{2}{16} \text{ A} + \frac{1}{16} \text{ A} \\
 &= 2\frac{7}{16} \text{ A}
 \end{aligned}$$

$$\begin{aligned}
 67. \quad & \frac{1}{16} \text{ A} + \frac{1}{12} \text{ A} + 1\frac{3}{4} \text{ A} \\
 &= \frac{3}{48} \text{ A} + \frac{4}{48} \text{ A} + 1\frac{36}{48} \text{ A} \\
 &= 1\frac{43}{48} \text{ A}
 \end{aligned}$$

$$\begin{aligned}
 68. \quad & 1\frac{1}{2} \text{ A} + \frac{3}{4} \text{ A} + \frac{3}{16} \text{ A} + \frac{7}{8} \text{ A} + 2\frac{1}{2} \text{ A} \\
 &= 1\frac{8}{16} \text{ A} + \frac{12}{16} \text{ A} + \frac{3}{16} \text{ A} + \frac{14}{16} \text{ A} + 2\frac{8}{16} \text{ A} \\
 &= 3\frac{45}{16} \text{ A} = 5\frac{13}{16} \text{ A}
 \end{aligned}$$

$$\begin{aligned}
 69. \quad & 6\frac{3}{4} \text{ in.} + 2\frac{7}{8} \text{ in.} \\
 &= 6\frac{6}{8} \text{ in.} + 2\frac{7}{8} \text{ in.} \\
 &= 8\frac{13}{8} \text{ in.} = 9\frac{5}{8} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 70. \quad & 3\frac{3}{8} \text{ in.} + 5\frac{5}{16} \text{ in.} + 3\frac{3}{16} \text{ in.} \\
 &= 3\frac{6}{16} \text{ in.} + 5\frac{5}{16} \text{ in.} + 3\frac{6}{16} \text{ in.} \\
 &= 11\frac{17}{16} \text{ in.} = 12\frac{1}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 71. \quad \text{a.} \quad & 6\frac{7}{8} \text{ in.} + 1\frac{3}{8} \text{ in.} + 2\frac{1}{4} \text{ in.} \\
 &= 6\frac{7}{8} \text{ in.} + 1\frac{3}{8} \text{ in.} + 2\frac{2}{8} \text{ in.} \\
 &= 9\frac{12}{8} \text{ in.} = 10\frac{4}{8} \text{ in.} = 10\frac{1}{2} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{b.} \quad & 1\frac{5}{8} \text{ in.} - \frac{7}{16} \text{ in.} - \frac{7}{16} \text{ in.} \\
 &= 1\frac{5}{8} \text{ in.} - \frac{14}{16} \text{ in.} \\
 &= 1\frac{5}{8} \text{ in.} - \frac{7}{8} \text{ in.} \\
 &= \frac{13}{8} \text{ in.} - \frac{7}{8} \text{ in.} \\
 &= \frac{6}{8} \text{ in.} = \frac{3}{4} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 72. \quad & 13\frac{13}{16} \text{ in.} - 1\frac{3}{8} \text{ in.} - 2\frac{5}{16} \text{ in.} - 4\frac{3}{4} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 13\frac{13}{16} \text{ in.} - 1\frac{6}{16} \text{ in.} - 2\frac{5}{16} \text{ in.} - 4\frac{12}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 13\frac{13}{16} \text{ in.} - 7\frac{26}{16} \text{ in.} \\
 &= 13\frac{13}{16} \text{ in.} - 8\frac{10}{16} \text{ in.} \\
 &= 5\frac{3}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 73. \quad \text{a.} \quad & 5\frac{1}{8} \text{ in.} + 5 \text{ in.} + 7\frac{5}{8} \text{ in.} + 4\frac{1}{16} \text{ in.} \\
 &= 5\frac{2}{16} \text{ in.} + 5 \text{ in.} + 7\frac{10}{16} \text{ in.} + 4\frac{1}{16} \text{ in.} \\
 &= 21\frac{13}{16} \text{ in.}
 \end{aligned}$$

73. (continued)

$$\begin{aligned}
 \text{b. } & 7\frac{1}{4} \text{ in.} - 3\frac{3}{16} \text{ in.} - 3\frac{3}{16} \text{ in.} \\
 &= 7\frac{1}{4} \text{ in.} - 6\frac{6}{16} \text{ in.} \\
 &= 7\frac{1}{4} \text{ in.} - 6\frac{3}{8} \text{ in.} \\
 &= 7\frac{2}{8} \text{ in.} - 6\frac{3}{8} \text{ in.} \\
 &= 6\frac{10}{8} \text{ in.} - 6\frac{3}{8} \text{ in.} \\
 &= \frac{7}{8} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 74. & 7\frac{1}{8} \text{ in.} - \frac{7}{8} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{7}{8} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 7\frac{1}{8} \text{ in.} - \frac{14}{16} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{14}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 7\frac{1}{8} \text{ in.} - \frac{34}{16} \text{ in.} \\
 &= 7\frac{1}{8} \text{ in.} - \frac{17}{8} \text{ in.} \\
 &= 7\frac{1}{8} \text{ in.} - 2\frac{1}{8} \text{ in.} \\
 &= 5 \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 75. & 16 \text{ in.} - 1\frac{5}{8} \text{ in.} = 15\frac{8}{8} \text{ in.} - 1\frac{5}{8} \text{ in.} \\
 &= 14\frac{3}{8} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 76. & \frac{3}{8} \text{ in.} - \frac{1}{16} \text{ in.} = \frac{6}{16} \text{ in.} - \frac{1}{16} \text{ in.} \\
 &= \frac{5}{16} \text{ in.}
 \end{aligned}$$

81. Length:

$$\begin{aligned}
 & \frac{7}{32} \text{ in.} + 3\frac{5}{16} \text{ in.} + \frac{7}{32} \text{ in.} + 3\frac{5}{16} \text{ in.} + \frac{7}{32} \text{ in.} + 3\frac{5}{16} \text{ in.} + \frac{7}{32} \text{ in.} \\
 &= \frac{7}{32} \text{ in.} + 3\frac{10}{32} \text{ in.} + \frac{7}{32} \text{ in.} + 3\frac{10}{32} \text{ in.} + \frac{7}{32} \text{ in.} + 3\frac{10}{32} \text{ in.} + \frac{7}{32} \text{ in.} \\
 &= 9\frac{58}{32} \text{ in.} = 9\frac{29}{16} \text{ in.} = 10\frac{13}{16} \text{ in.}
 \end{aligned}$$

Width:

$$\frac{7}{32} \text{ in.} + 3\frac{5}{16} \text{ in.} + \frac{7}{32} \text{ in.} = \frac{7}{32} \text{ in.} + 3\frac{10}{32} \text{ in.} + \frac{7}{32} \text{ in.} = 3\frac{24}{32} \text{ in.} = 3\frac{3}{4} \text{ in.}$$

$$\begin{aligned}
 77. & \frac{7}{8} \text{ in.} - \frac{51}{64} \text{ in.} = \frac{56}{64} \text{ in.} - \frac{51}{64} \text{ in.} \\
 &= \frac{5}{64} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 78. & \frac{5}{8} \text{ in.} - \frac{7}{16} \text{ in.} = \frac{10}{16} \text{ in.} - \frac{7}{16} \text{ in.} \\
 &= \frac{3}{16} \text{ in.}
 \end{aligned}$$

79. One cut:

$$\begin{aligned}
 & 1\frac{7}{8} \text{ in.} - \frac{3}{32} \text{ in.} \\
 &= 1\frac{28}{32} \text{ in.} - \frac{3}{32} \text{ in.} \\
 &= 1\frac{25}{32} \text{ in.}
 \end{aligned}$$

Three cuts:

$$\begin{aligned}
 & 1\frac{7}{8} \text{ in.} - \frac{3}{32} \text{ in.} - \frac{3}{32} \text{ in.} - \frac{3}{32} \text{ in.} \\
 &= 1\frac{28}{32} \text{ in.} - \frac{3}{32} \text{ in.} - \frac{3}{32} \text{ in.} - \frac{3}{32} \text{ in.} \\
 &= 1\frac{19}{32} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 80. & 65\frac{3}{4} \text{ ft} - 5\frac{5}{12} \text{ ft} - 43\frac{5}{6} \text{ ft} \\
 &= 65\frac{9}{12} \text{ ft} - 5\frac{5}{12} \text{ ft} - 43\frac{10}{12} \text{ ft} \\
 &= 64\frac{21}{12} \text{ ft} - 5\frac{5}{12} \text{ ft} - 43\frac{10}{12} \text{ ft} \\
 &= 16\frac{6}{12} \text{ ft} = 16\frac{1}{2} \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 82. \quad & 16 \text{ ft } 4\frac{1}{2} \text{ in.} - 1 \text{ ft } 2\frac{1}{4} \text{ in.} - 10\frac{3}{4} \text{ in.} \\
 &= 16 \text{ ft } 4\frac{1}{2} \text{ in.} - 1 \text{ ft } 2\frac{1}{4} \text{ in.} - 10\frac{3}{4} \text{ in.} \\
 &= 16 \text{ ft } 4\frac{1}{2} \text{ in.} - 1 \text{ ft } 2\frac{1}{4} \text{ in.} - 10\frac{3}{4} \text{ in.} \\
 &= 16 \text{ ft } 4\frac{1}{2} \text{ in.} - 1 \text{ ft } 12\frac{4}{4} \text{ in.} \\
 &= 15 \text{ ft } 16\frac{1}{2} \text{ in.} - 1 \text{ ft } 13 \text{ in.} \\
 &= 14 \text{ ft } 3\frac{1}{2} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 83. \quad & 15\frac{3}{8} \text{ in.} + 7\frac{3}{4} \text{ in.} + 11\frac{1}{2} \text{ in.} + 7\frac{7}{32} \text{ in.} + 10\frac{5}{16} \text{ in.} \\
 &= 15\frac{12}{32} \text{ in.} + 7\frac{24}{32} \text{ in.} + 11\frac{16}{32} \text{ in.} + 7\frac{7}{32} \text{ in.} + 10\frac{10}{32} \text{ in.} \\
 &= 50\frac{69}{32} \text{ in.} = 52\frac{5}{32} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 84. \quad & \frac{15}{16} \text{ in.} + 3\frac{1}{4} \text{ in.} + 2\frac{1}{16} \text{ in.} + 3\frac{3}{8} \text{ in.} + 1\frac{13}{16} \text{ in.} + 1\frac{1}{8} \text{ in.} \\
 &= \frac{15}{16} \text{ in.} + 3\frac{4}{16} \text{ in.} + 2\frac{1}{16} \text{ in.} + 3\frac{6}{16} \text{ in.} + 1\frac{13}{16} \text{ in.} + 1\frac{2}{16} \text{ in.} \\
 &= 10\frac{41}{16} \text{ in.} = 12\frac{9}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 85. \quad \text{a.} \quad & 1\frac{3}{32} \text{ in.} + 1\frac{10}{32} \text{ in.} + 2\frac{12}{32} \text{ in.} + 1\frac{10}{32} \text{ in.} + 1\frac{3}{32} \text{ in.} \\
 &= 6\frac{38}{32} \text{ in.} = 7\frac{6}{32} \text{ in.} = 7\frac{3}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 \text{b.} \quad & 10\frac{1}{2} \text{ in.} - 6\frac{5}{8} \text{ in.} - 2\frac{3}{16} \text{ in.} \\
 &= 10\frac{8}{16} \text{ in.} - 6\frac{10}{16} \text{ in.} - 2\frac{3}{16} \text{ in.} \\
 &= 9\frac{24}{16} \text{ in.} - 6\frac{10}{16} \text{ in.} - 2\frac{3}{16} \text{ in.} \\
 &= 1\frac{11}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 86. \quad & \frac{2}{3} + \frac{3}{4} + \frac{2}{3} = \frac{8}{12} + \frac{9}{12} + \frac{8}{12} \\
 &= \frac{25}{12} = 1\frac{1}{12} \text{ cords}
 \end{aligned}$$

$$\begin{aligned}
 87. \quad & 1\frac{1}{2} \text{ acres} - \frac{1}{2} \text{ acre} - \frac{1}{6} \text{ acre} - \frac{1}{3} \text{ acre} \\
 &= \frac{3}{2} \text{ acres} - \frac{1}{2} \text{ acre} - \frac{1}{6} \text{ acre} - \frac{1}{3} \text{ acre} \\
 &= \frac{9}{6} \text{ acres} - \frac{3}{6} \text{ acre} - \frac{1}{6} \text{ acre} - \frac{2}{6} \text{ acre} \\
 &= \frac{3}{6} \text{ acre} = \frac{1}{2} \text{ acre}
 \end{aligned}$$

$$\begin{aligned}
 88. \quad & 1\frac{1}{2} \text{ mi} + 2\frac{3}{4} \text{ mi} + \frac{3}{4} \text{ mi} + \frac{1}{2} \text{ mi} \\
 &= 1\frac{2}{4} \text{ mi} + 2\frac{3}{4} \text{ mi} + \frac{3}{4} \text{ mi} + \frac{2}{4} \text{ mi} \\
 &= 3\frac{10}{4} \text{ mi} = 5\frac{2}{4} \text{ mi} = 5\frac{1}{2} \text{ mi}
 \end{aligned}$$

$$89. \quad \frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4} \\ = \frac{5}{4} = 1\frac{1}{4} \text{ sticks}$$

$$90. \quad 15\frac{3}{8} - 12\frac{1}{2} = 15\frac{3}{8} - 12\frac{4}{8} \\ = 14\frac{11}{8} - 12\frac{4}{8} \\ = 2\frac{7}{8} \text{ pies}$$

$$91. \quad 3\frac{3}{8} - 2\frac{1}{4} = 3\frac{3}{8} - 2\frac{2}{8} \\ = 1\frac{1}{8} \text{ cups}$$

$$92. \quad 5\frac{1}{2} - 1\frac{1}{2} - 2\frac{3}{4} = 5\frac{2}{4} - 1\frac{2}{4} - 2\frac{3}{4} \\ = 4\frac{6}{4} - 1\frac{2}{4} - 2\frac{3}{4} \\ = 1\frac{1}{4} \text{ heads}$$

$$93. \quad 1\frac{1}{2} + 3 - 1\frac{3}{4} - 2\frac{1}{2} - \frac{1}{8} = 1\frac{4}{8} + 3 - 1\frac{6}{8} - 2\frac{4}{8} - \frac{1}{8} \\ = \frac{12}{8} + 3 - 1\frac{6}{8} - 2\frac{4}{8} - \frac{1}{8} \\ = \frac{1}{8} \text{ bag}$$

$$94. \quad \frac{3}{8} + 2 - \frac{5}{16} = \frac{6}{16} + \frac{32}{16} - \frac{5}{16} = \frac{33}{16} = 2\frac{1}{16} \text{ cases}$$

Section 1.8: Multiplication and Division of Fractions

1. 12

2. 4

3. 9

$$4. \quad 3\frac{1}{2} \times \frac{2}{5} = \frac{7}{2} \times \frac{2}{5} \\ = \frac{7}{5} = 1\frac{2}{5}$$

$$5. \quad 1\frac{3}{4} \times \frac{5}{16} = \frac{7}{4} \times \frac{5}{16} \\ = \frac{35}{64}$$

6. $\frac{1}{27}$

7. $\frac{2}{3}$

8. $\frac{15}{32}$

9. 10

$$10. \quad \frac{9}{16} \times \frac{2}{3} \times 1\frac{6}{15} \\ = \frac{9}{16} \times \frac{2}{3} \times \frac{21}{15} \\ = \frac{9}{16} \times \frac{2}{3} \times \frac{7}{5} \\ = \frac{21}{40}$$

