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ISBN-13: 978-130510553-9
ISBN-10: 1-30510553-2

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Stamford, CT 06902
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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; $31\text{ hr} + 2\text{ hr} + 3\text{ hr} + 2\text{ hr} + 3\text{ hr} = 41\text{ hr}$
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
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. $61,747\text{ r } 1$
29. 389
30. $434\text{ r } 24$
31. $844\text{ r } 40$
32. $1566\text{ r } 80$
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. $\$508 \div 4 = \127
41. $125\text{ mi/h} \times 4\text{ h} = 500\text{ mi}$
42. $500\text{ ft/min} \times 15\text{ min} = 7500\text{ ft}$
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.
 - $17\text{ ft } 5\text{ in.} = 17\text{ ft} \times 12\text{ in./ft} + 5\text{ in.}$
 - $= 209\text{ in.}$
 - $209\text{ in.} - 75\text{ in.} = 134\text{ in.}$
 - $134\text{ in.} \div 2 = 67\text{ in.}$ from either corner
48. $260\text{ acres} \times 165\text{ bu/acre} = 42,900\text{ bu}$

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

51. a.

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

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

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.

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

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

54.

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

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

55.

$$\$175,000 - \$300 = \$172,000$$

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

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

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

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

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

64.

$$3 \times 60 \text{ mg} = 180 \text{ g}$$

$$180 \text{ g} \div 30 \text{ g} = 6 \text{ tablets}$$

$$65. 800 \text{ mg} \div 200 \text{ mg} = 4 \text{ tablets}$$

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

67.

$$14 \text{ ft } 6 \text{ in.} - 4 \times (2 \text{ ft } 6 \text{ in.}) - 3 \times (1 \text{ ft})$$

$$= 14 \text{ ft } 6 \text{ in.} - 10 \text{ ft } - 3 \text{ ft}$$

$$= 1 \text{ ft } 6 \text{ in.}$$

$$(1 \text{ ft } 6 \text{ in.}) \div 2$$

$$= 18 \text{ in.} \div 2$$

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

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

56.

$$\frac{400 \text{ gal}}{10 \text{ gal}} = 40$$

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

57.

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

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

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

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

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

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

68. The outer dimension of the back wall is

$$17 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 4 \text{ in.} = 208 \text{ in. long and}$$

$$8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in. high so there would be}$$

$$\frac{96 \text{ in.}}{8 \text{ in.}} = 12 \text{ rows of } \frac{208 \text{ in.}}{16 \text{ in.}} = 13 \text{ blocks,}$$

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

$$12 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 8 \text{ in.} - 2 \times 4 \text{ in.} = 144 \text{ in.}$$

$$\text{long and } 8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in. high so there}$$

$$\text{would be } \frac{96 \text{ in.}}{8 \text{ in.}} = 12 \text{ rows of } \frac{144 \text{ in.}}{16 \text{ in.}} = 9$$

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.

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

70.

$$\begin{aligned}
 & 2 \times 30 \text{ gal} = 60 \text{ gal} \\
 & 60 \text{ gal} \div 5 \text{ gal/drum} = 12 \text{ drums} \\
 & \text{Order size} = 12 \text{ drums} - 8 \text{ drums} \\
 & \quad = 4 \text{ drums}
 \end{aligned}$$

71.

$$\begin{aligned}
 & 2500 \div 1000 = 2.5 \\
 & 2.5 \times 8540 \text{ bd ft} = 213,500 \text{ bd ft}
 \end{aligned}$$

72.

$$2 \text{ lb} \times \frac{\$520}{2000 \text{ lb}} = \$0.52/\text{lb}$$

Section 1.2: Order of Operations

1.

$$\begin{aligned}
 & 8 - 3(4 - 2) \\
 &= 8 - 3(2) \\
 &= 8 - 6 \\
 &= 2
 \end{aligned}$$

2.

$$\begin{aligned}
 & (8 + 6)4 + 8 \\
 &= (14)4 + 8 \\
 &= 56 + 8 \\
 &= 64
 \end{aligned}$$

3.

$$\begin{aligned}
 & (8 + 6) - (7 - 3) \\
 &= 14 - 4 \\
 &= 10
 \end{aligned}$$

4.

$$\begin{aligned}
 & 4 \times (2 \times 6) + (6 + 2) \div 4 \\
 &= 4 \times 12 + 8 \div 4 \\
 &= 48 + 2 \\
 &= 50
 \end{aligned}$$

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.

$$\begin{aligned}
 \text{Number of tables} &= 10 + 12 \\
 &= 22
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables per server} &= 22 \div 6 \\
 &= 3 \text{ r } 4
 \end{aligned}$$

$$\text{Servers needed} = 4$$

77. a. $\$131 + \$152 + \$128 = \411

b. $\$411 \div 3 = \137

5.

$$\begin{aligned}
 & 2(9 + 5) - 6 \times (13 + 2) \div 9 \\
 &= 2(14) - 6 \times 15 \div 9 \\
 &= 28 - 90 \div 9 \\
 &= 28 - 10 \\
 &= 18
 \end{aligned}$$

6.

$$\begin{aligned}
 & 5(8 \times 9) + (13 + 7) \div 4 \\
 &= 5(72) + 20 \div 4 \\
 &= 5(72) + 20 \div 4 \\
 &= 360 + 5 \\
 &= 365
 \end{aligned}$$

7.

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

8.

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

9.

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

10.

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

11.

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

12.

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

13.

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

14.

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

32.

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

33.

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

34.

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

35.

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

36.

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

37.

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

38.

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

39.

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

Section 1.3: Area and Volume

1.

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

2.

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

3.

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

40.

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

41.

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

42.

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

4.

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

5.