11. $\frac{1}{8}$

12. $\frac{1}{20}$

$$13. \quad 2\frac{1}{3} \times \frac{5}{8} \times \frac{6}{7} \\ = \frac{7}{3} \times \frac{5}{8} \times \frac{6}{7} \\ = \frac{5}{4} = 1\frac{1}{4}$$

14. $\frac{1}{63}$

$$15. \quad \frac{6}{11} \times \frac{26}{35} \times 1\frac{9}{13} \times \frac{7}{12} \\ = \frac{6}{11} \times \frac{26}{35} \times \frac{22}{13} \times \frac{7}{12} \\ = \frac{2}{5}$$

$$16. \quad \frac{3}{8} \div \frac{1}{4} = \frac{3}{8} \times \frac{4}{1} \\ = \frac{3}{2} = 1\frac{1}{2}$$

$$17. \quad \frac{3}{5} \div \frac{10}{12} = \frac{3}{5} \times \frac{12}{10} \\ = \frac{18}{25}$$

$$\begin{aligned} 18. \quad \frac{10}{12} \div \frac{3}{5} &= \frac{10}{12} \times \frac{5}{3} \\ &= \frac{25}{18} = 1\frac{7}{18} \end{aligned}$$

$$\begin{aligned} 19. \quad 4\frac{1}{2} \div \frac{1}{4} &= \frac{9}{2} \div \frac{1}{4} \\ &= \frac{9}{2} \times \frac{4}{1} \\ &= 18 \end{aligned}$$

$$\begin{aligned} 20. \quad 18\frac{2}{3} \div 6 &= \frac{56}{3} \div 6 \\ &= \frac{56}{3} \times \frac{1}{6} \\ &= \frac{28}{9} = 3\frac{1}{9} \end{aligned}$$

$$\begin{aligned} 21. \quad 15 \div \frac{3}{8} \\ &= 15 \times \frac{8}{3} \\ &= 40 \end{aligned}$$

$$\begin{aligned} 22. \quad \frac{77}{6} \div 6 &= \frac{77}{6} \times \frac{1}{6} \\ &= \frac{77}{36} = 2\frac{5}{36} \end{aligned}$$

$$\begin{aligned} 23. \quad \frac{7}{11} \div \frac{3}{5} &= \frac{7}{11} \times \frac{5}{3} \\ &= \frac{35}{33} = 1\frac{2}{33} \end{aligned}$$

$$\begin{aligned} 24. \quad 7 \div 3\frac{1}{8} &= 7 \div \frac{25}{8} \\ &= 7 \times \frac{8}{25} \\ &= \frac{56}{25} = 2\frac{6}{25} \end{aligned}$$

$$\begin{aligned} 25. \quad \frac{2}{5} \times 3\frac{2}{3} \div \frac{3}{4} &= \frac{2}{5} \times \frac{11}{3} \times \frac{4}{3} \\ &= \frac{88}{45} = 1\frac{43}{45} \end{aligned}$$

$$\begin{aligned} 26. \quad \frac{7}{8} \times \frac{1}{2} \div \frac{2}{7} &= \frac{7}{8} \times \frac{1}{2} \times \frac{7}{2} \\ &= \frac{49}{32} = 1\frac{17}{32} \end{aligned}$$

$$\begin{aligned} 27. \quad \frac{16}{5} \times \frac{3}{2} \times \frac{10}{4} \div 5\frac{1}{3} \\ &= \frac{16}{5} \times \frac{3}{2} \times \frac{10}{4} \div \frac{16}{3} \\ &= \frac{16}{5} \times \frac{3}{2} \times \frac{10}{4} \times \frac{3}{16} \\ &= \frac{9}{4} = 2\frac{1}{4} \end{aligned}$$

$$\begin{aligned} 28. \quad 6 \times 6 \times \frac{21}{7} \div 48 \\ &= 6 \times 6 \times \frac{21}{7} \times \frac{1}{48} \\ &= \frac{9}{4} = 2\frac{1}{4} \end{aligned}$$

$$\begin{aligned} 29. \quad \frac{7}{9} \times \frac{3}{8} \div \frac{28}{81} \\ &= \frac{7}{9} \times \frac{3}{8} \times \frac{81}{28} \\ &= \frac{27}{32} \end{aligned}$$

$$\begin{aligned} 30. \quad 2\frac{1}{3} \times \frac{5}{8} \div \frac{10}{4} \\ &= \frac{7}{3} \times \frac{5}{8} \times \frac{4}{10} \\ &= \frac{7}{12} \end{aligned}$$

$$\begin{aligned} 31. \quad \frac{2}{7} \times \frac{5}{9} \times \frac{3}{10} \div 6 \\ &= \frac{2}{7} \times \frac{5}{9} \times \frac{3}{10} \times \frac{1}{6} \\ &= \frac{1}{126} \end{aligned}$$

$$\begin{aligned} 32. \quad \frac{9}{4} \times \frac{9}{4} \times \frac{21}{7} \div 81 \\ &= \frac{9}{4} \times \frac{9}{4} \times \frac{21}{7} \times \frac{1}{81} \\ &= \frac{3}{16} \end{aligned}$$

$$\begin{aligned} 33. \quad \frac{7}{16} \div \frac{3}{8} \times \frac{1}{2} \\ &= \frac{7}{16} \times \frac{8}{3} \times \frac{1}{2} \\ &= \frac{7}{12} \end{aligned}$$

$$\begin{aligned}
 34. \quad & \frac{5}{8} \div \frac{25}{64} \times \frac{5}{6} \\
 &= \frac{5}{8} \times \frac{64}{25} \times \frac{5}{6} \\
 &= \frac{4}{3} = 1\frac{1}{3}
 \end{aligned}$$

$$35. \quad \frac{3}{4} \times 42 \text{ gal} = \frac{126}{4} \text{ gal} = \frac{63}{2} \text{ gal} = 31\frac{1}{2} \text{ gal}$$

$$\begin{aligned}
 36. \quad \text{a. } A &= l \times w \\
 A &= 6\frac{1}{3} \text{ ft} \times 3\frac{3}{4} \text{ ft} \\
 &= \frac{19}{3} \text{ ft} \times \frac{15}{4} \text{ ft} \\
 &= \frac{95}{4} \text{ ft}^2 = 23\frac{3}{4} \text{ ft}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } P &= 2l + 2w \\
 P &= 2 \times \left(6\frac{1}{3} \text{ ft}\right) + 2 \times \left(3\frac{3}{4} \text{ ft}\right) \\
 &= 2 \times \frac{19}{3} \text{ ft} + 2 \times \frac{15}{4} \text{ ft} \\
 &= \frac{38}{3} \text{ ft} + \frac{15}{2} \text{ ft} \\
 &= \frac{76}{6} \text{ ft} + \frac{45}{6} \text{ ft} \\
 &= \frac{121}{6} \text{ ft} = 20\frac{1}{6} \text{ ft}
 \end{aligned}$$

$$37. \quad 7 \times 6\frac{1}{2} \text{ in.} = 7 \times \frac{13}{2} \text{ in.} = \frac{91}{2} \text{ in.} = 45\frac{1}{2} \text{ in.}$$

$$\begin{aligned}
 39. \quad & \frac{684\frac{1}{4} \text{ mi}}{5\frac{2}{3} \text{ h}} = \frac{\frac{2737}{4} \text{ mi}}{\frac{17}{3} \text{ h}} = \frac{2737}{4} \times \frac{3}{17} \text{ mi/h} \\
 &= \frac{483}{4} \text{ mi/h} = 120\frac{3}{4} \text{ mi/h}
 \end{aligned}$$

$$42. \quad \frac{17 \text{ ft}}{4\frac{1}{2} \text{ ft}} = \frac{17 \text{ ft}}{\frac{9}{2} \text{ ft}} = 17 \times \frac{2}{9} = \frac{34}{9} = 3\frac{7}{9} \text{ lengths}$$

$$\begin{aligned}
 17 \text{ ft} - 3 \times 4\frac{1}{2} \text{ ft} &= 17 \text{ ft} - 3 \times \frac{9}{2} \text{ ft} \\
 &= \frac{34}{2} \text{ ft} - \frac{27}{2} \text{ ft} = \frac{7}{2} \text{ ft} = 3\frac{1}{2} \text{ ft}
 \end{aligned}$$

There will be three $4\frac{1}{2}$ ft pieces and one $4\frac{1}{2}$ ft piece.

38. Length of one cut:

$$\begin{aligned}
 & 1\frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + \frac{1}{16} \text{ in.} \\
 &= \frac{7}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + \frac{1}{16} \text{ in.} \\
 &= 21\frac{1}{16} \text{ in.} = \frac{337}{16} \text{ in.}
 \end{aligned}$$

Length of pipe:

$$\begin{aligned}
 & 6\frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} \\
 &= \frac{27}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} \\
 &= 81 \text{ in.}
 \end{aligned}$$

Number of pieces:

$$\begin{aligned}
 \frac{81 \text{ in.}}{\frac{337}{16} \text{ in.}} &= \frac{81}{1} \times \frac{16}{337} \\
 &= \frac{1296}{337} = 3\frac{285}{337} \\
 &= 3 \text{ pieces}
 \end{aligned}$$

Remaining length:

$$\begin{aligned}
 81 \text{ in.} - 3 \times \frac{337}{16} \text{ in.} &= \frac{1296}{16} \text{ in.} - \frac{1011}{16} \text{ in.} \\
 &= \frac{285}{16} \text{ in.} = 17\frac{13}{16} \text{ in.} \\
 &= 12 \text{ in.} + 5\frac{13}{16} \text{ in.} \\
 &= 1 \text{ ft } 5\frac{13}{16} \text{ in.}
 \end{aligned}$$

$$40. \quad 5 \times 3\frac{1}{4} \text{ h} = 5 \times \frac{13}{4} \text{ h} = \frac{65}{4} \text{ h} = 16\frac{1}{4} \text{ h}$$

$$41. \quad 9 \times 3\frac{2}{3} \text{ ft} = 9 \times \frac{11}{3} \text{ ft} = 33 \text{ ft}$$

$$43. \text{ board feet} = \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12}$$

$$\text{board feet} = \frac{10 \times 2 \text{ in.} \times 4 \text{ in.} \times 12 \text{ ft}}{12} = 80 \text{ bd ft}$$

$$44. \text{ board feet} = \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12}$$

$$\text{board feet} = \frac{24 \times 4 \text{ in.} \times 4 \text{ in.} \times 16 \text{ ft}}{12} = 512 \text{ bd ft}$$

$$45. \text{ board feet} = \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12}$$

$$\text{board feet} = \frac{175 \times 1 \text{ in.} \times 8 \text{ in.} \times 14 \text{ ft}}{12} = 1633\frac{1}{3} \text{ bd ft}$$

$$46. 8 \times 5\frac{3}{4} \text{ in.} = 8 \times \frac{23}{4} \text{ in.} = 46 \text{ in.}$$

$$\begin{aligned} 47. 4\frac{9}{32} \text{ in.} - 2 \times \frac{7}{32} \text{ in.} &= 4\frac{9}{32} \text{ in.} - \frac{14}{32} \text{ in.} \\ &= 3\frac{41}{32} \text{ in.} - \frac{14}{32} \text{ in.} \\ &= 3\frac{27}{32} \text{ in.} \end{aligned}$$

48. There will be 8 spaces between the rivets.

$$\begin{aligned} 8 \times 2\frac{5}{16} \text{ in.} &= 8 \times \frac{37}{16} \text{ in.} \\ &= \frac{37}{2} \text{ in.} = 18\frac{1}{2} \text{ in.} \end{aligned}$$

49. There will be 15 spaces between the rivets.

$$\begin{aligned} \frac{28\frac{1}{8} \text{ in.}}{15} &= 28\frac{1}{8} \text{ in.} \times \frac{1}{15} \\ &= \frac{15}{8} \text{ in.} = 1\frac{7}{8} \text{ in.} \end{aligned}$$

$$\begin{aligned} 50. \quad &\frac{1}{2} \times 12\frac{5}{8} \text{ in.} + 5\frac{3}{4} \text{ in.} + \frac{1}{2} \times 15\frac{9}{16} \text{ in.} \\ &= \frac{1}{2} \times \frac{101}{8} \text{ in.} + \frac{23}{4} \text{ in.} + \frac{1}{2} \times \frac{249}{16} \text{ in.} \\ &= \frac{101}{16} \text{ in.} + \frac{23}{4} \text{ in.} + \frac{249}{32} \text{ in.} \\ &= \frac{202}{32} \text{ in.} + \frac{184}{32} \text{ in.} + \frac{249}{32} \text{ in.} \\ &= \frac{635}{32} \text{ in.} = 19\frac{27}{32} \text{ in.} \end{aligned}$$

51. There will be $3 + 2 + 6 + 1 = 12$ cuts.

Total lengths of the pieces:

$$3 \times 2\frac{1}{8} \text{ in.} = 6\frac{3}{8} \text{ in.}$$

$$2 \times 5\frac{3}{4} \text{ in.} = 11\frac{1}{2} \text{ in.}$$

$$6 \times \frac{7}{8} \text{ in.} = 5\frac{1}{4} \text{ in.}$$

$$1 \times 3\frac{1}{2} \text{ in.} = 3\frac{1}{2} \text{ in.}$$

$$12 \times \frac{1}{16} \text{ in.} = \frac{3}{4} \text{ in.}$$

Remaining length:

$$36 \text{ in.} = 36 \text{ in.}$$

$$-6\frac{3}{8} \text{ in.} = -6\frac{3}{8} \text{ in.}$$

$$-11\frac{1}{2} \text{ in.} = -11\frac{4}{8} \text{ in.}$$

$$-5\frac{1}{4} \text{ in.} = -5\frac{2}{8} \text{ in.}$$

$$-3\frac{1}{2} \text{ in.} = -3\frac{4}{8} \text{ in.}$$

$$-\frac{3}{4} \text{ in.} = -\frac{6}{8} \text{ in.}$$

$$= \frac{69}{8} \text{ in.} = 8\frac{5}{8} \text{ in.}$$

52. a. $2 \text{ ft } 6 \text{ in.} = 30 \text{ in.}$

$$\frac{30 \text{ in.}}{2\frac{1}{2} \text{ in.}} = \frac{30 \text{ in.}}{\frac{5}{2} \text{ in.}} = 30 \times \frac{2}{5} = 12 \text{ pins}$$

b. $2\frac{1}{2} \text{ in.} + \frac{1}{16} \text{ in.} = 2\frac{8}{16} \text{ in.} + \frac{1}{16} \text{ in.}$

$$= 2\frac{9}{16} \text{ in.}$$

$$\frac{30 \text{ in.}}{2\frac{9}{16} \text{ in.}} = \frac{30 \text{ in.}}{\frac{41}{16} \text{ in.}}$$

$$= 30 \times \frac{16}{41}$$

$$= \frac{480}{41} = 11\frac{29}{41} \text{ or } 11 \text{ pins}$$

54. $\frac{318 \text{ in.}}{4} = \frac{159}{2} \text{ in.} = 79\frac{1}{2} \text{ in.}$