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

6.

$$27 \text{ in.} \times 15 \text{ in.} = 405 \text{ in}^2$$

$$15 \text{ in.} \times 18 \text{ in.} = 270 \text{ in}^2$$

$$27 \text{ in.} \times 18 \text{ in.} = 486 \text{ in}^2$$

$$27 \text{ in.} \times 18 \text{ in.} = 486 \text{ in}^2$$

$$15 \text{ in.} \times 18 \text{ in.} = \underline{270 \text{ in}^2}$$

$$\text{Total} = 1917 \text{ in}^2$$

7.

$$\text{Area of outer rectangle: } 9 \text{ cm} \times 12 \text{ cm} = 108 \text{ cm}^2$$

$$\text{Area of inner rectangle: } 6 \text{ cm} \times 4 \text{ cm} = \underline{24 \text{ cm}^2}$$

$$\text{Total area: } = 84 \text{ cm}^2$$

8.

$$\text{Area of outer rectangle: } 8 \text{ in.} \times 8 \text{ in.} = 64 \text{ in}^2$$

$$\text{Area of inner rectangle: } 5 \text{ in.} \times 5 \text{ in.} = \underline{25 \text{ in}^2}$$

$$\text{Total area: } = 39 \text{ in}^2$$

9.

$$\text{Area of left rectangle: } 8 \text{ in.} \times 3 \text{ in.} = 24 \text{ in}^2$$

$$\text{Area of middle rectangle: } 2 \text{ in.} \times 6 \text{ in.} = 12 \text{ in}^2$$

$$\text{Area of right rectangle: } 3 \text{ in.} \times 4 \text{ in.} = \underline{12 \text{ in}^2}$$

$$\text{Total area: } = 48 \text{ in}^2$$

12.

$$\text{Area of outer rectangle: } 30 \text{ cm} \times 30 \text{ cm} = 900 \text{ cm}^2$$

$$\text{Area of squares: } 4 \times 5 \text{ cm} \times 5 \text{ cm} = \underline{800 \text{ cm}^2}$$

$$\text{Total area: } = 800 \text{ cm}^2$$

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

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

15.

$$\text{Area of ceiling: } 12 \text{ ft} \times 16 \text{ ft} = 192 \text{ ft}^2$$

$$\text{Area of left/right walls: } 2 \times 8 \text{ ft} \times 12 \text{ ft} = 192 \text{ ft}^2$$

$$\text{Area of front/back walls: } 2 \times 8 \text{ ft} \times 16 \text{ ft} = \underline{256 \text{ ft}^2}$$

$$\text{Total area: } = 640 \text{ ft}^2$$

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.

10.

$$\text{Area of upper rectangle: } 2 \text{ in.} \times 6 \text{ in.} = 12 \text{ in}^2$$

$$\text{Area of middle rectangle: } 6 \text{ in.} \times 2 \text{ in.} = 12 \text{ in}^2$$

$$\text{Area of lower rectangle: } 2 \text{ in.} \times 6 \text{ in.} = \underline{12 \text{ in}^2}$$

$$\text{Total area: } = 36 \text{ in}^2$$

11.

$$\text{Area of upper rectangle: } 3 \text{ in.} \times 6 \text{ in.} = 24 \text{ in}^2$$

$$\text{Area of lower rectangle: } 7 \text{ in.} \times 4 \text{ in.} = \underline{28 \text{ in}^2}$$

$$\text{Total area: } = 52 \text{ in}^2$$

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.

$$A = l \times w$$

$$A = 24 \text{ ft} \times 45 \text{ ft}$$

$$= 1080 \text{ ft}^2$$

$$\text{Value} = 1080 \text{ ft}^2 \times \$110/\text{ft}^2$$

$$= \$118,800$$

b.

$$\text{Area of upper rectangle: } 24 \text{ ft} \times 85 \text{ ft} = 2040 \text{ ft}^2$$

$$\text{Area of lower rectangle: } 19 \text{ ft} \times 16 \text{ ft} = \underline{304 \text{ ft}^2}$$

$$\text{Total area: } = 2344 \text{ ft}^2$$

$$\text{Value} = 2344 \text{ ft}^2 \times \$110/\text{ft}^2 = \$257,840$$

18.

$$\text{Area of upper rectangle: } 28 \text{ ft} \times 75 \text{ ft} = 2100 \text{ ft}^2$$

$$\text{Area of lower left rectangle: } 16 \text{ ft} \times 26 \text{ ft} = 416 \text{ ft}^2$$

$$\text{Area of lower right rectangle: } 12 \text{ ft} \times 24 \text{ ft} = \underline{288 \text{ ft}^2}$$

$$\text{Total area: } = 2804 \text{ ft}^2$$

$$\text{Value} = 2804 \text{ ft}^2 \times \$90/\text{ft}^2 = \$252,360$$

19.

$$V = l \times w \times h$$

$$V = 3 \text{ m} \times 4 \text{ m} \times 8 \text{ m}$$

$$= 96 \text{ m}^3$$

21.

$$\text{Volume of upper box: } 6 \text{ cm} \times 4 \text{ cm} \times 5 \text{ cm} = 120 \text{ cm}^3$$

$$\text{Volume of lower box: } 6 \text{ cm} \times 20 \text{ cm} \times 5 \text{ cm} = \underline{600 \text{ cm}^3}$$

$$\text{Total Volume: } = 720 \text{ cm}^3$$

22.

$$\text{Volume of left box: } 3 \text{ cm} \times 3 \text{ cm} \times 18 \text{ cm} = 162 \text{ cm}^3$$

$$\text{Volume of right box: } 6 \text{ cm} \times 15 \text{ cm} \times 3 \text{ cm} = \underline{270 \text{ cm}^3}$$

$$\text{Total Volume: } = 432 \text{ cm}^3$$

23.

$$\text{Volume of left box: } 5 \text{ in.} \times 6 \text{ in.} \times 40 \text{ in.} = 1200 \text{ in}^3$$

$$\text{Volume of middle box: } 25 \text{ in.} \times 6 \text{ in.} \times 10 \text{ in.} = 1500 \text{ in}^3$$

$$\text{Volume of right box: } 5 \text{ in.} \times 6 \text{ in.} \times 40 \text{ in.} = \underline{1200 \text{ in}^3}$$

$$\text{Total Volume: } = 3900 \text{ in}^3$$

20.

$$V = l \times w \times h$$

$$V = 10 \text{ ft} \times 20 \text{ ft} \times 8 \text{ ft}$$

$$= 1600 \text{ ft}^3$$

24.

$$\text{Volume of left box: } 8 \text{ ft} \times 8 \text{ ft} \times 20 \text{ ft} = 1280 \text{ ft}^3$$

$$\text{Volume of middle box: } 32 \text{ ft} \times 8 \text{ ft} \times 8 \text{ ft} = 2048 \text{ ft}^3$$

$$\text{Volume of right box: } 8 \text{ ft} \times 20 \text{ ft} \times 15 \text{ ft} = \underline{2400 \text{ ft}^3}$$

$$\text{Total Volume: } = 5728 \text{ ft}^3$$

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.

$$V = l \times w \times h$$

$$V = 8 \text{ in.} \times 20 \text{ in.} \times 72 \text{ in.}$$

$$= 11,520 \text{ in}^3$$

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

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.

$$V = l \times w \times h$$

$$V = 14 \text{ in.} \times 16 \text{ in.} \times 4 \text{ in.}$$

$$= 896 \text{ in}^3$$

$$216 \text{ ft}^3 \times 42 \text{ lb/ft}^3 = 9072 \text{ lb.}$$

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

$$113 \text{ ft} \times 90 \text{ ft} = 10170 \text{ ft}^2 \text{ so there could be}$$

$$10170 \text{ ft}^2 \div 4000 \text{ ft}^2 = 2 \text{ r } 2170 \text{ or 2 stores.}$$

37.

The height of the cardboard sheet would be

$$16 \text{ in.} + 9 \text{ in.} = 25 \text{ in. and the width would}$$

$$\text{be } 4 \times 9 \text{ in.} + 1 \text{ in.} = 37 \text{ in.}$$

38.

The volume of the box is

$$16 \text{ in.} \times 9 \text{ in.} \times 9 \text{ in.} = 1296 \text{ in}^3 \text{ so}$$

$$1296 \text{ in}^3 - 450 \text{ in}^3 = 846 \text{ in}^3 \text{ of peanuts are}$$

required.

39.

$$V = l \times w \times h$$

$$V = 4 \text{ ft} \times 4 \text{ ft} \times 8 \text{ ft}$$

$$= 128 \text{ ft}^3$$

40.

$$A = l \times w$$

$$A = 125 \text{ ft} \times 24 \text{ ft}$$

$$= 3000 \text{ ft}^2$$

$$V = l \times w \times h$$

$$V = 125 \text{ ft} \times 24 \text{ ft} \times 12 \text{ ft}$$

$$= 36,000 \text{ ft}^3$$

41.

$$8 \text{ ft} \times 12 \text{ in./ft} = 96 \text{ in.}$$

$$24 \text{ ft} \times 12 \text{ in./ft} = 288 \text{ in.}$$

$$V = l \times w \times h$$

$$= 96 \text{ in.} \times 288 \text{ in.} \times 3 \text{ in.}$$

$$= 82944 \text{ in}^3$$

$$1 \text{ ft}^3 = 1728 \text{ in}^3, \text{ so } \frac{82944 \text{ in}^3}{1728 \text{ in}^3} = 48 \text{ ft}^3 \text{ of mulch}$$

are needed.

Section 1.4: Formulas

1.

$$W = fd$$

$$W = (30)(20)$$

$$= 600$$

2.

$$W = fd$$

$$W = (17)(9)$$

$$= 153$$

3.

$$W = fd$$

$$W = (1125)(10)$$

$$= 11,250$$

4.

$$W = fd$$

$$W = (203)(27)$$

$$= 5481$$

5.

$$W = fd$$

$$W = (176)(326)$$

$$= 57,376$$

42.

$$4 \text{ ft} \times 12 \text{ in./ft} = 48 \text{ in.}$$

$$8 \text{ ft} \times 12 \text{ in./ft} = 96 \text{ in.}$$

$$48 \text{ in.} \times 96 \text{ in.} = 4608 \text{ in}^2$$

$$4 \text{ in.} \times 4 \text{ in.} = 16 \text{ in}^2$$

$$\frac{4608 \text{ in}^2}{16 \text{ in}^2} = 288 \text{ containers}$$

6.

$$W = fd$$

$$W = (2400)(120)$$

$$= 288,000$$

7.

$$f = ma$$

$$f = (1600)(24)$$

$$= 38,400$$

8.

$$P = \frac{V^2}{R}$$

$$P = \frac{(120)^2}{24}$$

$$= \frac{14,400}{24}$$

$$= 600$$

9.

$$I = \frac{E}{R}$$

$$I = \frac{120}{15}$$

$$= 8$$

10.

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

11.

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

12.

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

13.

$$\begin{aligned}A &= \frac{1}{2}bh \\A &= \frac{1}{2}(10 \text{ in.})(8 \text{ in.}) \\&= 40 \text{ in}^2\end{aligned}$$

14.

$$\begin{aligned}A &= \frac{1}{2}bh \\A &= \frac{1}{2}(36 \text{ cm})(20 \text{ cm}) \\&= 360 \text{ cm}^2\end{aligned}$$

15.

$$\begin{aligned}A &= \frac{1}{2}bh \\A &= \frac{1}{2}(54 \text{ ft})(30 \text{ ft}) \\&= 810 \text{ ft}^2\end{aligned}$$

16.

$$\begin{aligned}A &= \frac{1}{2}bh \\A &= \frac{1}{2}(188 \text{ m})(220 \text{ m}) \\&= 20,680 \text{ m}^2\end{aligned}$$

17.

$$\begin{aligned}A &= lw \\A &= (8 \text{ m})(7 \text{ m}) \\&= 56 \text{ m}^2\end{aligned}$$

18.

$$\begin{aligned}A &= lw \\A &= (24 \text{ in.})(15 \text{ in.}) \\&= 360 \text{ in}^2\end{aligned}$$

19.

$$\begin{aligned}A &= lw \\A &= (36 \text{ ft})(18 \text{ ft}) \\&= 648 \text{ ft}^2\end{aligned}$$

20.

$$\begin{aligned}A &= lw \\A &= (250 \text{ cm})(120 \text{ cm}) \\&= 30,000 \text{ cm}^2\end{aligned}$$

21.

$$\begin{aligned}A &= \left(\frac{a+b}{2}\right)h \\A &= \left(\frac{7 \text{ ft} + 9 \text{ ft}}{2}\right)(4 \text{ ft}) \\&= \left(\frac{16 \text{ ft}}{2}\right)(4 \text{ ft}) \\&= (8 \text{ ft})(4 \text{ ft}) \\&= 32 \text{ ft}^2\end{aligned}$$

22.

$$\begin{aligned}A &= \left(\frac{a+b}{2}\right)h \\A &= \left(\frac{30 \text{ in.} + 50 \text{ in.}}{2}\right)(24 \text{ in.}) \\&= \left(\frac{80 \text{ in.}}{2}\right)(24 \text{ in.}) \\&= (40 \text{ in.})(24 \text{ in.}) \\&= 960 \text{ in}^2\end{aligned}$$

23.

$$\begin{aligned}A &= \left(\frac{a+b}{2}\right)h \\A &= \left(\frac{96 \text{ cm} + 24 \text{ cm}}{2}\right)(30 \text{ cm}) \\&= \left(\frac{120 \text{ cm}}{2}\right)(30 \text{ cm}) \\&= (60 \text{ cm})(30 \text{ cm}) \\&= 1800 \text{ cm}^2\end{aligned}$$

24.