55. $V = lwh$

$$V = (4 \text{ ft}) \left(2\frac{2}{3} \text{ ft} \right) \left(\frac{1}{4} \text{ ft} \right)$$

$$= (4 \text{ ft}) \left(\frac{8}{3} \text{ ft} \right) \left(\frac{1}{4} \text{ ft} \right)$$

$$= \frac{8}{3} \text{ ft}^3 = 2\frac{2}{3} \text{ ft}^3$$

53. Number of revolutions = $\frac{9\frac{9}{64} \text{ in.}}{\frac{3}{128} \text{ in.}}$

$$= \frac{585}{64} \text{ in.}$$

$$= \frac{64}{3} \text{ in.}$$

$$= \frac{585}{64} \times \frac{128}{3}$$

$$= 390 \text{ revolutions}$$

$$\text{Time} = 390 \text{ revolutions} \times \frac{1 \text{ min}}{45 \text{ revolutions}}$$

$$= \frac{26}{3} \text{ min} = 8\frac{2}{3} \text{ min}$$

56. $6 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 72 \text{ in.}$

$$\frac{72 \text{ in.}}{5\frac{1}{4} \text{ in.}} = \frac{72}{\frac{21}{4}}$$

$$= 72 \times \frac{4}{21}$$

$$= \frac{96}{7} = 13\frac{5}{7} \text{ or } 13 \text{ lengths}$$

$$57. \quad \frac{7\frac{1}{2} \text{ h}}{6} = \frac{15}{2} \frac{\text{h}}{6}$$

$$= \frac{15}{2} \text{ h} \times \frac{1}{6}$$

$$= \frac{5}{4} \text{ h} = 1\frac{1}{4} \text{ h}$$

$$58. \quad 11 \text{ cars} \times \frac{3}{4} \text{ h/car} = \frac{33}{4} \text{ h} = 8\frac{1}{4} \text{ h}$$

$$59. \quad \text{Power} = (\text{voltage}) \times (\text{current})$$

$$\text{Power} = 12\frac{1}{2} \times 220$$

$$= \frac{25}{2} \times 220$$

$$= 2750 \text{ W}$$

$$60. \quad V = IR$$

$$V = 4\frac{1}{4} \times 24\frac{1}{2}$$

$$= \frac{17}{4} \times \frac{49}{2} = \frac{833}{8} = 104\frac{1}{8} \text{ V}$$

$$61. \quad V = I^2 R$$

$$V = \left(3\frac{3}{4}\right)^2 \times 5\frac{1}{3}$$

$$= \left(\frac{15}{4}\right)^2 \times \frac{16}{3}$$

$$= \frac{225}{16} \times \frac{16}{3} = \frac{225}{3} = 75 \text{ W}$$

$$65. \quad \text{a. There will be 6 spaces between the outlets.}$$

$$\frac{43\frac{1}{2} \text{ ft}}{6} = \frac{87}{2} \frac{\text{ft}}{6}$$

$$= \frac{87}{2} \text{ ft} \times \frac{1}{6} = 7\frac{1}{4} \text{ ft or } 7 \text{ ft } 3 \text{ in.}$$

$$\text{b. } 43\frac{1}{2} \text{ ft} + 2\left(\frac{3.0 \text{ in.}}{2}\right) = 43 \text{ ft } 6 \text{ in.} + 3 \text{ in.}$$

$$= 43 \text{ ft } 9 \text{ in.}$$

$$\text{c. There are 3 spaces between the outlets.}$$

$$3(7 \text{ ft } 3 \text{ in.}) + \frac{3 \text{ in.}}{2} = 21 \text{ ft } 9 \text{ in.} + 1.5 \text{ in.}$$

$$= 21 \text{ ft } 10.5 \text{ in.}$$

$$62. \quad 12 \times 8\frac{1}{2} \text{ ft} = 102 \text{ ft}$$

$$7 \times 18\frac{1}{2} \text{ ft} = 129\frac{1}{2} \text{ ft}$$

$$24 \times 1\frac{3}{4} \text{ ft} = 42 \text{ ft}$$

$$12 \times 6\frac{1}{2} \text{ ft} = 78 \text{ ft}$$

$$2 \times 34\frac{1}{4} \text{ ft} = 68\frac{1}{2} \text{ ft}$$

$$= 420 \text{ ft}$$

$$63. \quad \text{Current} = (\text{voltage}) \div (\text{resistance})$$

$$\text{Current} = 24 \div 10\frac{1}{2}$$

$$= 24 \div \frac{21}{2}$$

$$= 24 \times \frac{2}{21} = \frac{16}{7} \text{ A} = 2\frac{2}{7} \text{ A}$$

$$64. \quad \text{There will be 77 lengths of wire and}$$

$$\frac{13}{31} \times \frac{31}{8} \text{ in.} = \frac{13}{8} \text{ in.} = 1\frac{5}{8} \text{ in. remaining.}$$

$$\frac{25 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}}}{3\frac{7}{8} \text{ in.}} = \frac{300 \text{ in.}}{\frac{31}{8} \text{ in.}}$$

$$= 300 \times \frac{13}{31}$$

$$= 77\frac{13}{31}$$

$$66. \quad 120 \text{ acres} \times 1\frac{3}{4} \text{ gal/acres}$$

$$= 120 \text{ acres} \times \frac{7}{4} \text{ gal/acres}$$

$$= 210 \text{ gal}$$

$$67. \quad \frac{60 \text{ gal}}{\frac{3}{4} \text{ gal}} = 60 \times \frac{4}{3} = 80$$

$$80 \times \frac{1}{2} \text{ lb} = 40 \text{ lb}$$

$$\begin{aligned}
 68. \quad \frac{500 \text{ lb}}{22\frac{1}{2} \text{ lb}} &= \frac{500}{\frac{45}{2}} \\
 &= 500 \times \frac{2}{45} \\
 &= \frac{200}{9} \text{ ft}^3 = 22\frac{2}{9} \text{ ft}^3 \\
 15 \text{ tons} &= 15 \text{ tons} \times \frac{2000 \text{ lb}}{1 \text{ ton}} = 30,000 \text{ lb} \\
 \frac{30,000 \text{ lb}}{22\frac{1}{2} \text{ lb}} &= \frac{30,000}{\frac{45}{2}} \\
 &= 30,000 \times \frac{2}{45} \\
 &= \frac{4000}{3} \text{ ft}^3 = 1333\frac{1}{3} \text{ ft}^3
 \end{aligned}$$

70. a. Gravel: $V = lwh$

$$\begin{aligned}
 V &= 120 \text{ ft} \times 180 \text{ ft} \times 4 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)^3 \\
 &= \frac{800}{3} \text{ yd}^3 = 266\frac{2}{3} \text{ yd}^3
 \end{aligned}$$

Concrete: $V = lwh$

$$\begin{aligned}
 V &= 120 \text{ ft} \times 180 \text{ ft} \times 3\frac{1}{2} \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)^3 \\
 &= \frac{700}{3} \text{ yd}^3 = 233\frac{1}{3} \text{ yd}^3
 \end{aligned}$$

b. Concrete cost = $233\frac{1}{3} \text{ yd}^3 \times \$94/\text{yd}^3 = \$21,933.33$

$$\text{Gravel cost} = 266\frac{2}{3} \text{ yd}^3 \times \frac{2500 \text{ lb}}{1 \text{ yd}^3} \times \frac{1 \text{ ton}}{2000 \text{ lb}} \times \$14/\text{ton} = \$4666.67$$

$$\text{Total cost} = \$21,933.33 + \$4666.67 = \$26,600$$

$$\begin{aligned}
 71. \quad \frac{1}{5} \times 2\frac{1}{2} \text{ lb} &= \frac{1}{5} \times \frac{5}{2} \text{ lb} \\
 &= \frac{1}{2} \text{ oz}
 \end{aligned}$$

$$72. \quad \frac{45 \text{ mg}}{10 \text{ mg}} = \frac{9}{2} \text{ tablets} = 4\frac{1}{2} \text{ tablets}$$

$$73. \quad \frac{15 \text{ mg}}{30 \text{ mg}} = \frac{1}{2} \text{ tablet}$$

$$74. \quad \frac{45 \text{ mg}}{30 \text{ mg}} = \frac{3}{2} \text{ tablets} = 1\frac{1}{2} \text{ tablets}$$

$$\begin{aligned}
 69. \quad \frac{448 \text{ lb} \times \frac{1 \text{ bu}}{56 \text{ lb}}}{\frac{1}{20} \text{ acre}} &= \frac{8 \text{ bu}}{\frac{1}{20} \text{ acre}} \\
 &= \frac{8}{\frac{1}{20}} \text{ bu/acre} \\
 &= 8 \times 20 \text{ bu/acre} \\
 &= 160 \text{ bu/acre}
 \end{aligned}$$

$$\begin{aligned}
 75. \quad 2 \times 7\frac{1}{4} \text{ lb} &= 2 \times \frac{29}{4} \text{ lb} \\
 &= \frac{58}{4} \text{ lb} \\
 &= \frac{29}{2} \text{ lb} = 14\frac{1}{2} \text{ lb}
 \end{aligned}$$

$$\begin{aligned}
 76. \quad \frac{1}{20} \times 7\frac{1}{2} \text{ lb} &= \frac{1}{20} \times \frac{15}{2} \text{ lb} \\
 &= \frac{3}{8} \text{ lb}
 \end{aligned}$$

$$77. \quad \frac{12 \text{ oz}}{\frac{1}{2} \text{ oz}} = 12 \times \frac{2}{1} = 24 \text{ doses}$$

$$78. \quad 3 \times 2\frac{1}{2} \text{ oz} = 3 \times \frac{5}{2} \text{ oz} \\ = \frac{15}{2} \text{ oz} \\ = 7\frac{1}{2} \text{ oz}$$

$$79. \quad 5 \times \frac{1}{2} \text{ tsp} = \frac{5}{2} \text{ tsp} \\ = 2\frac{1}{2} \text{ tsp}$$

$$80. \quad 6 \times 6\frac{1}{8} \text{ in.} + 5 \times \frac{1}{4} \text{ in.} \\ = 6 \times \frac{49}{8} \text{ in.} + 5 \times \frac{1}{4} \text{ in.} \\ = \frac{147}{4} \text{ in.} + \frac{5}{4} \text{ in.} \\ = \frac{152}{4} \text{ in.} = 38 \text{ in.}$$

$$81. \quad \text{a.} \quad \frac{3 \text{ in.} - 1\frac{1}{2} \text{ in.}}{2} = \frac{1\frac{1}{2} \text{ in.}}{2} \\ = \frac{\frac{3}{2} \text{ in.}}{2} \\ = \frac{3}{2} \text{ in.} \times \frac{1}{2} \\ = \frac{3}{4} \text{ in.}$$

$$\text{b.} \quad \text{Area} = \text{Outer area} - \text{Inner area} \\ = 3 \text{ in.} \times 2\frac{3}{4} \text{ in.} - 1\frac{1}{2} \text{ in.} \times 2 \text{ in.} \\ = 3 \text{ in.} \times \frac{11}{4} \text{ in.} - \frac{3}{2} \text{ in.} \times 2 \text{ in.} \\ = \frac{33}{4} \text{ in}^2 - 3 \text{ in}^2 \\ = \frac{33}{4} \text{ in}^2 - \frac{12}{4} \text{ in}^2 = \frac{21}{4} \text{ in}^2 \\ \text{Volume} = Al \\ = \frac{21}{4} \text{ in}^2 \times 12 \text{ in.} = 63 \text{ in}^3$$

$$82. \quad \text{Length of one cut:}$$

$$3\frac{1}{8} \text{ in.} + \frac{1}{8} \text{ in.} \\ = 3\frac{2}{8} \text{ in.} = 3\frac{1}{4} \text{ in.} = \frac{13}{4} \text{ in.}$$

Number of pieces:

$$\frac{36 \text{ in.}}{\frac{13}{4} \text{ in.}} = \frac{36}{1} \times \frac{4}{13} \\ = \frac{144}{13} = 11\frac{1}{13} \\ = 11 \text{ pieces}$$

$$83. \quad R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} \\ R_T = \frac{1}{\frac{1}{12 \Omega} + \frac{1}{6 \Omega}} \\ = \frac{1}{\frac{1}{12 \Omega} + \frac{2}{12 \Omega}} \\ = \frac{1}{\frac{3}{12 \Omega}} = \frac{12 \Omega}{3} = 4 \Omega$$

$$84. \quad R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} \\ R_T = \frac{1}{\frac{1}{40 \Omega} + \frac{1}{60 \Omega} + \frac{1}{80 \Omega}} \\ = \frac{1}{\frac{6}{240 \Omega} + \frac{4}{240 \Omega} + \frac{3}{240 \Omega}} \\ = \frac{1}{\frac{13}{240 \Omega}} = \frac{240 \Omega}{13} = 18\frac{6}{13} \Omega$$

$$\begin{aligned}
 85. \quad R_T &= \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}} \\
 R_T &= \frac{1}{\frac{1}{6\Omega} + \frac{1}{12\Omega} + \frac{1}{24\Omega} + \frac{1}{48\Omega}} \\
 &= \frac{1}{\frac{8}{48\Omega} + \frac{4}{48\Omega} + \frac{2}{48\Omega} + \frac{1}{48\Omega}} \\
 &= \frac{1}{\frac{15}{48\Omega}} = \frac{48\Omega}{15} = 3\frac{3}{5}\Omega = 3\frac{1}{5}\Omega
 \end{aligned}$$

86. There will be 4 cuts.

$$\begin{aligned}
 5 \times 18 \text{ in.} + 4 \times \frac{1}{8} \text{ in.} &= 90 \text{ in.} + \frac{1}{2} \text{ in.} \\
 &= 90\frac{1}{2} \text{ in.} \\
 &= 7 \text{ ft } 6\frac{1}{2} \text{ in.}
 \end{aligned}$$

$$87. \quad \text{Red flowers} = 300 \times \frac{1}{4} = 75 \text{ flowers}$$

$$\text{White flowers} = 300 \times \frac{3}{4} = 225 \text{ flowers}$$

$$88. \quad \frac{27 \text{ ft}}{1\frac{1}{2} \text{ ft}} = \frac{27}{\frac{3}{2}} = 27 \times \frac{2}{3} = 18 \text{ lengths}$$

$$89. \quad \frac{1\frac{1}{2} \text{ cups}}{\frac{1}{4} \text{ cup}} = \frac{\frac{3}{2}}{\frac{1}{4}} = \frac{3}{2} \times \frac{4}{1} = 6 \text{ scoops}$$

$$90. \quad \text{Dough for one pie} = \frac{1}{4} \text{ lb} + \frac{1}{8} \text{ lb}$$

$$= \frac{1}{4} \text{ lb} + \frac{3}{8} \text{ lb}$$

$$\text{Number of pies} = \frac{12 \text{ lb}}{\frac{3}{8} \text{ lb}}$$

$$= 12 \times \frac{8}{3} = 32 \text{ pies}$$

$$\begin{aligned}
 91. \quad 14 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} &= \frac{14}{16} \text{ lb} = \frac{7}{8} \text{ lb} \\
 16\frac{1}{4} \text{ lb} - 5\frac{1}{2} \text{ lb} &= 15\frac{5}{4} \text{ lb} - 5\frac{2}{4} \text{ lb} \\
 &= 10\frac{3}{4} \text{ lb} \\
 10\frac{3}{4} \text{ lb} &= \frac{43}{4} \text{ lb} \\
 \frac{43}{4} \text{ lb} &= \frac{\frac{43}{4}}{\frac{7}{8}} \text{ lb} \\
 &= \left(\frac{43}{4}\right)\left(\frac{8}{7}\right) \\
 &= \frac{86}{7} = 12\frac{2}{7}
 \end{aligned}$$

Number of whole steaks = 12

$$92. \quad 12 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 192 \text{ oz}$$

$$192 \text{ oz} - 28 \text{ oz} = 164 \text{ oz}$$

$$\begin{aligned}
 \frac{164 \text{ oz}}{192 \text{ oz}} &= \frac{41}{48} \\
 &= \frac{4 \cdot 41}{4 \cdot 48} = \frac{41}{48}
 \end{aligned}$$

$$93. \quad 10\frac{1}{3} \text{ gal} - 3 \times 2\frac{1}{2} \text{ gal}$$

$$= \frac{31}{3} \text{ gal} - 3 \times \frac{5}{2} \text{ gal}$$

$$= \frac{31}{3} \text{ gal} - \frac{15}{2} \text{ gal}$$

$$= \frac{62}{6} \text{ gal} - \frac{45}{6} \text{ gal}$$

$$= \frac{17}{6} \text{ gal} = 2\frac{5}{6} \text{ gal}$$

$$94. \quad \frac{5}{8} + \frac{1}{4} = \frac{5}{8} + \frac{2}{8} = \frac{7}{8} \text{ loin remaining}$$

$$\frac{1}{8} \times 3 = \frac{3}{8} \text{ loin for soup}$$

Section 1.9: The U.S. System of Weights and Measures

$$1. \quad 3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 7 \text{ in.} = 43 \text{ in.}$$

$$2. \quad 6 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} + 4 \text{ ft} = 22 \text{ ft}$$