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

$$A = \left(\frac{450 \text{ m} + 750 \text{ m}}{2} \right) (250 \text{ m})$$

$$= \left(\frac{1200 \text{ m}}{2} \right) (250 \text{ m})$$

$$= (600 \text{ m})(250 \text{ m})$$

$$= 150,000 \text{ m}^2$$

25.

$$V = lwh$$

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

$$= 4500 \text{ cm}^3$$

26.

$$V = lwh$$

$$V = (48 \text{ in.})(24 \text{ in.})(96 \text{ in.})$$

$$= 110,592 \text{ in}^3$$

27.

$$v = v_0 + gt$$

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

$$= 172$$

28.

$$Q = CV$$

$$Q = (12)(2500)$$

$$= 30,000$$

33.

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 = $31,800 \text{ ft}^2 \div 1000 = 31.8 \text{ tsf}$

29.

$$I = \frac{E}{Z}$$

$$I = \frac{240}{15}$$

$$= 16$$

30.

$$P = I^2 R$$

$$P = (4)^2 (2000)$$

$$= 32,000$$

31.

$$P = cd^2 SN$$

$$P = (0.7853)(3)^2 (4)(4)$$

$$= 113.1$$

32.

$$l = \frac{V}{cd^2}$$

$$l = \frac{47 \text{ in}^3}{(0.785)(2.98 \text{ in.})^2}$$

$$= 6.742 \text{ in.}$$

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.
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.
6. a. $6+7+5=18$ is divisible by 3, so 675 is divisible by 3.
b. 675 is not divisible by 4.
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.

$V = lwh$

$V = (15 \text{ ft})(8 \text{ ft})(6 \text{ ft})$

$= 720 \text{ ft}^3$

12.

$d = vt$

$d = (45)(4)$

$= 180$

13.

$I = \frac{E}{R}$

$I = \frac{120}{12}$

$= 10$

3. 2,711,279

4. 620

8.

$3^2 + 12 \div 3 - 2 \times 3$

$= 9 + 4 - 6$

$= 7$

9.

$12 + 2[3(8 - 2) - 2(3 + 1)]$

$= 12 + 2[3(6) - 2(4)]$

$= 12 + 2[18 - 8]$

$= 12 + 2[10]$

$= 12 + 20$

$= 32$

14.

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(40)(15)$

$= 300$

15. $51 = 3 \cdot 17$ is not prime.

16. 47 is prime.

17. $1 + 9 + 5 = 15$ is divisible by 3, so 195 is not divisible by 3.

18. 821 does not end in 0 or 5, so it is not divisible by 5.

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

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

Section 1.6: Introduction to Fractions

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

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

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

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

5. $\frac{9}{48} = \frac{3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{16}$
6. $\frac{8}{10} = \frac{2 \cdot 2 \cdot 2}{2 \cdot 5} = \frac{4}{5}$
7. $\frac{13}{39} = \frac{13}{3 \cdot 13} = \frac{1}{3}$
8. $\frac{24}{36} = \frac{2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{2}{3}$
9. $\frac{48}{60} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{4}{5}$
10. $\frac{72}{96} = \frac{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{4}$
11. $\frac{9}{9} = 1$
12. $\frac{15}{1} = 15$
13. $\frac{0}{8} = 0$
14. $\frac{6}{6} = 1$
15. $\frac{9}{0}$ is undefined
16. $\frac{6}{8} = \frac{2 \cdot 3}{2 \cdot 2 \cdot 2} = \frac{3}{4}$
17. $\frac{14}{16} = \frac{2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$
18. $\frac{7}{28} = \frac{7}{2 \cdot 2 \cdot 7} = \frac{1}{4}$
19. $\frac{27}{36} = \frac{3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$
20. $\frac{15}{18} = \frac{3 \cdot 5}{2 \cdot 3 \cdot 3} = \frac{5}{6}$
21. $\frac{12}{16} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{3}{4}$
22. $\frac{9}{18} = \frac{3 \cdot 3}{2 \cdot 3 \cdot 3} = \frac{1}{2}$
23. $\frac{20}{25} = \frac{2 \cdot 2 \cdot 5}{5 \cdot 5} = \frac{4}{5}$
24. $\frac{12}{36} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{1}{3}$
25. $\frac{12}{40} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 5} = \frac{3}{10}$
26. $\frac{54}{72} = \frac{2 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$
27. $\frac{112}{128} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$
28. $\frac{330}{360} = \frac{2 \cdot 3 \cdot 5 \cdot 11}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5} = \frac{11}{12}$
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. a. $1\frac{1}{3} = \frac{(1 \times 3) + 1}{3} = \frac{4}{3} \text{ cups}$

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

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.

$$\begin{aligned} \frac{1}{14} + \frac{1}{15} + \frac{1}{6} &= \frac{15}{210} + \frac{14}{210} + \frac{35}{210} \\ &= \frac{64}{210} \\ &= \frac{32}{105} \end{aligned}$$

23.

$$\begin{aligned} \frac{3}{10} + \frac{1}{14} + \frac{4}{15} &= \frac{63}{210} + \frac{15}{210} + \frac{56}{210} \\ &= \frac{134}{210} \\ &= \frac{67}{105} \end{aligned}$$

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

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

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

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

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.

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

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

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

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

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

38.

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

$$2\frac{3}{4} = 2\frac{6}{8}$$

$$7\frac{9}{8} = 8\frac{1}{8}$$

39.

$$7\frac{3}{16} = 6\frac{19}{16}$$

$$4\frac{7}{8} = 4\frac{14}{16}$$

$$2\frac{5}{16}$$

40.

$$8\frac{1}{4} = 7\frac{20}{16}$$

$$4\frac{7}{16} = 4\frac{7}{16}$$

$$3\frac{13}{16}$$

41.

$$3\frac{4}{5} = 3\frac{36}{45}$$

$$9\frac{8}{9} = 9\frac{49}{45}$$

$$12\frac{86}{45} = 13\frac{41}{45}$$

42.

$$4\frac{5}{12} = 4\frac{25}{60}$$

$$6\frac{17}{20} = 6\frac{51}{60}$$

$$10\frac{76}{60} = 10\frac{19}{15} = 11\frac{4}{15}$$

43.

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

44.

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

45.

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

46.

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

47.

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

48.

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

49. a.

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

b.

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

50.

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

51.

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

52.

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

53.

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

54.

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

55.

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

56.

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

60. a.

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

b.

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

57.

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

58. $6 \text{ lb} \times 16 \text{ oz/lb} = 96 \text{ lb}$

$$\begin{aligned} & 3\frac{1}{2} \text{ oz} + 33\frac{1}{8} \text{ oz} + 96 \text{ oz} + 10\frac{1}{3} \text{ oz} \\ &= 3\frac{12}{24} \text{ oz} + 33\frac{3}{24} \text{ oz} + 96 \text{ oz} + 10\frac{8}{24} \text{ oz} \\ &= 142\frac{23}{24} \text{ oz} \end{aligned}$$

59.

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

61. a.

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

b.

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

62. a.

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

b.

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

63. a.

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

b.

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

64.

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

65.

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

66.

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

67.

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

68.

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

69.

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

70.

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

71. a.

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

b.

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

72.

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

73. a.

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

b.

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

74.

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

75.

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

76.

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

77.

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

78.

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

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:

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

80.

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

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:

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

83.

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

84.

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

85. a.

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

82.

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

85. (continued)

b.

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

86.

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

87.

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

88.

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

89.

$$\begin{aligned} \frac{3}{4} + \frac{1}{2} &= \frac{3}{4} + \frac{2}{4} \\ &= \frac{5}{4} = 1\frac{1}{4} \text{ sticks} \end{aligned}$$

90.

$$\begin{aligned} 15\frac{3}{8} - 12\frac{1}{2} &= 15\frac{3}{8} - 12\frac{4}{8} \\ &= 14\frac{11}{8} - 12\frac{4}{8} \\ &= 2\frac{7}{8} \text{ pies} \end{aligned}$$

91.

$$\begin{aligned} 3\frac{3}{8} - 2\frac{1}{4} &= 3\frac{3}{8} - 2\frac{2}{8} \\ &= 1\frac{1}{8} \text{ cups} \end{aligned}$$

92.

$$\begin{aligned} 5\frac{1}{2} - 1\frac{1}{2} - 2\frac{3}{4} &= 5\frac{2}{4} - 1\frac{2}{4} - 2\frac{3}{4} \\ &= 4\frac{6}{4} - 1\frac{2}{4} - 2\frac{3}{4} \\ &= 1\frac{1}{4} \text{ heads} \end{aligned}$$

93.

$$\begin{aligned} 1\frac{1}{2} + 3 - 1\frac{3}{4} - 2\frac{1}{2} - \frac{1}{8} &= 1\frac{4}{8} + 3 - 1\frac{6}{8} - 2\frac{4}{8} - \frac{1}{8} \\ &= \frac{12}{8} + 3 - 1\frac{6}{8} - 2\frac{4}{8} - \frac{1}{8} \\ &= \frac{1}{8} \text{ bag} \end{aligned}$$

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

Section 1.8: Multiplication and Division of Fractions

1. 12

2. 4

3. 9

4.

$$\begin{aligned} 3\frac{1}{2} \times \frac{2}{5} &= \frac{7}{2} \times \frac{2}{5} \\ &= \frac{7}{5} = 1\frac{2}{5} \end{aligned}$$

5.

$$\begin{aligned} 1\frac{3}{4} \times \frac{5}{16} &= \frac{7}{4} \times \frac{5}{16} \\ &= \frac{35}{64} \end{aligned}$$

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

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

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

9. 10

10.

$$\begin{aligned} & \frac{9}{16} \times \frac{2}{3} \times 1 \frac{6}{15} \\ &= \frac{9}{16} \times \frac{2}{3} \times \frac{21}{15} \\ &= \frac{9}{16} \times \frac{2}{3} \times \frac{7}{5} \\ &= \frac{21}{40} \end{aligned}$$

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

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

13.

$$\begin{aligned} & 2 \frac{1}{3} \times \frac{5}{8} \times \frac{6}{7} \\ &= \frac{7}{3} \times \frac{5}{8} \times \frac{6}{7} \\ &= \frac{5}{4} = 1 \frac{1}{4} \end{aligned}$$

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

15.

$$\begin{aligned} & \frac{6}{11} \times \frac{26}{35} \times 1 \frac{9}{13} \times \frac{7}{12} \\ &= \frac{6}{11} \times \frac{26}{35} \times \frac{22}{13} \times \frac{7}{12} \\ &= \frac{2}{5} \end{aligned}$$

16.

$$\begin{aligned} \frac{3}{8} \div \frac{1}{4} &= \frac{3}{8} \times \frac{4}{1} \\ &= \frac{3}{2} = 1 \frac{1}{2} \end{aligned}$$

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

32.

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

33.

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

34.

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

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

36. a.

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

b.

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

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

38.

$$\frac{6\frac{2}{3} \text{ ft}}{1\frac{3}{4} \text{ ft}} = \frac{\frac{20}{3} \text{ ft}}{\frac{7}{4} \text{ ft}} = \frac{80}{21} = 3\frac{17}{21} = 3 \text{ lengths}$$

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

42.

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

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

There will be three $4\frac{1}{2}$ ft pieces and one $3\frac{1}{2}$ ft piece.

43.

$$\begin{aligned} \text{bd ft} &= \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12} \\ \text{bd ft} &= \frac{10 \times 2 \text{ in.} \times 4 \text{ in.} \times 12 \text{ ft}}{12} = 80 \text{ bd ft} \end{aligned}$$

44.

$$\begin{aligned} \text{bd ft} &= \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12} \\ \text{bd ft} &= \frac{24 \times 4 \text{ in.} \times 4 \text{ in.} \times 16 \text{ ft}}{12} = 512 \text{ bd ft} \end{aligned}$$

45.

$$\begin{aligned} \text{bd ft} &= \frac{\text{number of boards} \times \text{thickness (in in.)} \times \text{width (in in.)} \times \text{length (in ft)}}{12} \\ \text{bd ft} &= \frac{175 \times 1 \text{ in.} \times 8 \text{ in.} \times 14 \text{ ft}}{12} = 1633\frac{1}{3} \text{ bd ft} \end{aligned}$$

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

39.

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

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

47.

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

48. There will be 8 spaces between the rivets.

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

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

Total lengths of the pieces:

$$\begin{aligned} 3 \times 2\frac{1}{8} \text{ in.} &= 6\frac{3}{8} \text{ in.} \\ 2 \times 5\frac{3}{4} \text{ in.} &= 11\frac{1}{2} \text{ in.} \\ 6 \times \frac{7}{8} \text{ in.} &= 5\frac{1}{4} \text{ in.} \\ 1 \times 3\frac{1}{2} \text{ in.} &= 3\frac{1}{2} \text{ in.} \\ 12 \times \frac{1}{16} \text{ in.} &= \frac{3}{4} \text{ in.} \end{aligned}$$

52. a.

$$\begin{aligned} 2 \text{ ft } 6 \text{ in.} &= 30 \text{ in.} \\ \frac{30 \text{ in.}}{2\frac{1}{2} \text{ in.}} &= \frac{30 \text{ in.}}{\frac{5}{2} \text{ in.}} = 30 \times \frac{2}{5} = 12 \text{ pins} \end{aligned}$$

49. There will be 15 spaces between the rivets.

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

50.