3. $5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} + 3 \text{ oz} = 83 \text{ oz}$
4. $7 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 252 \text{ in.}$
 $3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 36 \text{ in.}$
 $6 \text{ in.} = \underline{6 \text{ in.}}$
 $= 294 \text{ in.}$
5. $4 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} + 1 \text{ pt} = 9 \text{ pt}$
6. $6 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 48 \text{ pt}$
 $3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = \underline{6 \text{ pt}}$
 $= 54 \text{ pt}$
7. $3 \text{ tbs} \times \frac{3 \text{ tsp}}{1 \text{ tbs}} = 9 \text{ tsp}$
8. $2 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 16 \text{ pt}$
9. $8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$
10. $5 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 15 \text{ ft}$
11. $3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 6 \text{ pt}$
12. $4 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 21,120 \text{ ft}$
13. $96 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 8 \text{ ft}$
14. $72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$
15. $10 \text{ pt} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 5 \text{ qt}$
16. $54 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 4\frac{1}{2} \text{ ft}$
17. $88 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 5\frac{1}{2} \text{ lb}$
18. $32 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 2 \text{ pt}$
19. $14 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 3\frac{1}{2} \text{ gal}$
20. $3 \text{ bu} \times \frac{4 \text{ pk}}{1 \text{ bu}} = 12 \text{ pk}$
21. $56 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 3\frac{1}{2} \text{ pt}$
22. $7040 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 1\frac{1}{3} \text{ mi}$
23. $92 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 30\frac{2}{3} \text{ yd}$
24. $9000 \text{ lb} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 4\frac{1}{2} \text{ tons}$
25. $2 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 3520 \text{ yd}$
26. $6000 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 46\frac{7}{8} \text{ gal}$
27. $500 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 15\frac{5}{8} \text{ qt}$
28. $3 \text{ mi} \times \frac{320 \text{ rods}}{1 \text{ mi}} = 960 \text{ rods}$
29. $\frac{80 \text{ in.}}{12 \text{ in.}} = 6 \text{ r } 8 = 6 \text{ ft } 8 \text{ in.}$
30. $22,000 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 4\frac{1}{6} \text{ mi}$
31. $12\frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = \frac{51}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 153 \text{ in.}$
32. $15 \times 24 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 22\frac{1}{2} \text{ lb}$
33. $144 \text{ fl oz} + 24 \text{ fl oz} + 56 \text{ fl oz} = 224 \text{ fl oz}$
 $224 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 7 \text{ qt}$
34. $15 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{\frac{4}{25} \Omega}{1 \text{ ft}} = 7\frac{1}{5} \Omega$

35. $1 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1}{1000} \frac{\Omega}{\text{ft}} = \frac{66}{125} \Omega$
36. $4200 \text{ lb} + 600 \text{ lb} + 5800 \text{ lb} + 1300 \text{ lb} + 2100 \text{ lb} = 14,000 \text{ lb}$
 $14,000 \text{ lb} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 7 \text{ tons}$
37. $3\frac{3}{4} \text{ ft} \times 4\frac{2}{3} \text{ ft} = \frac{15}{4} \text{ ft} \times \frac{14}{3} \text{ ft} = \frac{35}{2} \text{ ft}$
 $\frac{35}{2} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 2520 \text{ in}^2$
38. a. $72 \text{ in.} + 68 \text{ in.} + 82 \text{ in.} = 222 \text{ in.}$
 $222 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 18\frac{1}{2} \text{ ft}$
 b. $18\frac{1}{2} \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 6\frac{1}{6} \text{ yd}$
39. a. $2 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 10,560 \text{ ft}$
 b. $10,560 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 3520 \text{ yd}$
40. a. $17\frac{1}{2} \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} = 70 \text{ qt}$
 b. $70 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 140 \text{ pt}$
41. $3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 48 \text{ oz}$
42. $2200 \frac{\text{ft}^3}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ s}} = 36\frac{2}{3} \text{ ft}^3/\text{s}$
43. $153 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 51 \text{ yd}$
44. $3 \text{ ft} \times 6 \text{ ft} \times 4 \text{ ft} = 72 \text{ ft}^3$
 $72 \text{ ft}^3 \times 62.4 \frac{\text{lb}}{\text{ft}^3} \times \frac{1 \text{ gal}}{8.34 \text{ lb}} = 538.7 \text{ gal}$
45. $561 \text{ ft} \times \frac{1 \text{ chain}}{66 \text{ ft}} = 8\frac{1}{2} \text{ chains}$
46. $12 \text{ fathoms} \times \frac{6 \text{ ft}}{1 \text{ fathom}} = 72 \text{ ft}$
47. $15 \text{ drams} \times \frac{27\frac{17}{50} \text{ grains}}{1 \text{ dram}} = 410\frac{1}{10} \text{ grains}$
48. $96 \text{ drams} \times \frac{1 \text{ oz}}{8 \text{ drams}} = 12 \text{ oz}$
49. $4500 \frac{\text{ft}}{\text{h}} \times \frac{1 \text{ h}}{60 \text{ min}} = 75 \frac{\text{ft}}{\text{min}}$
50. $28 \frac{\text{ft}}{\text{s}} \times \frac{60 \text{ s}}{1 \text{ min}} = 1680 \frac{\text{ft}}{\text{min}}$
51. $1\frac{1}{5} \frac{\text{mi}}{\text{s}} \times \frac{60 \text{ s}}{1 \text{ min}} = 72 \frac{\text{mi}}{\text{min}}$
52. $7200 \frac{\text{ft}}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ s}} = 120 \frac{\text{ft}}{\text{s}}$
53. $40 \frac{\text{mi}}{\text{h}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}}$
 $= 58\frac{2}{3} \frac{\text{ft}}{\text{s}}$
54. $64 \frac{\text{ft}}{\text{s}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}}$
 $= 43\frac{7}{11} \frac{\text{mi}}{\text{h}}$
55. $24 \frac{\text{in.}}{\text{s}} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{60 \text{ s}}{1 \text{ min}} = 120 \frac{\text{ft}}{\text{min}}$
56. $36 \frac{\text{in.}}{\text{s}} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}}$
 $= 2\frac{1}{22} \frac{\text{mi}}{\text{h}}$
57. $14 \text{ yd } 5 \text{ ft } 34 \text{ in.}$
 $= 14 \text{ yd } 7 \text{ ft } 10 \text{ in.}$
 $= 16 \text{ yd } 1 \text{ ft } 10 \text{ in.}$
58. $(8 \text{ yd } 1 \text{ ft } 3 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$
 $= (8 \text{ yd } 0 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$
 $= (7 \text{ yd } 3 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$
 $= 5 \text{ yd } 1 \text{ ft } 9 \text{ in.}$
59. $3 \times 1.5 \text{ tons} \times \frac{2000 \text{ lb}}{1 \text{ ton}} = 9000 \text{ lb}$

$$60. \quad 34,850 \text{ ft}^2 \times \frac{1 \text{ acre}}{43,560 \text{ ft}^2} = 0.8 \text{ acres}$$

$$62. \quad 3 \text{ tbs} \times \frac{3 \text{ tsp}}{1 \text{ tbs}} = 9 \text{ tsp}$$

$$61. \quad 4 \text{ rods} \times \frac{16.5 \text{ ft}}{1 \text{ rod}} = 66 \text{ ft}$$
$$\frac{66 \text{ ft}}{3 \text{ ft}} = 22 \text{ paces}$$

$$63. \quad 7 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} = 28 \text{ qt}$$

$$64. \quad 1\frac{1}{4} \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} \times \frac{2 \text{ cups}}{1 \text{ pt}} \times \frac{8 \text{ fl oz}}{1 \text{ cup}} = 160 \text{ fl oz}$$
$$\frac{160 \text{ fl oz}}{1\frac{1}{3} \text{ fl oz}} = 120 \text{ servings}$$

$$65. \quad 2 \text{ gal} = 2 \text{ gal}$$
$$2 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = \frac{1}{2} \text{ gal}$$
$$3 \text{ pt} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = \frac{3}{8} \text{ gal}$$
$$\frac{1}{2} \text{ gal} = \frac{1}{2} \text{ gal}$$
$$= 3\frac{3}{8} \text{ gal}$$

Unit 1B Review

$$1. \quad \frac{9}{15} = \frac{3 \cdot 3}{3 \cdot 5} = \frac{3}{5}$$

$$2. \quad \frac{48}{54} = \frac{2 \cdot 3 \cdot 8}{2 \cdot 3 \cdot 9} = \frac{8}{9}$$

$$3. \quad \frac{27}{6} = 4 \text{ r } 3 = 4\frac{3}{6} = 4\frac{1}{2}$$

$$4. \quad \frac{(3 \times 5) + 2}{5} = \frac{17}{5}$$

$$5. \quad \frac{5}{6} + \frac{2}{3} = \frac{5}{6} + \frac{4}{6} = \frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$$

$$6. \quad 5\frac{3}{8} - 2\frac{5}{12}$$
$$= 5\frac{9}{24} - 2\frac{10}{24}$$
$$= 4\frac{33}{24} - 2\frac{10}{24}$$
$$2\frac{23}{24}$$

$$7. \quad \frac{4}{15}$$

$$8. \quad \frac{3}{4} \div 1\frac{5}{8}$$
$$= \frac{3}{4} \div \frac{13}{8}$$
$$= \frac{3}{4} \times \frac{8}{13}$$
$$= \frac{6}{13}$$

$$9. \quad 1\frac{2}{3} + 3\frac{5}{6} - 2\frac{1}{4}$$
$$= 1\frac{8}{12} + 3\frac{10}{12} - 2\frac{3}{12}$$
$$= 4\frac{18}{12} - 2\frac{3}{12}$$
$$= 2\frac{15}{12} = 3\frac{3}{12} = 3\frac{1}{4}$$

$$\begin{aligned}
 10. \quad & 4\frac{2}{3} \div 3\frac{1}{2} \times 1\frac{1}{2} \\
 &= \frac{14}{3} \div \frac{7}{2} \times \frac{3}{2} \\
 &= \frac{14}{3} \times \frac{2}{7} \times \frac{3}{2} \\
 &= \frac{4}{3} \times \frac{3}{2} \\
 &= 2
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & 72 \text{ in.} - 16\frac{3}{4} \text{ in.} - 24\frac{7}{8} \text{ in.} - 12\frac{5}{16} \text{ in.} - 3 \times \frac{1}{16} \text{ in.} \\
 &= 72 \text{ in.} - 16\frac{12}{16} \text{ in.} - 24\frac{14}{16} \text{ in.} - 12\frac{5}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 72 \text{ in.} - 16\frac{12}{16} \text{ in.} - 24\frac{14}{16} \text{ in.} - 12\frac{5}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 &= 72 \text{ in.} - 53\frac{34}{24} \text{ in.} \\
 &= 71\frac{24}{24} \text{ in.} - 54\frac{10}{24} \text{ in.} \\
 &= 16\frac{14}{24} \text{ in.} = 17\frac{7}{8} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 13. \quad & P = 2l + 2w \\
 & P = 2\left(6\frac{1}{4} \text{ in.}\right) + 2\left(2\frac{2}{3} \text{ in.}\right) \\
 &= 2\left(\frac{25}{4} \text{ in.}\right) + 2\left(\frac{8}{3} \text{ in.}\right) \\
 &= \frac{25}{2} \text{ in.} + \frac{16}{3} \text{ in.} \\
 &= \frac{75}{6} \text{ in.} + \frac{32}{6} \text{ in.} \\
 &= \frac{107}{6} \text{ in.} = 17\frac{5}{6} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & A = lw \\
 & A = \left(6\frac{1}{4} \text{ in.}\right)\left(2\frac{2}{3} \text{ in.}\right) \\
 &= \left(\frac{25}{4} \text{ in.}\right)\left(\frac{8}{3} \text{ in.}\right) \\
 &= \frac{50}{3} \text{ in}^2 = 16\frac{2}{3} \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & 7 \text{ in.} - 1\frac{7}{8} \text{ in.} - 1\frac{1}{2} \text{ in.} - 1\frac{1}{3} \text{ in.} - 1\frac{5}{12} \text{ in.} \\
 &= 7 \text{ in.} - 1\frac{21}{24} \text{ in.} - 1\frac{12}{24} \text{ in.} - 1\frac{8}{24} \text{ in.} - 1\frac{10}{24} \text{ in.} \\
 &= 7 \text{ in.} - 4\frac{51}{24} \text{ in.} \\
 &= 6\frac{24}{24} \text{ in.} - 6\frac{4}{24} \text{ in.} \\
 &= \frac{21}{24} \text{ in.} = \frac{7}{8} \text{ in.}
 \end{aligned}$$

$$15. \quad 4 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 48 \text{ in.}$$

$$16. \quad 24 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 8 \text{ yd}$$

$$17. \quad 3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 48 \text{ oz}$$

$$18. \quad 20 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 5 \text{ gal}$$

$$19. \quad \frac{60 \text{ mi}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 88 \text{ ft/s}$$

$$\begin{aligned}
 20. \quad & 14 \text{ ft } 4 \text{ in.} = 13 \text{ ft } 16 \text{ in.} \\
 & \quad \underline{8 \text{ ft } 8 \text{ in.}} = 8 \text{ ft } 8 \text{ in.} \\
 & \quad \quad = 5 \text{ ft } 8 \text{ in.}
 \end{aligned}$$

Section 1.10: Addition and Subtraction of Decimal Fractions

1. four thousandths

2. twenty-one thousandths

3. five ten-thousandths

4. seven and one-tenth

5. one and four hundred twenty-one hundred-thousandths
6. one thousand forty-two and seven thousandths
7. six and ninety-two thousandths
8. eight and one thousand four hundred sixty-one ten-thousandths
9. 5.02; $5\frac{2}{100} = 5\frac{1}{50}$
10. 123.006; $123\frac{6}{1999} = 123\frac{3}{500}$
11. 71.0021; $71\frac{21}{10,000}$
12. 0.065; $\frac{65}{1000} = \frac{13}{200}$
13. 43.0101; $43\frac{101}{10,000}$
14. 0.000563; $\frac{563}{1,000,000}$
15. 0.375
16. 0.64
17. $0.\overline{73}$
18. 0.4
19. 0.34
20. $1.\overline{2}$
21. $1.\overline{27}$
22. 5.12
23. $18.\overline{285714}$
24. 15.125
25. $34.\overline{2}$
26. $38.\overline{3}$
27. $\frac{7}{10}$
28. $\frac{6}{10} = \frac{3}{5}$
29. $\frac{11}{100}$
30. $\frac{75}{100} = \frac{3}{4}$
31. $\frac{8425}{10,000} = \frac{337}{400}$
32. $3\frac{14}{100} = 3\frac{7}{50}$
33. $10\frac{76}{100} = 10\frac{19}{25}$
34. $148\frac{255}{1000} = 148\frac{51}{200}$
35. 150.000
36. 207.165
37. 163.204
38. 244.037
39. 86.6
40. 1.58
41. 15.308
42. 123.588
43. 8.68
44. 8.94
45. 4.862
46. 130.09
47. 10.0507
48. 0.92454
49. $6.25\text{ ft} - 2.4\text{ ft} - 2.4\text{ ft} = 1.45\text{ ft}$, so the remaining piece will be $1.45\text{ ft} \times 2.4\text{ ft}$.
50. $10.25\text{ ft} + 15.4\text{ ft} + 14.1\text{ ft} = 39.75\text{ ft}$
51. $2.3\text{ h} + 3.1\text{ h} + 5.4\text{ h} = 10.8\text{ h}$
52. $125.5\text{ mi} + 110.3\text{ mi} + 97.8\text{ mi} = 333.6\text{ mi}$
53. $\frac{3}{8}\text{ in.} - \frac{1}{16}\text{ in.} = \frac{6}{16}\text{ in.} - \frac{1}{16}\text{ in.}$
 $= \frac{5}{16}\text{ in.} = 0.3125\text{ in.}$
54. $\$17.33 + \$11.58 + \$11.58 = \40.49
55. $a = 2.69\text{ cm} + 1.87\text{ cm} = 4.56\text{ cm}$
 $b = 8.32\text{ cm} - 3.45\text{ cm} = 4.87\text{ cm}$