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

Remaining length:

$$\begin{aligned} 36 \text{ in.} &= 36 \text{ in.} \\ -6\frac{3}{8} \text{ in.} &= -6\frac{3}{8} \text{ in.} \\ -11\frac{1}{2} \text{ in.} &= -11\frac{4}{8} \text{ in.} \\ -5\frac{1}{4} \text{ in.} &= -5\frac{2}{8} \text{ in.} \\ -3\frac{1}{2} \text{ in.} &= -3\frac{4}{8} \text{ in.} \\ -\frac{3}{4} \text{ in.} &= -\frac{6}{8} \text{ in.} \\ &= \frac{69}{8} \text{ in.} = 8\frac{5}{8} \text{ in.} \end{aligned}$$

52. (continued)

b.

$$2\frac{1}{2} \text{ in.} + \frac{1}{16} \text{ in.} = 2\frac{8}{16} \text{ in.} + \frac{1}{16} \text{ in.} = 2\frac{9}{16} \text{ in.}$$

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

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

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

53.

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

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

$$= \frac{3}{128} \text{ in.}$$

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

$$= 390 \text{ revolutions}$$

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

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

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

55.

$V = lwh$

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

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

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

56.

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

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

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

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

57.

$$7\frac{1}{2} \text{ h} = \frac{15}{2} \text{ h}$$

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

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

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

59.

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

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

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

$$= 2750 \text{ W}$$

60.

$V = IR$

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

$$= \frac{17}{4} \times \frac{49}{2}$$

$$= \frac{833}{8} = 104\frac{1}{8} \text{ V}$$

61.

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

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

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

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

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

$$= 420 \text{ ft}$$

62.

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

$$\begin{aligned} \text{Current} &= 24 \div 10 \frac{1}{2} \\ &= 24 \div \frac{21}{2} \\ &= 24 \times \frac{2}{21} \\ &= \frac{16}{7} \text{ A} = 1 \frac{2}{7} \text{ A} \end{aligned}$$

63.

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

$$\begin{aligned} \text{Current} &= 24 \div 10 \frac{1}{2} \\ &= 24 \div \frac{21}{2} \\ &= 24 \times \frac{2}{21} \\ &= \frac{16}{7} \text{ A} = 1 \frac{2}{7} \text{ A} \end{aligned}$$

64.

$$\begin{aligned} \frac{25 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}}}{3 \frac{3}{4} \text{ in.}} &= \frac{300 \text{ in.}}{\frac{15}{4} \text{ in.}} \\ &= 300 \times \frac{4}{15} \\ &= 80 \text{ lengths} \end{aligned}$$

65. There will be 18 spaces between the outlets.

$$\begin{aligned} \frac{130 \frac{1}{2} \text{ ft}}{18} &= \frac{261}{18} \text{ ft} \\ &= \frac{261}{2} \text{ ft} \times \frac{1}{18} \\ &= 7 \frac{1}{4} \text{ ft or } 7 \frac{1}{4} \text{ ft } 3 \text{ in.} \end{aligned}$$

66.

$$\begin{aligned} 120 \text{ acres} \times 1 \frac{3}{4} \text{ gal/acres} \\ &= 120 \text{ acres} \times \frac{7}{4} \text{ gal/acres} \\ &= 210 \text{ gal} \end{aligned}$$

67.

$$\begin{aligned} \frac{60 \text{ gal}}{\frac{3}{4} \text{ gal}} &= 60 \times \frac{4}{3} = 80 \\ 80 \times \frac{1}{2} \text{ lb} &= 40 \text{ lb} \end{aligned}$$

68.

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

69.

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

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.

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

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

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

71.

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

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

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

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

75.

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

76.

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

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

78.

$$\begin{aligned} 3 \times 2 \frac{1}{2} \text{ oz} &= 3 \times \frac{5}{2} \text{ oz} \\ &= \frac{15}{2} \text{ oz} \\ &= 7 \frac{1}{2} \text{ oz} \end{aligned}$$

79.

$$\begin{aligned} 5 \times \frac{1}{2} \text{ tsp} &= \frac{5}{2} \text{ tsp} \\ &= 2 \frac{1}{2} \text{ tsp} \end{aligned}$$

80.

$$\begin{aligned} 6 \times 6 \frac{1}{8} \text{ in.} + 5 \times \frac{1}{4} \text{ in.} \\ &= 6 \times \frac{49}{8} \text{ in.} + 5 \times \frac{1}{4} \text{ in.} \\ &= \frac{147}{4} \text{ in.} + \frac{5}{4} \text{ in.} \\ &= \frac{152}{4} \text{ in.} = 38 \text{ in.} \end{aligned}$$

81. a.

$$\begin{aligned} \frac{3 \text{ in.} - 1 \frac{1}{2} \text{ in.}}{2} &= \frac{1 \frac{1}{2} \text{ in.}}{2} \\ &= \frac{\frac{3}{2} \text{ in.}}{2} \\ &= \frac{3}{2} \text{ in.} \times \frac{1}{2} \\ &= \frac{3}{4} \text{ in.} \end{aligned}$$

b.

$$\begin{aligned} \frac{3 \text{ in.} - 1 \frac{1}{2} \text{ in.}}{2} &= \frac{1 \frac{1}{2} \text{ in.}}{2} \\ &= \frac{\frac{3}{2} \text{ in.}}{2} \\ &= \frac{3}{2} \text{ in.} \times \frac{1}{2} \\ &= \frac{3}{4} \text{ in.} \end{aligned}$$

82.

$$\begin{aligned} \text{Area of face} &= \text{Outer area} - \text{Inner area} \\ &= 3 \text{ in.} \times 2 \frac{3}{4} \text{ in.} - 1 \frac{1}{2} \text{ in.} \times 2 \text{ in.} \\ &= 3 \text{ in.} \times \frac{11}{4} \text{ in.} - \frac{3}{2} \text{ in.} \times 2 \text{ in.} \\ &= \frac{33}{4} \text{ in}^2 - 3 \text{ in}^2 \\ &= \frac{33}{4} \text{ in}^2 - \frac{12}{4} \text{ in}^2 = \frac{21}{4} \text{ in}^2 \\ \text{Volume} &= A l \\ &= \frac{21}{4} \text{ in}^2 \times 12 \text{ in.} = 63 \text{ in}^3 \\ &= 11 \text{ whole cuts} \end{aligned}$$

83.

$$\begin{aligned} R_T &= \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} \\ R_T &= \frac{1}{\frac{1}{12 \Omega} + \frac{1}{6 \Omega}} \\ &= \frac{1}{\frac{1}{12 \Omega} + \frac{2}{12 \Omega}} \\ &= \frac{1}{\frac{3}{12 \Omega}} = \frac{12 \Omega}{3} = 4 \Omega \end{aligned}$$

84.

$$\begin{aligned} R_T &= \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} \\ R_T &= \frac{1}{\frac{1}{40 \Omega} + \frac{1}{60 \Omega} + \frac{1}{80 \Omega}} \\ &= \frac{1}{\frac{6}{240 \Omega} + \frac{4}{240 \Omega} + \frac{3}{240 \Omega}} \\ &= \frac{1}{\frac{13}{240 \Omega}} = \frac{240 \Omega}{13} = 18 \frac{6}{13} \Omega \end{aligned}$$

85.