56.
$$\begin{array}{r} 3.45 \text{ cm} \\ 1.87 \text{ cm} \\ 4.87 \text{ cm} \\ 2.69 \text{ cm} \\ 8.32 \text{ cm} \\ \underline{4.56 \text{ cm}} \\ 25.76 \text{ cm} \end{array}$$
57.
$$\begin{array}{r} 4.17 \text{ in.} \\ 1.30 \text{ in.} \\ 1.00 \text{ in.} \\ \underline{1.47 \text{ in.}} \\ 7.94 \text{ in.} \end{array}$$
58. $6.573 \text{ in.} - 0.938 \text{ in.} - 0.688 \text{ in.} - 1.313 \text{ in.} - 0.625 \text{ in.} - 1.501 \text{ in.} = 1.508 \text{ in.}$
59. $9.625 \text{ in.} = 9\frac{5}{8} \text{ in.}$
 $9\frac{5}{8} \text{ in.} \div 2 = 4\frac{5}{32} \text{ in.} = 4.8125 \text{ in.}$
60. $1.125 \text{ in.} - 0.046 \text{ in.} - 0.046 \text{ in.} = 1.033 \text{ in.}$
61.
$$\begin{array}{r} 0.3 \text{ A} \\ 0.105 \text{ A} \\ 0.45 \text{ A} \\ 0.93 \text{ A} \\ 0.27 \text{ A} \\ \underline{0.55 \text{ A}} \\ 2.605 \text{ A} \end{array}$$
62.
$$\begin{array}{r} 21.5 \Omega \\ 42.6 \Omega \\ 62.3 \Omega \\ 19.8 \Omega \\ \underline{32.2 \Omega} \\ 178.4 \Omega \end{array}$$
63.
$$\begin{array}{r} 15.7 \Omega \\ 40 \Omega \\ 25.5 \Omega \\ 0.6 \Omega \\ 1200 \Omega \\ \underline{115 \Omega} \\ 1396.8 \Omega \end{array}$$
72. $\$114.57 + \$145.36 + \$99.21 = \359.14
73. a. 1430.2 bbl
 b. $1697.6 \text{ bbl} - 1430.2 \text{ bbl} = 267.4 \text{ bbl}$
64.
$$\begin{array}{r} 3.2 \text{ V} \\ 5.1 \text{ V} \\ 0.45 \text{ V} \\ 0.03 \text{ V} \\ 0.8 \text{ V} \\ 0.007 \text{ V} \\ \underline{2 \text{ V}} \\ 11.587 \text{ V} \end{array}$$
65. $1.625 \text{ in.} - 1.093 \text{ in.} = 0.532 \text{ in.}$
66. $a = 13.47 \text{ cm} - 6.74 \text{ cm} - 4.89 \text{ cm}$
 $= 1.84 \text{ cm}$
 $b = 1.23 \text{ cm} + 1.79 \text{ cm}$
 $= 3.02 \text{ cm}$
 $c = (2.62 \text{ cm} - 0.98 \text{ cm}) \div 2$
 $= 0.82 \text{ cm}$
67. $(1.94 \text{ in.} - 1.50 \text{ in.}) \div 2 = 0.22 \text{ in.}$
68. $l = 2.375 \text{ in.} + 3.375 \text{ in.}$
 $= 5.75 \text{ in.}$
 $A = 1.250 \text{ in.} + 3.750 \text{ in.} + 1.250 \text{ in.}$
 $= 6.25 \text{ in.}$
69. $4.125 \text{ in.} - 0.007 \text{ in.} = 4.118 \text{ in.}$
70. $0.2573 \text{ in.} - 0.2476 \text{ in.} = 0.0097 \text{ in.}$
71. $11.2 \text{ billion} - 7.4 \text{ billion} = 3.8 \text{ billion}$
74.
$$\begin{aligned} &2\frac{1}{3} \text{ qt} + 1\frac{1}{6} \text{ qt} + 3\frac{1}{4} \text{ qt} \\ &= 2\frac{4}{12} \text{ qt} + 1\frac{2}{12} \text{ qt} + 3\frac{3}{12} \text{ qt} \\ &= 6\frac{9}{12} \text{ qt} = 6\frac{3}{4} \text{ qt} = 6.75 \text{ qt} \end{aligned}$$

$$\begin{aligned} 75. \quad & 1\frac{3}{4} \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal} \\ & = 1.75 \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal} \\ & = 3.4 \text{ gal} \end{aligned}$$

$$\begin{aligned} 77. \quad & 2.5 \text{ lb} = 2.5 \text{ lb} \\ & 12 \text{ oz} \div 16 \text{ oz/lb} = 0.75 \text{ lb} \\ & 1.5 \text{ oz} \div 16 \text{ oz/lb} = 0.9375 \text{ lb} \\ & 0.7 \text{ lb} = 0.7 \text{ lb} \\ & 14 \text{ oz} \div 16 \text{ oz/lb} = 0.875 \text{ lb} \\ & 18 \text{ oz} \div 16 \text{ oz/lb} = \underline{1.125 \text{ lb}} \\ & = 6.0125 \text{ lb} \\ & = 6 \text{ lb} \end{aligned}$$

$$\begin{aligned} 76. \quad & 0.75 \text{ oz} \\ & 1.3 \text{ oz} \\ & 2.5 \text{ oz} \\ & \underline{0.1 \text{ oz}} \\ & 4.65 \text{ oz} \end{aligned}$$

Section 1.11: Rounding Numbers

- | | |
|--------------|---|
| 1. a. 1700 | 12. a. 3.8 |
| b. 1650 | b. 3.765 |
| 2. a. 1800 | 13. 600; 640; 636; 636.2; 636.18; 636.183 |
| b. 1760 | 14. 1500; 1450; 1452; 1451.5; 1451.53; 1451.525 |
| 3. a. 3100 | 15. 17,200; 17,160; 17,159; 17,159.2; 17,159.17; 17,159.167 |
| b. 3130 | 16. 0; 10; 8; 8.2; 8.17; 8.172 |
| 4. a. 100 | 17. 1,543,700; 1,543,680; 1,543,679; N/A; N/A; N/A |
| b. 70 | 18. 41,900; 41,890; 41,892; 41,892.2; 41,892.16; 41,892.157 |
| 5. a. 18,700 | 19. 10,600; 10,650; 10,650; 10,649.8; 10,649.83; N/A |
| b. 18,680 | 20. 100; 80; 84; 84.0; 84.01; 84.007 |
| 6. a. 6000 | 21. 600; 650; 650; 649.9; 649.90; 649.900 |
| b. 5970 | 22. 100; 150; 148; 148.0; 148.00; 147.995 |
| 7. a. 3.1 | 23. 237,000 |
| b. 3.142 | 24. 203 |
| 8. a. 0.2 | 25. 0.0328 |
| b. 0.162 | 26. 64,000 |
| 9. a. 0.1 | 27. 72 |
| b. 0.57 | 28. 0.033 |
| 10. a. 1.0 | |
| b. 0.984 | |
| 11. a. 0.1 | |
| b. 0.070 | |

29. 1,462,000

30. 23.23

31. 0.0003376

32. 20,700

33. 1.01

34. 0.00119

Section 1.12: Multiplication and Division of Decimal Fractions

1. 0.555

2. 23.97

3. 10.5126

4. 27,000

5. 9,280,000

6. 634.5

7. 30

8. 3

9. 15

$$\begin{aligned}
 19. \quad & \frac{8^2 - 6^2}{4 \cdot 8 + (7 + 9)} \\
 &= \frac{64 - 36}{32 + 16} \\
 &= \frac{28}{48} = \frac{7}{12}
 \end{aligned}$$

$$\begin{aligned}
 20. \quad & \frac{148 - 3 \cdot 4^2}{5^3 - 2 \cdot 5^2} \\
 &= \frac{148 - 3 \cdot 16}{125 - 2 \cdot 25} \\
 &= \frac{148 - 48}{125 - 50} \\
 &= \frac{100}{75} \\
 &= \frac{4}{3} = 1\frac{1}{3}
 \end{aligned}$$

$$\begin{aligned}
 21. \quad & \frac{4 \cdot 5 \cdot 6 - 5 \cdot 2^3}{4^2 \cdot 5 + 5 \cdot 2^2} \\
 &= \frac{20 \cdot 6 - 5 \cdot 8}{16 \cdot 5 + 5 \cdot 4} \\
 &= \frac{120 - 40}{80 + 20} = \frac{80}{100} = \frac{4}{5}
 \end{aligned}$$

10. 19.4

11. 248.23

12. 5197.37

13. 3676.47

14. 2466.67

15. 7.80

16. 0.984

17. 6.59

18. 72.8

$$\begin{aligned}
 22. \quad & \frac{2^3 + (2 + 3 \cdot 6)^2}{(2 \cdot 5 - 4)^2 + 3 \cdot 5} \\
 &= \frac{8 + (2 + 18)^2}{(10 - 4)^2 + 15} \\
 &= \frac{8 + 20^2}{6^2 + 15} \\
 &= \frac{8 + 400}{36 + 15} = \frac{408}{51} = 8
 \end{aligned}$$

$$23. \quad \frac{3.6 \text{ ft}}{3} = 1.2 \text{ ft}$$

$$24. \quad \frac{7 \text{ ft}}{4} = 1.75 \text{ ft}$$

$$25. \quad \frac{321.3 \text{ mi}}{2.7 \text{ h}} = 119 \text{ mi/h}$$

$$26. \quad \frac{\$104.06}{24.2 \text{ gal}} = \$4.30/\text{gal}$$

$$27. \quad \frac{475 \text{ mi}}{17.12 \text{ gal}} = 27.7 \text{ mi/gal}$$

$$28. \quad \frac{\$565.40}{4} = \$141.35$$

$$29. \quad 12 \times 8\frac{7}{8} \text{ in.} = 12 \times 8.875 \text{ in.} \\ = 106.5 \text{ in.}$$

$$\frac{106.5 \text{ in.}}{11} = 9.682 \text{ in.}$$

$$30. \quad \frac{\$24.96}{4 \text{ ft}} = \$6.24/\text{ft}$$

$$\$6.24/\text{ft} \times \frac{1 \text{ ft}}{12 \text{ in.}} = \$0.52/\text{in.} \text{ or } 52\text{¢}/\text{in.}$$

$$31. \quad \text{a. } 8 \times 4.72 \text{ m} = 37.76 \text{ m}$$

$$\text{b. } 2 \times 4.72 \text{ m} = 9.44 \text{ m}$$

$$32. \quad 8 \times 4.75 \text{ mm} = 38.00 \text{ mm}$$

$$33. \quad n = \frac{1}{p}$$

$$n = \frac{1}{0.0125} \\ = 80 \text{ threads/in.}$$

$$34. \quad \frac{78 \text{ ft}}{3.25 \text{ ft}} = 24 \text{ lengths}$$

$$35. \quad 32.63 \text{ in.} - 8 \times 3.56 \text{ in.} - 8 \times 0.15 \text{ in.} \\ = 2.95 \text{ in.}$$

$$36. \quad 32 \times 0.045 \text{ in.} = 1.44 \text{ in.}$$

$$41. \quad 4.62 \text{ in.} + 7 \times 0.47 \text{ in.} + 6 \times 6.44 \text{ in.} + 4.65 \text{ in.} = 51.20 \text{ in.}$$

$$42. \quad \frac{\$595}{\$29.75} = 20 \text{ hours}$$

$$43. \quad 6 \times 56.25 \text{ in}^3 = 337.50 \text{ in}^3$$

$$44. \quad 6 \times 0.9 \text{ L} = 5.4 \text{ L}$$

$$47. \quad \text{a. } 45,000 \text{ mi} \times \frac{0.062 \text{ in.}}{15,000 \text{ mi}} = 0.186 \text{ in.}$$

$$\text{b. } 60,000 \text{ mi} \times \frac{0.062 \text{ in.}}{15,000 \text{ mi}} = 0.248 \text{ in.} \\ \text{Thickness} = 0.375 \text{ in.} - 0.248 \text{ in.} \\ = 0.127 \text{ in.}$$

$$48. \quad \frac{500 \text{ person h}}{5 \text{ people} \times 8 \text{ h/day}} = 12.5 \text{ days}$$

$$49. \quad 150 \text{ acres} \times 1.6 \frac{\text{gal}}{\text{acre}} = 240 \text{ gal}$$

$$37. \quad \frac{18 \text{ in.}}{0.0060 \text{ in.}} = 3000 \text{ sheets}$$

$$38. \quad (45 \text{ ft } 3 \text{ in.})(64 \text{ ft } 6 \text{ in.}) \\ = (45.25 \text{ ft})(64.5 \text{ ft}) \\ = 2918.625 \text{ ft}^2$$

$$39. \quad V = lwh \\ V = (87 \text{ ft})(42 \text{ ft})(9 \text{ ft}) \\ = 32,886 \text{ ft}^3$$

$$\text{Cost} = 32,886 \text{ ft}^3 \times \left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)^3 \times \frac{\$39.00}{1 \text{ yd}^3} \\ = \$47,502.00$$

$$40. \quad \frac{2.640 \text{ in.} - 2.640 \text{ in.}}{0.018 \text{ in.}}$$

$$= \frac{0.252 \text{ in.}}{0.018 \text{ in.}} \\ = 14 \text{ cuts}$$

$$45. \quad \frac{2.0 \text{ L}}{4} = 0.5 \text{ L}$$

$$46. \quad \frac{318 \text{ in}^3}{8} = 39.75 \text{ in}^3$$

$$50. \quad \text{a. } 300 \text{ gal} \times \frac{1.7 \text{ lb}}{10 \text{ gal}} = 51 \text{ lb}$$

$$\text{b. } 300 \text{ gal} \times \frac{1 \text{ acre}}{10 \text{ gal}} = 30 \text{ acres}$$

51. The cost of one head of cattle is
 $550 \text{ lb} \times \$1.45/\text{lb} = \797.50 .

The revenue of one head of cattle is
 $(550 \text{ lb} + 500 \text{ lb}) \times \$1.20/\text{lb} = \$1260.00$.

The expected profit is \$150, so the cost of the weight gain is $\$1260.00 - \$797.50 - \$150.00 = \312.00 .

The cost of weight gain per pound is
 $\frac{\$312.00}{500 \text{ lb}} = \$0.625/\text{lb}$, or 62.5¢/lb.