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}}$$

$$R_T = \frac{1}{\frac{1}{6\Omega} + \frac{1}{12\Omega} + \frac{1}{24\Omega} + \frac{1}{48\Omega}}$$

$$= \frac{1}{\frac{8}{48\Omega} + \frac{4}{48\Omega} + \frac{2}{48\Omega} + \frac{1}{48\Omega}}$$

$$= \frac{1}{\frac{15}{48\Omega}} = \frac{48\Omega}{15} = 3\frac{3}{5}\Omega = 3\frac{1}{5}\Omega$$

86. There will be 4 cuts.

$$5 \times 18 \text{ in.} + 4 \times \frac{1}{8} \text{ in.} = 90 \text{ in.} + \frac{1}{2} \text{ in.}$$

$$= 90\frac{1}{2} \text{ in.}$$

$$= 7 \text{ ft } 6\frac{1}{2} \text{ in.}$$

87.

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

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

88.

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

89.

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

90.

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

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

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

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

91.

$$14 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = \frac{14}{16} \text{ lb} = \frac{7}{8} \text{ lb}$$

$$16\frac{1}{4} \text{ lb} - 5\frac{1}{2} \text{ lb} = 15\frac{5}{4} \text{ lb} - 5\frac{2}{4} \text{ lb}$$

$$= 10\frac{3}{4} \text{ lb}$$

$$\frac{10\frac{3}{4} \text{ lb}}{\frac{7}{8} \text{ lb}} = \frac{\frac{43}{4} \text{ lb}}{\frac{7}{8} \text{ lb}}$$

$$= \left(\frac{43}{4}\right)\left(\frac{8}{7}\right)$$

$$= \frac{86}{7} = 12\frac{2}{7}$$

Number of whole steaks = 12

92.

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

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

$$\frac{164 \text{ oz}}{192 \text{ oz}} = \frac{41}{48}$$

$$= \frac{4 \cdot 41}{4 \cdot 48} = \frac{41}{48}$$

93.

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

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

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

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

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

94.

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

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

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

1. $3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 7 \text{ in.} = 43 \text{ in.}$
2. $6 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} + 4 \text{ ft} = 22 \text{ ft}$
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.

$$144 \text{ fl oz} + 24 \text{ fl oz} + 56 \text{ fl oz} = 224 \text{ fl oz}$$

$$224 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 7 \text{ qt}$$

$$34. \quad 15 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{\frac{4}{25} \Omega}{1 \text{ ft}} = 7 \frac{1}{5} \Omega$$

36.

$$4200 \text{ lb} + 600 \text{ lb} + 5800 \text{ lb} + 1300 \text{ lb} + 2100 \text{ lb} = 14,000 \text{ lb}$$

$$14,000 \text{ lb} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 2 \text{ tons}$$

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.

$$72 \text{ in.} + 68 \text{ in.} + 82 \text{ in.} = 222 \text{ in.}$$

$$222 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 18 \frac{1}{2} \text{ ft}$$

$$b. \quad 18 \frac{1}{2} \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 6 \frac{1}{6} \text{ yd}$$

$$39. \quad a. \quad 2 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 10,560 \text{ ft}$$

$$b. \quad 10,560 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 3520 \text{ yd}$$

$$40. \quad a. \quad 17 \frac{1}{2} \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} = 70 \text{ qt}$$

$$b. \quad 70 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 140 \text{ pt}$$

$$41. \quad 3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 48 \text{ oz}$$

$$42. \quad 2200 \frac{\text{ft}^3}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ s}} = 36 \frac{2}{3} \text{ ft}^3/\text{s}$$

$$43. \quad 153 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 51 \text{ yd}$$

44.

$$3 \text{ ft} \times 6 \text{ ft} \times 4 \text{ ft} = 72 \text{ ft}^3$$

$$72 \text{ ft}^3 \times 62.4 \frac{\text{lb}}{\text{ft}^3} \times \frac{1 \text{ gal}}{8.34 \text{ lb}} = 538.7 \text{ gal}$$

$$45. \quad 561 \text{ ft} \times \frac{1 \text{ chain}}{66 \text{ ft}} = 8 \frac{1}{2} \text{ chains}$$

$$35. \quad 1 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{\frac{1}{10} \Omega}{1000 \text{ ft}} = \frac{66}{125} \Omega$$

$$46. \quad 12 \text{ fathoms} \times \frac{6 \text{ ft}}{1 \text{ fathom}} = 72 \text{ ft}$$

$$47. \quad 15 \text{ drams} \times \frac{27 \frac{17}{50} \text{ grains}}{1 \text{ dram}} = 410 \frac{1}{10} \text{ grains}$$

$$48. \quad 96 \text{ drams} \times \frac{1 \text{ oz}}{8 \text{ drams}} = 12 \text{ oz}$$

$$49. \quad 4500 \frac{\text{ft}}{\text{h}} \times \frac{1 \text{ h}}{60 \text{ min}} = 75 \frac{\text{ft}}{\text{min}}$$

$$50. \quad 28 \frac{\text{ft}}{\text{s}} \times \frac{60 \text{ s}}{1 \text{ min}} = 1680 \frac{\text{ft}}{\text{min}}$$

$$51. \quad 1 \frac{1}{5} \frac{\text{mi}}{\text{s}} \times \frac{60 \text{ s}}{1 \text{ min}} = 72 \frac{\text{mi}}{\text{min}}$$

$$52. \quad 7200 \frac{\text{ft}}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ s}} = 120 \frac{\text{ft}}{\text{s}}$$

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.

$$64 \frac{\text{ft}}{\text{s}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}}$$

$$= 43 \frac{7}{11} \frac{\text{mi}}{\text{h}}$$

$$55. \quad 24 \frac{\text{in.}}{\text{s}} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{60 \text{ s}}{1 \text{ min}} = 120 \frac{\text{ft}}{\text{min}}$$