52. $20 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 0.4 \text{ pt}$

$60 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 1.2 \text{ pt}$

$150 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 3 \text{ pt}$

$350 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 7 \text{ pt}$

53. $2 \times \pi \times 60 \text{ Hz} \times 0.25 \text{ H} = 94.2 \Omega$

54. $2 \times \pi \times 60 \text{ Hz} \times 0.035 \text{ H} = 13.2 \Omega$

55. $(6.4 \text{ V})(0.045 \text{ A}) = 0.288 \text{ W}$

56. $(0.95 \text{ V})(0.0065 \text{ A}) = 0.006175 \text{ W}$

69. $316,128,839 \text{ people} \times 4.4 \text{ lb/person} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 695,000 \text{ tons}$

70. $\frac{10,240 \text{ ft}^3}{1.2445 \text{ ft}^3/\text{bu}} = 8228 \text{ bu}$

71. $V = lwh$

$$V = (4 \text{ ft})(8 \text{ ft})(16 \text{ in.}) \times \frac{1 \text{ ft}}{12 \text{ in.}}$$

$$= \frac{512}{12} \text{ ft}^3 = 42.7 \text{ ft}^3$$

72. $3.25 \times 0.25 \text{ gal} = 0.8125 \text{ gal}$

57. $\frac{220 \text{ V}}{35.5 \Omega} = 6.20 \text{ A}$

58. $\frac{1.5 \text{ V}}{0.25 \text{ A}} = 6 \Omega$

59. $\frac{115 \text{ V}}{0.84 \text{ A}} = 136.9 \Omega$

60. $\frac{115 \text{ V}}{18 \Omega} = 6.39 \text{ A}$

61. $3 \times 0.1 \text{ mg} = 0.3 \text{ mg}$

62. $2 \times 0.25 \text{ g} = 0.5 \text{ g}$

63. $\frac{0.5 \text{ mg}}{0.1 \text{ mg}} = 5 \text{ tablets}$

64. $\frac{1.25 \text{ mg}}{0.25 \text{ mg}} = 5 \text{ tablets}$

65. $350 \text{ mi} \times \frac{0.868 \text{ naut. mi}}{1 \text{ mi}} = 303.8 \text{ naut. mi}$

66. $5 \times 16.0 \text{ A} + 4 \times 13.8 \text{ A} = 135.2 \text{ A}$

67. $4.00 \text{ ft} \times 8.00 \text{ ft} \times 40.32 \frac{\text{lb}}{\text{ft}^2} = 1290 \text{ lb}$

68. $365 \text{ days} \times 4.44 \text{ lb/day} = 1620 \text{ lb}$

73. $200 \times 1.5 \text{ oz} = 300 \text{ oz}$

$5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz}$

$\frac{300 \text{ oz}}{80 \text{ oz}} = 3.75 \text{ bags}$

74. a. $110 \times 2.2 \text{ oz} = 242 \text{ oz}$

b. $5.5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 88 \text{ oz}$

$\frac{242 \text{ oz}}{88 \text{ oz}} = 2.75$, so 3 containers

c. $3 \times 88 \text{ oz} - 242 \text{ oz} = 22 \text{ oz}$

Section 1.13: Percent

1. 0.27

2. 0.15

3. 0.06

4. 0.05

5. 1.56
6. 2.32
7. 0.292
8. 0.362
9. 0.087
10. 1.287
11. 9.478
12. 0.6829
13. 0.0028
14. 0.0078
15. 0.00068
16. 0.000093
17. $4\frac{1}{4}\% = 4.25\% = 0.0425$
18. $9\frac{1}{2}\% = 9.5\% = 0.095$
19. $\frac{3}{8}\% = 0.375\% = 0.00375$
20. $50\frac{1}{3}\% = 50.\bar{3}\% = 0.50\bar{3}$
21. 54%
22. 25%
23. 8%
24. 2%
25. 62%
26. 79%
27. 217%
28. 34.5%
29. 435%
30. 22.5%
31. 18.5%
32. 625%
33. 29.7%
34. 711%
35. 519%

36. 81.5%
37. 1.87%
38. 3.42%
39. 0.29%
40. 0.062%
41. $\frac{4}{5} = 0.8 = 80\%$
42. $\frac{3}{4} = 0.75 = 75\%$
43. $\frac{1}{8} = 0.125 = 12\frac{1}{2}\% \text{ or } 12.5\%$
44. $\frac{2}{5} = 0.4 = 40\%$
45. $\frac{1}{6} = 0.1\bar{6} \text{ r } 4 = 16\frac{4}{6}\% = 16\frac{2}{3}\%$
46. $\frac{1}{3} = 0.3\bar{3} \text{ r } 1 = 33\frac{1}{3}\%$
47. $\frac{4}{9} = 0.4\bar{4} \text{ r } 4 = 44\frac{4}{9}\%$
48. $\frac{3}{7} = 0.42\bar{8} \text{ r } 6 = 42\frac{6}{7}\%$
49. $\frac{3}{5} = 0.60 = 60\%$
50. $\frac{5}{6} = 0.8\bar{3} \text{ r } 2 = 83\frac{2}{6}\% = 83\frac{1}{3}\%$
51. $\frac{13}{40} = 0.325 = 32.5\% \text{ or } 32\frac{1}{2}\%$
52. $\frac{17}{50} = 0.34 = 34\%$
53. $\frac{7}{16} = 0.4375 = 43.75\% \text{ or } 43\frac{3}{4}\%$
54. $\frac{15}{16} = 0.9375 = 93.75\% \text{ or } 93\frac{3}{4}\%$
55. $\frac{96}{40} = 2.40 = 240\%$
56. $\frac{100}{16} = 6.25 = 625\%$

$$57. \quad 1\frac{3}{4} = 1.75 = 175\%$$

$$58. \quad 2\frac{1}{3} = \frac{7}{3} = 2.33 \text{ r } 1 = 233\frac{1}{3}\%$$

$$59. \quad 2\frac{5}{12} = \frac{29}{12} = 2.41 \text{ r } 8 = 241\frac{8}{12}\% = 241\frac{2}{3}\%$$

$$60. \quad 5\frac{3}{8} = 5.375 = 537.5\% \text{ or } 537\frac{1}{2}\%$$

$$61. \quad 75\% = \frac{75}{100} = \frac{3}{4}$$

$$62. \quad 45\% = \frac{45}{100} = \frac{9}{20}$$

$$63. \quad 16\% = \frac{16}{100} = \frac{4}{25}$$

$$64. \quad 80\% = \frac{80}{100} = \frac{4}{5}$$

$$65. \quad 60\% = \frac{60}{100} = \frac{3}{5}$$

$$66. \quad 15\% = \frac{15}{100} = \frac{3}{20}$$

$$67. \quad 93\% = \frac{93}{100}$$

$$68. \quad 32\% = \frac{32}{100} = \frac{8}{25}$$

$$69. \quad 275\% = \frac{275}{100} = \frac{11}{4} = 2\frac{3}{4}$$

$$70. \quad 325\% = \frac{325}{100} = \frac{13}{4} = 3\frac{1}{4}$$

$$71. \quad 125\% = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$$

$$72. \quad 150\% = \frac{150}{100} = \frac{3}{2} = 1\frac{1}{2}$$

$$73. \quad 10\frac{3}{4}\% = \frac{43}{4}\% = \frac{43}{4} \times \frac{1}{100} = \frac{43}{400}$$

$$74. \quad 13\frac{2}{5}\% = \frac{67}{5}\% = \frac{67}{5} \times \frac{1}{100} = \frac{67}{500}$$

$$75. \quad 10\frac{7}{10}\% = \frac{107}{10}\% = \frac{107}{10} \times \frac{1}{100} = \frac{107}{1000}$$

$$76. \quad 40\frac{7}{20}\% = \frac{807}{20}\% = \frac{807}{20} \times \frac{1}{100} = \frac{807}{2000}$$

$$77. \quad 17\frac{1}{4}\% = \frac{69}{4}\% = \frac{69}{4} \times \frac{1}{100} = \frac{69}{400}$$

$$78. \quad 6\frac{1}{3}\% = \frac{19}{3}\% = \frac{19}{3} \times \frac{1}{100} = \frac{19}{300}$$

$$79. \quad 16\frac{1}{6}\% = \frac{97}{6}\% = \frac{97}{6} \times \frac{1}{100} = \frac{97}{600}$$

$$80. \quad 72\frac{1}{8}\% = \frac{577}{8}\% = \frac{577}{8} \times \frac{1}{100} = \frac{577}{800}$$

81.

Fraction	Decimal	Percent
$\frac{3}{8}$	0.375	37.5%
$\frac{45}{100} = \frac{9}{20}$	0.45	45%
$\frac{18}{100} = \frac{9}{50}$	0.18	18%
$1\frac{2}{5}$	1.4	140%
$1\frac{8}{100} = 1\frac{2}{25}$	1.08	108%
$\frac{1675}{1000} = \frac{67}{40}$	0.1675	$16\frac{3}{4}\%$

Section 1.14: Rate, Base, and Part

1. $P = 60$; $R = 25\%$; $B = 240$

2. $P = \$100$; $R = 33\frac{1}{3}\%$; $B = \$300$

3. $P = 108$; $R = 40\%$; $B = 270$

4. $P = 72$; $R = 15\%$; $B = 480$

5. $P = \text{unknown}$; $R = 4\%$; $B = 28,000$

6. $P = 25$; $R = \text{unknown}$; $B = 28$

7. $P = 21$; $R = 60\%$; $B = \text{unknown}$

8. $P = \text{unknown}$; $R = 10\%$; $B = 15,000$

9. $P = 2050$; $R = 6\%$; $B = \text{unknown}$

10. $P = \$40$; $R = \text{unknown}$; $B = \$500$

11. $P = BR$

$$P = (\$32,500)(0.08) \\ = \$2600$$

Her new salary is $\$32,500 + \$2600 = \$35,100$.

13. a. 10% ; $\$5.49 + \$3.28 + \$7.22 + \$2.12 = \$18.11$

$$\$18.11 - 0.10 \times \$18.11 = \$16.30$$

$$20\%; \$12.57 + \$22.12 + \$17.88 = \$52.57$$

$$\$52.57 - 0.20 \times \$52.57 = \$42.06$$

$$30\%; \$38.42 + \$40.12 + \$35.18 = \$113.72$$

$$\$113.72 - 0.30 \times \$113.72 = \$79.60$$

$$\text{Total; } \$16.30 + \$42.06 + \$79.61 = \$137.96$$

b. $137.96 + 0.0625 \times 137.96 = \146.58

14. $B = \frac{P}{R}$
$$B = \frac{2040}{0.075} \\ = 27,200$$

15. $880 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 2650 \text{ ft}$

$$R = \frac{P}{B}$$

$$R = \frac{2650 \text{ ft}}{5280 \text{ ft}} \\ = 0.5 = 50\%$$

16. $B = \frac{P}{R}$
$$B = \frac{0.35 \text{ mi}}{0.04} \\ = 8.75 \text{ mi}$$

17. $B = \frac{P}{R}$
$$B = \frac{\$72}{0.045} \\ = \$1600$$

18. $R = \frac{P}{B}$
$$R = \frac{3.5}{7.15} \\ = 0.490 = 49.0\%$$

12. $P = BR$

$$P = (\$2870)(0.06) \\ = \$172.20$$

His new monthly salary is

$\$2870 + \$172.20 = \$3042.20$ so his new annual salary is $12 \times \$3042.20 = \$36,506.40$.

19. $P = BR$
$$P = (48)(2.35) \\ = 112.8$$

20. $R = \frac{P}{B}$
$$R = \frac{1}{\frac{15}{8}} \\ = \frac{8}{15} = 0.533 = 53.3\%$$

21. $P = BR$
$$P = (32 \text{ V})(0.28) \\ = 8.96 \text{ V}$$

22. $P = BR$
$$P = (\$159.95)(0.075) \\ = \$12.00 \\ 4(\$159.95 + \$12.00 + \$2.50 + \$3.69) \\ = \$712.56$$

23. $R = \frac{P}{B}$
$$R = \frac{97}{130} \\ = 0.746 = 74.6\%$$

24. $P = BR$

$$P = (115 \text{ welds})(0.92) \\ = 106 \text{ welds}$$

25. $R = \frac{P}{B}$

$$R = \frac{24 \text{ h}}{65 \text{ h}} \\ = 0.369 = 36.9\%$$

26. Total hours = 1.5 h + 0.4 h = 1.9 h

$$R = \frac{P}{B}$$

$$R = \frac{0.4 \text{ h}}{1.9 \text{ h}} \\ = 0.211 = 21.1\%$$

27. $R = \frac{P}{B}$

$$R = \frac{0.3 \text{ qt}}{4.5 \text{ qt}} \\ = 0.067 = 6.7\%$$

28. $R = \frac{P}{B}$

$$R = \frac{1.5 \text{ lb/h}}{2 \text{ lb/h}} \\ = 0.75 = 75\%$$

29. $R = \frac{P}{B}$

$$R = \frac{2400 \text{ ft}^3 - 1920 \text{ ft}^3}{2400 \text{ ft}^3} \\ = \frac{480 \text{ ft}^3}{2400 \text{ ft}^3} \\ = 0.20 = 20\%$$

30. Window area = $78 \frac{1}{2} \text{ ft} \times 12 \frac{1}{6} \text{ ft} \times 0.20$
 $= 191 \text{ ft}^2$

Area of 1 window = $(2 \text{ ft})(6 \text{ ft}) = 12 \text{ ft}^2$

$$\frac{191 \text{ ft}^2}{12 \text{ ft}^2} = 15.9$$

Fifteen windows could be drawn on the wall.

31. $B = \frac{P}{R}$

$$B = \frac{20 \text{ ft}}{0.03} \\ = 666.7 \text{ ft} \\ A = 666.7 \text{ ft} + 100 \text{ ft} = 766.7 \text{ ft}$$

32. $66 \text{ ft} \times \frac{3}{4} + 3 \text{ in.} = 49 \text{ ft } 6 \text{ in.} + 3 \text{ in.}$
 $= 49 \text{ ft } 9 \text{ in.}$

33. Chemical: $160 \text{ acre} \times \frac{2 \frac{3}{4} \text{ lb}}{1 \text{ acre}} = 440 \text{ lb}$

Active ingredients: $440 \text{ lb} \times 0.80 = 352 \text{ lb}$

Inert ingredients: $440 \text{ lb} - 352 \text{ lb} = 88 \text{ lb}$

34. $60 \text{ lb} \times 0.39 = 23.4 \text{ lb}$

$$120 \text{ acre} \times \frac{45 \text{ bu}}{1 \text{ acre}} \times \frac{23.4 \text{ lb}}{1000 \text{ ft}^2} = 126,360 \text{ lb}$$

35. $7310 \text{ lb} \times \frac{1 \text{ gal}}{8.6 \text{ lb}} = 850 \text{ gal}$

Butterfat = $850 \text{ gal} \times 0.42 = 35.7 \text{ gal}$

36. Seeded area = $(18,400 \text{ ft}^2)(0.60)$
 $= 11,040 \text{ ft}^2$

$$\text{Seed required} = 11,040 \text{ ft}^2 \times \frac{2 \text{ lb}}{1000 \text{ ft}^2} \\ = 22 \text{ lb}$$

37. $R = \frac{P}{B}$

$$R = \frac{150 - 39}{150} \\ = 74\%$$

38. $P = BR$

$$P = (500 \text{ ml})(0.15) \\ = 75 \text{ ml}$$

39. $P = BR$

$$P = (250 \text{ ml})(0.03) \\ = 7.5 \text{ ml}$$

40. $P = BR$

$$P = (2000 \text{ ml})(0.0015) \\ = 3 \text{ ml}$$

$$41. \quad R = \frac{P}{B}$$

$$R = \frac{25 \text{ ml}}{1000 \text{ ml}}$$

$$= 0.025 = 2.5\%$$

$$43. \quad \text{Percent increase} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent increase} = \frac{115 \text{ lb/in}^2 - 75 \text{ lb/in}^2}{75 \text{ lb/in}^2} \times 100\%$$

$$= 53.3\%$$

$$44. \quad \text{Percent decrease} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent decrease} = \frac{\$98,500 - \$79,400}{\$98,500} \times 100\%$$

$$= 19.4\%$$

$$45. \quad \text{Percent decrease} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent decrease} = \frac{\$25.50 - \$21.88}{\$25.50} \times 100\%$$

$$= 14.2\%$$

$$46. \quad \text{Percent increase} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent increase} = \frac{6500 \text{ ft}^2}{28,000 \text{ ft}^2} \times 100\%$$

$$= 23.2\%$$

47. First item:

$$\$100.00 - 0.55 \times \$100.00 = \$45.$$

Second item:

$$\$100.00 - 0.40 \times \$100.00 = \$60.00$$

$$\$60.00 - 0.15 \times \$60.00 = \$51.00$$

$$48. \quad P = BR$$

$$P = (\$22.15)(0.32)$$

$$= \$7.09$$

$$\text{New salary} = \$22.15 + \$7.09 = \$29.24$$

$$49. \quad P = BR$$

$$P = (1640 \text{ lb})(0.95)$$

$$= 1558 \text{ lb}$$

$$42. \quad \text{Percent increase} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent increase} = \frac{128 \text{ V} - 115 \text{ V}}{115 \text{ V}} \times 100\%$$

$$= 11.3\%$$

$$50. \quad R = \frac{P}{B}$$

$$R = \frac{59}{125}$$

$$= 0.472 = 47.2\%$$

$$51. \quad R = \frac{P}{B}$$

$$R = \frac{187}{250}$$

$$= 0.748 = 74.8\%$$

$$52. \quad \text{Population} = 135 + 42 - 7 - 3 - 5 - 10$$

$$= 152$$

$$\text{Percent increase} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percent increase} = \frac{152 - 135}{135} \times 100\%$$

$$= 12.6\%$$

$$53. \quad \text{a.} \quad P = BR$$

$$P = (25 \text{ deer/mi}^2)(0.40)$$

$$= 10 \text{ deer/mi}^2$$

$$\text{Population} = 25 \text{ deer/mi}^2 + 10 \text{ deer/mi}^2$$

$$= 35 \text{ deer/mi}^2$$

$$\text{b.} \quad P = BR$$

$$P = (35 \text{ deer/mi}^2)(0.40)$$

$$= 14 \text{ deer/mi}^2$$

$$\text{Population} = 35 \text{ deer/mi}^2 + 14 \text{ deer/mi}^2$$

$$= 49 \text{ deer/mi}^2$$

54. a. $P = BR$
 $P = (4.6 \text{ lb})(0.25)$
 $= 1.15 \text{ lb}$
 Average per day = $4.6 \text{ lb} - 1.15 \text{ lb}$
 $= 3.45 \text{ lb}$

b. $3.45 \text{ lb} \times 75,000 \times 365 \times \frac{1 \text{ ton}}{2000 \text{ lb}}$
 $= 47,200 \text{ tons}$

c. $100\% - 30\% = 70\%$

$$B = \frac{P}{R}$$

$$B = \frac{73,500 \text{ tons}}{0.70}$$

$$= 105,000 \text{ tons}$$

57.

	Total Cost
	$22 \times \$1.33 = \29.26
	$14 \times \$3.89 = \54.46
	$12 \times \$6.49 = \77.88
	$6 \times \$7.43 = \44.58
	$6 \times \$8.76 = \52.56
	$6 \times \$5.54 = \33.24
	$5 \times \$6.45 = \32.25
	$4 \times \$2.09 = \8.36
	$120 \times \$1.69 = \202.80
Subtotal	\$535.39
7.5% Sales Tax	$\$535.39 \times 0.075 = \40.16
Labor	$32 \times \$48.00 = \1536
Total	\$2111.55
Less 5% Cash Discount Net 30 Days	$\$2111.55 \times 0.05 = \105.58
Net Total	$\$2111.55 - \$105.58 = \$2005.97$

55. Total cost = \$5.66

$$B = \frac{P}{R}$$

$$B = \frac{\$5.66}{0.34}$$

$$= \$16.65$$

56. $P = BR$
 $P = (70 \text{ lb})(0.17)$
 $= 11.9 \text{ lb}$

Remaining = $70 \text{ lb} - 11.9 \text{ lb} = 58.1 \text{ lb}$

58. a. Amount for Soybeans : $1495.47 \times \$9.52 = \$14,236.87$
 Net Amount: $\$14,236.87 - \$224.67 - \$72.26 - \$27.73 = \$13,912.18$

b. Amount for Corn : $2398.99 \times \$4.23 + 2398.99 \times \$4.23 + 2398.99 \times \$4.23 = \$21,377.73$
 Net Amount: $\$21,377.73 - \$740.67 - \$55.92 - \$ - 320.75 - \$337.54 = \$19,922.85$

59.

	$66 \times \$7.97 = \526.02
	$30 \times \$3.95 = \118.50
	$14 \times \$3.39 = \47.46
	$17 \times \$6.59 = \112.03
	$9 \times \$5.39 = \48.51
	$7 \times \$4.97 = \34.79
	$10 \times \$11.97 = \119.70
	$6 \times \$16.89 = \101.34
	$15 \times \$24.25 = \363.75
	$80 \times \$17.29 = \1383.2
	$250 \times \$2.18 = \545
Subtotal	\$3400.30
Less 2% Discount	$\$3400.30 \times 0.02 = \68.00
Subtotal	$\$3400.30 - \$68.00 = \$3332.30$
5 $\frac{3}{4}$ % Sales Tax	$\$3332.30 \times 0.0575 = \191.61
NET TOTAL	$\$3332.30 + \$191.61 = \$3523.90$

60.

	Net Price
	$3(\$18.58 - 0.40 \times \$18.58)$ $= \$33.44$
	$5(\$65.10 - 0.25 \times \$65.10)$ $= \$244.13$
	$5(\$73.95 - 0.25 \times \$73.95)$ $= \$277.31$
	$8(\$43.90 - 0.25 \times \$43.90)$ $= \$263.40$
	$2(\$124.60 - 0.20 \times \$124.60)$ $= \$199.36$
	$5(\$18.80 - 0.15 \times \$18.80)$ $= \$79.90$
Subtotal	\$1097.54
Less 5% if paid in 30 days	$\$1097.54 \times 0.05 = \54.877
Total	\$1042.66

Section 1.15: Powers and Roots

- 225
- 625
- 222
- 0.000778
- 0.00000661
- 2,940,000,000
- 729
- 2740
- 562
- 0.0000114
- 0.00483
- 15,300
- 157
- 276,000
- 2.96
- 112
- 68.9
- 0.0806
- 42.4
- 2.12
- 0.198
- 8.78

Section 1.16: Applications Involving Percent: Business and Personal Finance

1. a.
- $i = prt$

$$i = (\$2000)(0.05)(3)$$

$$= \$300$$

b.
$$\text{payment} = \frac{\text{principle} + \text{interest}}{\text{loan period}}$$

$$\text{payment} = \frac{\$2000 + \$300}{36}$$

$$= \$63.89$$

$$2. \quad i = prt$$

$$i = (\$2500)(0.045)(2) \\ = \$225$$

$$3. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$7500 \left(1 + \frac{0.065}{4} \right)^{(4)(4)} \\ = \$7500(1.01625)^{16} \\ = \$9706.67$$

$$4. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$10,500 \left(1 + \frac{0.0575}{2} \right)^{(2)(6)} \\ = \$10,500(1.02875)^{12} \\ = \$14,753.92$$

$$5. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$15,000 \left(1 + \frac{0.055}{2} \right)^{(2)(8)} \\ = \$15,000(1.0275)^{16} \\ = \$23,152.64$$

$$6. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$6000 \left(1 + \frac{0.075}{4} \right)^{(4)(5)} \\ = \$6000(1.01875)^{20} \\ = \$8699.69$$

$$7. \quad P = \$150,000$$

$$i = 0.065/12$$

$$n = 30 \times 12 = 360$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$150,000 \left(\frac{\left(\frac{0.065}{12} \right) \left(1 + \frac{0.065}{12} \right)^{360}}{\left(1 + \frac{0.065}{12} \right)^{360} - 1} \right) \\ = \$948.10$$

$$8. \quad P = \$75,000$$

$$i = 0.0625/12$$

$$n = 15 \times 12 = 180$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$75,000 \left(\frac{\left(\frac{0.0625}{12} \right) \left(1 + \frac{0.0625}{12} \right)^{180}}{\left(1 + \frac{0.0625}{12} \right)^{180} - 1} \right) \\ = \$643.07$$

$$9. \quad \text{Price} = 275 \text{ acres} \times \$4100/\text{acre}$$

$$= \$1,127,500$$

$$P = \$1,127,500 \times 0.75 = \$845,625$$

$$i = 0.0675$$

$$n = 20$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$845,625 \left(\frac{0.0675(1+0.0675)^{20}}{(1+0.0675)^{20} - 1} \right) \\ = \$78,276.71$$

$$10. \quad P = ([\$45,500 - \$4500]) \times 0.80 = \$32,800$$

$$i = 0.0725 / 12$$

$$n = 5 \times 12 = 60$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$32,800 \left(\frac{\left(\frac{0.0725}{12} \right) \left(1 + \frac{0.0725}{12} \right)^{60}}{\left(1 + \frac{0.0725}{12} \right)^{60} - 1} \right)$$
$$= \$653.36$$

$$11. \quad \text{a.} \quad P = \$24,000$$

$$i = 0.0075 / 12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$24,000 \left(\frac{\left(\frac{0.0075}{12} \right) \left(1 + \frac{0.0075}{12} \right)^{36}}{\left(1 + \frac{0.0075}{12} \right)^{36} - 1} \right)$$
$$= \$674.40$$

$$\text{Total payment} = \$674.40 \times 36 = \$24,278.40$$

$$\text{b.} \quad P = \$24,000 - \$1500 = \$22,500$$

$$i = 0.085 / 12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$22,500 \left(\frac{\left(\frac{0.085}{12} \right) \left(1 + \frac{0.085}{12} \right)^{36}}{\left(1 + \frac{0.085}{12} \right)^{36} - 1} \right)$$
$$= \$710.27$$

$$\text{Total payment} = \$710.27 \times 36 = \$25,569.71$$

Choice a costs $\$25,569.71 - \$24,278.51 = \$1291.20$ less.

12. a.

$$P = \$19,500$$

$$i = 0.0175/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$19,500 \left(\frac{\left(\frac{0.0175}{12} \right) \left(1 + \frac{0.0175}{12} \right)^{36}}{\left(1 + \frac{0.0175}{12} \right)^{36} - 1} \right)$$

$$= \$556.40$$

$$\text{Total payment} = \$556.40 \times 36 = \$20,030.40$$

b.

$$P = \$19,500 - \$2500 = \$17,000$$

$$i = 0.065/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$17,000 \left(\frac{\left(\frac{0.065}{12} \right) \left(1 + \frac{0.065}{12} \right)^{36}}{\left(1 + \frac{0.065}{12} \right)^{36} - 1} \right)$$

$$= \$521.03$$

$$\text{Total payment} = \$521.03 \times 36 = \$18,757.08$$

Choice b costs $\$20,030.57 - \$18,757.19 = \$1273.38$ less.

13. $P = \$220,500 - \$4500 - \$9500 - \$8000 = \$198,500$

$$i = 0.08$$

$$n = 4$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$198,500 \left(\frac{(0.08)(1+0.08)^4}{(1+0.08)^4 - 1} \right)$$

$$= \$59,931.28$$

$$14. \text{ Dealer price} = \$150,500 \times (1 + 0.035 + 0.0095) = \$157,197.25$$

$$P = \$157,197.25 - \$7500 - \$10,000 = \$139,697.25$$

$$i = 0.0725$$

$$n = 5$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$\begin{aligned} A &= \$139,697.25 \left(\frac{(0.0725)(1+0.0725)^5}{(1+0.0725)^5 - 1} \right) \\ &= \$34,299.23 \end{aligned}$$

$$15. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{1} \right)^{(1)(3)} \\ &= \$30,000(1.05)^3 \\ &= \$34,728.75 \end{aligned}$$

$$16. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{12} \right)^{(12)(3)} \\ &= \$34,844.17 \end{aligned}$$

$$17. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{365} \right)^{(365)(3)} \\ &= \$34,854.67 \end{aligned}$$

$$21. \quad P = \$37,500 - \$37,500 \times 0.10 + \$37,500 \times 0.06$$

$$= \$36,000$$

$$i = 0.042/12 = 0.0035$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$\begin{aligned} A &= \$36,000 \left(\frac{0.0035(1+0.0035)^{36}}{(1+0.0035)^{36} - 1} \right) \\ &= \$1066.07 \end{aligned}$$

$$18. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{52} \right)^{(52)(3)} \\ &= \$34,852.52 \end{aligned}$$

$$19. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$8400 \left(1 + \frac{0.035}{12} \right)^{(12)(5)} \\ &= \$10,003.92 \end{aligned}$$

$$20. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$4000 \left(1 + \frac{0.055}{52} \right)^{(52)(4)} \\ &= \$4983.73 \end{aligned}$$

22. Discount amount = $(0.02)(\$12,000) = \240

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$12,000 - \$240} \times \frac{365}{20} = 37.2\%$$

23. Discount amount = $(0.03)(\$15,870) = \476.10

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$476.10}{\$15,870 - \$476.10} \times \frac{365}{20} = 56.4\%$$

24. Discount amount = $(0.02)(\$3000) = \60

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$60}{\$3000 - \$60} \times \frac{365}{18} = 41.4\%$$

25. Discount amount = $(0.025)(\$129,115.23) = \3227.88

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$3227.88}{\$129,115.23 - \$3227.88} \times \frac{365}{20} = 46.8\%$$

26. Discount amount = $(0.02)(\$22,000) = \440

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$440}{\$22,000 - \$440} \times \frac{365}{30} = 24.8\%$$

27. Discount amount = $(0.01)(\$21,500) = \215

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$215}{\$21,500 - \$215} \times \frac{365}{10} = 36.9\%$$

28. Discount amount = $(0.015)(\$16,000) = \240

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$16,000 - \$240} \times \frac{365}{20} = 27.8\%$$

Unit 1C Review

1. 1.625

2. $\frac{45}{100} = \frac{9}{20}$

3. 10.129
4. 116.935
5. 5.854
6. $55.6 \text{ ft} - 15.0 \text{ ft} - 15.0 \text{ ft} = 25.6 \text{ ft}$
7. 55.6 ft
 15.0 ft
 15.0 ft
 9.5 ft
 25.6 ft
 9.5 ft
 15.0 ft
 $\underline{15.0 \text{ ft}}$
 160.2 ft
8. a. 45.1
b. 45.06
9. a. 45.1
b. 45.06
10. 0.11515
11. 18.85
12. $18.5 \text{ in.} \div 2.75 \text{ in.} = 6 \text{ r } 2$. Six cables could be cut and there would be 2 in. remaining.
13. 0.25
14. 72.4
15. $P = BR$
 $P = (420)(0.165)$
 $= 69.3$
16. $B = \frac{P}{R}$
 $B = \frac{240}{0.12}$
 $= 2000$
17. $R = \frac{P}{B}$
 $R = \frac{96 \text{ yd}}{240 \text{ yd}}$
 $= 40.0\%$
18. $P = BR$
 $P = (\$16.50)(0.06)$
 $= \$0.99$
Her new salary is $\$16.50 + \$0.99 = \$17.49/\text{h.}$
19. 2110
20. 9.40

Chapter 1 Review

1. 8243
2. 55,197
3. 9,178,000
4. 226 r 240
5. $12 - 3(5 - 2)$
 $= 12 - 3(3)$
 $= 12 - 9$
 $= 3$
6. $(6 + 4)8 \div 2 + 3$
 $= (10)8 \div 2 + 3$
 $= 80 \div 2 + 3$
 $= 40 + 3$
 $= 43$
7. $18 \div 2 \times 5 \div 3 - 6 + 4 \times 7$
 $= 9 \times 5 \div 3 - 6 + 28$
 $= 45 \div 3 - 6 + 28$
 $= 15 - 6 + 28$
 $= 37$
8. $\frac{2 \cdot 4^2 + 3(4 + 5)^2}{10^2 - 3 \cdot 5^2}$
 $= \frac{2 \cdot 16 + 3(9)^2}{100 - 3 \cdot 25}$
 $= \frac{32 + 3(81)}{100 - 75}$
 $= \frac{32 + 234}{25}$
 $= \frac{275}{25}$
 $= 11$

9. Area of left rectangle: $55 \text{ ft} \times 120 \text{ ft} = 6600 \text{ ft}^2$
 Area of middle rectangle: $160 \text{ ft} \times 60 \text{ ft} = 9600 \text{ ft}^2$
 Area of right rectangle: $260 \text{ ft} \times 60 \text{ ft} = \underline{21,600 \text{ ft}^2}$
 Total area: $= 31,800 \text{ ft}^2$
 Area in tsf = $31,800 \text{ ft}^2 \div 1000 = 31.8 \text{ tsf}$

10. Volume of left box: $10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^3$
 Volume of middle box: $10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^2$
 Volume of right box: $10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = \underline{10 \text{ cm}^2}$
 Total Volume: $= 30 \text{ cm}^2$

$$11. C = \frac{5}{9}(F - 32)$$

$$C = \frac{5}{9}(50 - 32)$$

$$= \frac{5}{9}(18)$$

$$= 10$$

$$12. P = \frac{Fs}{t}$$

$$P = \frac{(600)(50)}{10}$$

$$= \frac{30,000}{10}$$

$$= 3000$$

13. $4 + 6 + 0 = 10$ is not divisible by 3, so 28 is not divisible by 3.

$$14. 54 = 2 \cdot 3 \cdot 3 \cdot 3$$

$$15. 330 = 2 \cdot 3 \cdot 5 \cdot 11$$

$$16. \frac{36}{56} = \frac{9 \cdot 4}{14 \cdot 4} = \frac{9}{14}$$

$$17. \frac{180}{216} = \frac{5 \cdot 36}{6 \cdot 36} = \frac{5}{6}$$

$$18. 4\frac{1}{6}$$

$$19. 3\frac{18}{5} = 3 + \frac{18}{5} = 3 + 3\frac{3}{5} = 6\frac{3}{5}$$

$$20. 2\frac{5}{8} = \frac{(2 \times 8) + 5}{8} = \frac{21}{8}$$

$$21. 3\frac{7}{16} = \frac{(3 \times 16) + 7}{16} = \frac{55}{16}$$

$$22. \frac{16}{8} = 2$$

$$23. \frac{1}{4} + \frac{5}{12} + \frac{5}{6}$$

$$= \frac{3}{12} + \frac{5}{12} + \frac{10}{12}$$

$$= \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$$

$$24. \frac{29}{36} - \frac{7}{30}$$

$$= \frac{145}{180} - \frac{42}{180}$$

$$= \frac{103}{180}$$

$$25. 5\frac{3}{16} + 9\frac{5}{12}$$

$$= 5\frac{9}{48} + 9\frac{20}{48}$$

$$= 14\frac{29}{48}$$

$$26. 6\frac{3}{8} - 4\frac{7}{12}$$

$$= 6\frac{9}{24} - 4\frac{14}{24}$$

$$= 5\frac{33}{24} - 4\frac{14}{24}$$

$$= 1\frac{19}{24}$$

$$\begin{aligned}
 27. \quad & 18 - 6\frac{2}{5} \\
 &= 17\frac{5}{5} - 6\frac{2}{5} \\
 &= 11\frac{3}{5}
 \end{aligned}$$

$$\begin{aligned}
 28. \quad & 16\frac{2}{3} + 1\frac{1}{4} - 12\frac{11}{12} \\
 &= 16\frac{8}{12} + 1\frac{3}{12} - 12\frac{11}{12} \\
 &= 17\frac{11}{12} - 12\frac{11}{12} \\
 &= 5
 \end{aligned}$$

$$29. \quad \frac{1}{4}$$

$$\begin{aligned}
 30. \quad & 3\frac{6}{7} \times 4\frac{2}{3} \\
 &= \frac{27}{7} \times \frac{14}{3} \\
 &= 18
 \end{aligned}$$

$$\begin{aligned}
 31. \quad & \frac{3}{8} \div 6 \\
 &= \frac{3}{8} \times \frac{1}{6} \\
 &= \frac{1}{16}
 \end{aligned}$$

$$\begin{aligned}
 32. \quad & \frac{2}{3} \div 1\frac{7}{9} \\
 &= \frac{2}{3} \div \frac{16}{9} \\
 &= \frac{2}{3} \times \frac{9}{16} \\
 &= \frac{3}{8}
 \end{aligned}$$

$$38. \quad 36 \text{ mi} \times \frac{1760 \text{ yd}}{3 \text{ mi}} = 63,360 \text{ yd}$$

$$39. \quad 0.5625$$

$$40. \quad 0.41\overline{6}$$

$$41. \quad \frac{45}{100} = \frac{9}{20}$$

$$42. \quad 19\frac{625}{1000} = 19\frac{5}{8}$$

$$\begin{aligned}
 33. \quad & 1\frac{4}{5} \div 1\frac{9}{16} \times 11\frac{2}{3} \\
 &= \frac{9}{5} \div \frac{25}{16} \times \frac{35}{3} \\
 &= \frac{9}{5} \times \frac{16}{25} \times \frac{35}{3} \\
 &= \frac{144}{125} \times \frac{35}{3} \\
 &= \frac{336}{25} = 13\frac{11}{25}
 \end{aligned}$$

$$\begin{aligned}
 34. \quad A &= 12\frac{5}{16} \text{ in.} - 4\frac{3}{8} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 4\frac{6}{16} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 11\frac{21}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 3\frac{6}{16} \text{ in.} = 3\frac{3}{8} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 B &= 9\frac{3}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} + 2\frac{1}{2} \text{ in.} \\
 &= 9\frac{3}{32} \text{ in.} + 2\frac{16}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 11\frac{19}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 5\frac{14}{32} \text{ in.} = 5\frac{7}{16} \text{ in.}
 \end{aligned}$$

$$35. \quad 6 \text{ lb } 9 \text{ oz} = \left(6 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} \right) + 9 \text{ oz} = 105 \text{ oz}$$

$$36. \quad 168 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 2016 \text{ in.}$$

$$37. \quad 72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$$

$$43. \quad 168.278$$

$$44. \quad 17.25$$

$$45. \quad 68.665$$

$$46. \quad 33.72$$

$$47. \quad 3206.5$$

$$48. \quad 1.9133$$

$$49. \quad 3.18$$

50. 20.6

51. a. 200

b. 248.2

c. 250

52. a. 5.6

b. 5.65

c. 5.6491

53. $15\% = \frac{15}{100} = 0.15$

54. $8\frac{1}{4}\% = 8.25\% = 0.0825$

55. 6.5%

56. 120%

57. $P = BR$

$$P = (\$12,000)(0.0875)$$

$$= \$1050$$

60. $R = \frac{P}{B}$

$$R = \frac{\frac{11}{64}}{\frac{13}{32}} = \frac{11}{64} \times \frac{32}{13}$$

$$= 42.3\%$$

62. Area of ceiling: $16 \text{ ft} \times 20 \text{ ft} = 320 \text{ ft}^2$

Area of left/right walls: $2 \times 9 \text{ ft} \times 16 \text{ ft} = 288 \text{ ft}^2$

Area of front/back walls: $2 \times 9 \text{ ft} \times 20 \text{ ft} = 360 \text{ ft}^2$

Total area: $= 968 \text{ ft}^2$

$968 \text{ ft}^2 \div 400 \text{ ft}^2 = 2.42$; Three gallons of paint are needed.

The total cost will be $3 \times (\$16.99 + 0.0775 \times \$16.99) = \$54.92$.

63. $\frac{7}{8} \text{ in.} - \frac{9}{16} \text{ in.} = \frac{14}{16} \text{ in.} - \frac{9}{16} \text{ in.} = \frac{5}{16} \text{ in.}$

64. Height = $20 \text{ in.} + 2 \times 5 \text{ in.} = 30 \text{ in.}$

Length = $4 \times 10 \text{ in.} + 1 \text{ in.} = 41 \text{ in.}$

The sheet of cardboard would have to be 30 in. $\times$ 41 in.

65. 4020

58.

Fraction	Decimal	Percent
$\frac{1}{4}$	0.25	25%
$\frac{3}{8}$	0.375	$37\frac{1}{2}\%$
$\frac{5}{6}$	$0.83\frac{1}{3}$	$83\frac{1}{3}\%$
$8\frac{3}{4}$	8.75	875%
$2\frac{2}{5}$	2.4	240%
$\frac{3}{2000}$	0.0015	0.15%

$$59. R = \frac{P}{B}$$

$$R = \frac{\$32,000}{\$84,000}$$

$$= 38.1\%$$

61. $60 \text{ tons} \times 0.80 = 48 \text{ tons}$

66. 139

$$67. A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$12,500 \left(1 + \frac{0.045}{2} \right)^{(2)(5)}$$

$$= \$12,500 (1.0225)^{10}$$

$$= \$15,615.04$$

68. Truck: $(\$26,500 - \$2500) \times 0.80 = \$19,200$

Tax: $\$19,200 \times 0.0725 = \1392

$P = \$19,200 + \$1392 = \$20,592$

$i = 0.0725/12$

$n = 5 \times 12 = 60$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$20,592 \left(\frac{\left(\frac{0.0725}{12} \right) \left(1 + \frac{0.0725}{12} \right)^{60}}{\left(1 + \frac{0.0725}{12} \right)^{60} - 1} \right)$$

$$= \$402.91$$

Chapter 1 Test

1. 5729

2. 3516

5. $8 + 2(5 \times 6 + 8)$

$= 8 + 2(30 + 8)$

$= 8 + 2(38)$

$= 8 + 76 = 84$

7. Area of upper rectangle: $10 \text{ m} \times 40 \text{ m} = 400 \text{ m}^2$

Area of middle rectangle: $10 \text{ m} \times 15 \text{ m} = 150 \text{ m}^2$

Area of lower rectangle: $10 \text{ m} \times 20 \text{ m} = \underline{200 \text{ m}^2}$

Total area: $= 750 \text{ m}^2$

8. Volume of outer box: $10 \text{ in.} \times 12 \text{ in.} \times 20 \text{ in.} = 2400 \text{ in}^3$

Volume of missing corner: $3 \text{ in.} \times 4 \text{ in.} \times 20 \text{ in.} = \underline{240 \text{ in}^3}$

Total Volume: $= 2160 \text{ in}^3$

9. $\frac{120 \text{ V}}{40 \Omega} = 3 \text{ A}$

10. $P = 2l + 2w$

$P = 2(20) + 2(15)$

$= 40 + 30$

$= 70$

12. $P = 2a + b$

$P = 2(36) + 15$

$= 72 + 15$

$= 87$

3. 2,584.450

4. 1600

6. $15 - 9 \div 3 + 3 \times 4$

$= 15 - 3 + 12 = 24$

11. $t = \frac{d}{r}$

$t = \frac{1050}{21}$

$= 50$

13. $90 = 2 \cdot 3 \cdot 3 \cdot 5$

14. $220 = 2 \cdot 2 \cdot 5 \cdot 11$

15. $\frac{30}{64} = \frac{15 \cdot 2}{32 \cdot 2} = \frac{15}{32}$

$$16. \quad \frac{28}{42} = \frac{2 \cdot 14}{3 \cdot 14} = \frac{2}{3}$$

$$17. \quad \frac{23}{6} = 3 \text{ r } 5 = 3\frac{5}{6}$$

$$18. \quad 3\frac{1}{4} = \frac{3 \times 4 + 1}{4} = \frac{13}{4}$$

$$19. \quad \frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

$$20. \quad \frac{5}{16} - \frac{5}{32} = \frac{10}{32} - \frac{5}{32} = \frac{5}{32}$$

$$21. \quad 3\frac{1}{8} = 3\frac{1}{8}$$

$$2\frac{1}{2} = 2\frac{4}{8}$$

$$4\frac{3}{4} = 4\frac{6}{8}$$

$$9\frac{11}{8} = 10\frac{3}{8}$$

$$22. \quad 10\frac{1}{8} - 3\frac{5}{16}$$

$$= 10\frac{2}{16} - 3\frac{5}{16}$$

$$= 9\frac{18}{16} - 3\frac{5}{16}$$

$$= 6\frac{13}{16}$$

$$23. \quad 3\frac{5}{8} + 2\frac{3}{16} - 1\frac{1}{4}$$

$$= 3\frac{10}{16} + 2\frac{3}{16} - 1\frac{4}{16}$$

$$= 5\frac{13}{16} - 1\frac{4}{16}$$

$$= 4\frac{9}{16}$$

$$24. \quad \frac{3}{8} \times \frac{16}{27} = \frac{3}{8} \times \frac{8 \cdot 2}{9 \cdot 3} = \frac{2}{9}$$

$$25. \quad \frac{3}{8} \div 3\frac{5}{16} = \frac{3}{8} \div \frac{53}{16}$$

$$= \frac{3}{8} \times \frac{16}{53}$$

$$= \frac{6}{53}$$

$$26. \quad \frac{3}{40}$$

$$27. \quad 3\frac{5}{8} + 1\frac{3}{4} \times 6\frac{1}{5} = \frac{29}{8} + \frac{7}{4} \times \frac{31}{5}$$

$$= \frac{29}{8} + \frac{217}{20}$$

$$= \frac{145}{40} + \frac{434}{40}$$

$$= \frac{579}{40} = 14\frac{19}{40}$$

$$28. \quad P = 2l + 2w$$

$$P = 2\left(4\frac{3}{4}\right) + 2\left(2\frac{1}{2}\right)$$

$$= 2\left(\frac{19}{4}\right) + 2\left(\frac{5}{2}\right)$$

$$= \frac{19}{2} + \frac{10}{2}$$

$$= \frac{29}{2} = 14\frac{1}{2}$$

$$29. \quad 3\frac{5}{8} \text{ A} + 2\frac{3}{4} \text{ A} + 4\frac{5}{16} \text{ A}$$

$$= 3\frac{10}{16} \text{ A} + 2\frac{12}{16} \text{ A} + 4\frac{5}{16} \text{ A}$$

$$= 9\frac{27}{16} \text{ A} = 10\frac{11}{16} \text{ A}$$

$$30. \quad 120 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 40 \text{ yd}$$

$$31. \quad 3 \text{ lb } 5 \text{ oz} = \left(3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}}\right) + 5 \text{ oz} = 53 \text{ oz}$$

$$32. \quad \frac{5}{8} = 0.625$$

$$33. \quad 2.12 = 2\frac{12}{100} = 2\frac{3}{25}$$

$$34. \quad 65.024$$

$$35. \quad 397.19$$

$$36. \quad \text{a. } 27.3$$

$$\text{b. } 27.28$$

$$37. \quad 8.0784$$

$$38. \quad 0.05$$

$$\begin{aligned} 39. \quad B &= \frac{P}{R} \\ B &= \frac{59.45}{0.41} \\ &= 145 \end{aligned}$$

$$\begin{aligned} 40. \quad R &= \frac{P}{B} \\ R &= \frac{88}{284} \\ &= 31.0\% \end{aligned}$$

$$\begin{aligned} 41. \quad P &= BR \\ P &= (\$612)(0.067) \\ &= \$41 \end{aligned}$$

Her new salary is $\$612 + \$41 = \$653$.

$$42. \quad 0.0552$$

$$43. \quad 6.73$$

$$44. \quad A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$4000 \left(1 + \frac{0.045}{12} \right)^{(12)(3)} \\ &= \$4000(1.00375)^{36} \\ &= \$4576.99 \end{aligned}$$