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.

$$\begin{aligned} &14 \text{ yd } 5 \text{ ft } 34 \text{ in.} \\ &= 14 \text{ yd } 7 \text{ ft } 10 \text{ in.} \\ &= 16 \text{ yd } 1 \text{ ft } 10 \text{ in.} \end{aligned}$$

58.

$$\begin{aligned} &(8 \text{ yd } 1 \text{ ft } 3 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.}) \\ &= (8 \text{ yd } 0 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.}) \\ &= (7 \text{ yd } 3 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.}) \\ &= 5 \text{ yd } 1 \text{ ft } 9 \text{ in.} \end{aligned}$$

59. $3 \times 1.5 \text{ tons} \times \frac{2000 \text{ lb}}{1 \text{ ton}} = 9000 \text{ lb}$

64.

$$\begin{aligned} \frac{1}{4} \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} \times \frac{2 \text{ cups}}{1 \text{ pt}} \times \frac{8 \text{ fl oz}}{1 \text{ cup}} &= 160 \text{ fl oz} \\ \frac{160 \text{ fl oz}}{1\frac{1}{3} \text{ fl oz}} &= 120 \text{ servings} \end{aligned}$$

65.

$$\begin{aligned} 2 \text{ gal} &= 2 \text{ gal} \\ 2 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} &= \frac{1}{2} \text{ gal} \\ 3 \text{ pt} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} &= \frac{3}{8} \text{ gal} \\ \frac{1}{2} \text{ gal} &= \frac{1}{2} \text{ gal} \\ &= 3\frac{3}{8} \text{ gal} \end{aligned}$$

Unit 1B Review

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

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

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

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

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

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

61.

$$\begin{aligned} 4 \text{ rods} \times \frac{16.5 \text{ ft}}{1 \text{ rod}} &= 66 \text{ ft} \\ \frac{66 \text{ ft}}{3 \text{ ft}} &= 22 \text{ paces} \end{aligned}$$

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

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

6.

$$\begin{aligned} 5\frac{3}{8} - 2\frac{5}{12} \\ &= 5\frac{9}{24} - 2\frac{10}{24} \\ &= 4\frac{33}{24} - 2\frac{10}{24} \\ &= 4\frac{23}{24} \end{aligned}$$

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

8.

$$\begin{aligned}
 &= \frac{3}{4} \div 1\frac{5}{8} \\
 &= \frac{3}{4} \div \frac{13}{8} \\
 &= \frac{3}{4} \times \frac{8}{13} \\
 &= \frac{6}{13}
 \end{aligned}$$

9.

$$\begin{aligned}
 &1\frac{2}{3} + 3\frac{5}{6} - 2\frac{1}{4} \\
 &= 1\frac{8}{12} + 3\frac{10}{12} - 2\frac{3}{12} \\
 &= 4\frac{18}{12} - 2\frac{3}{12} \\
 &= 2\frac{15}{12} = 3\frac{3}{12} = 3\frac{1}{4}
 \end{aligned}$$

12.

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

13.

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

10.

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

11.

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

14.

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

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

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

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

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

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

20. $14 \text{ ft } 4 \text{ in.} = 13 \text{ ft } 16 \text{ in.}$
 $\underline{8 \text{ ft } 8 \text{ in.}} = \underline{8 \text{ ft } 8 \text{ in.}}$
 $= 5 \text{ ft } 8 \text{ in.}$

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.

$$\begin{aligned} \frac{3}{8} \text{ in.} - \frac{1}{16} \text{ in.} &= \frac{6}{16} \text{ in.} - \frac{1}{16} \text{ in.} \\ &= \frac{5}{16} \text{ in.} = 0.3125 \text{ in.} \end{aligned}$$

54. $\$17.33 + \$11.58 + \$11.58 = \40.49

55.

$$a = 2.69 \text{ cm} + 1.87 \text{ cm} = 4.56 \text{ cm}$$

$$b = 8.32 \text{ cm} - 3.45 \text{ cm} = 4.87 \text{ cm}$$

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.

$$0.3 \text{ A}$$

$$0.105 \text{ A}$$

$$0.45 \text{ A}$$

$$0.93 \text{ A}$$

$$0.27 \text{ A}$$

$$\underline{0.55 \text{ A}}$$

$$2.605 \text{ A}$$

62.

$$21.5 \Omega$$

$$42.6 \Omega$$

$$62.3 \Omega$$

$$19.8 \Omega$$

$$\underline{32.2 \Omega}$$

$$178.4 \Omega$$

56.

$$3.45 \text{ cm}$$

$$1.87 \text{ cm}$$

$$4.87 \text{ cm}$$

$$2.69 \text{ cm}$$

$$8.32 \text{ cm}$$

$$\underline{4.56 \text{ cm}}$$

$$25.76 \text{ cm}$$

57.

$$4.17 \text{ in.}$$

$$1.30 \text{ in.}$$

$$1.00 \text{ in.}$$

$$\underline{1.47 \text{ in.}}$$

$$7.94 \text{ in.}$$

63.

$$15.7 \Omega$$

$$40 \Omega$$

$$25.5 \Omega$$

$$0.6 \Omega$$

$$1200 \Omega$$

$$\underline{115 \Omega}$$

$$1396.8 \Omega$$

64.

$$3.2 \text{ V}$$

$$5.1 \text{ V}$$

$$0.45 \text{ V}$$

$$0.03 \text{ V}$$

$$0.8 \text{ V}$$

$$0.007 \text{ V}$$

$$\underline{2 \text{ V}}$$

$$11.587 \text{ V}$$

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. $11.20 \text{ billion} - 6.11 \text{ billion} = 5.09 \text{ billion}$

72. $\$114.57 + \$145.36 + \$99.21 = \359.14

73. 1317.5 bbl

74.

$$2\frac{1}{3} \text{ qt} + 1\frac{1}{6} \text{ qt} + 3\frac{1}{4} \text{ qt}$$

$$= 2\frac{4}{12} \text{ qt} + 1\frac{2}{12} \text{ qt} + 3\frac{3}{12} \text{ qt}$$

$$= 6\frac{9}{12} \text{ qt} = 6\frac{3}{4} \text{ qt} = 6.75 \text{ qt}$$

75.

$$1\frac{3}{4} \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal}$$

$$= 1.75 \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal}$$

$$= 3.4 \text{ gal}$$

76.

$$0.75 \text{ oz}$$

$$1.3 \text{ oz}$$

$$2.5 \text{ oz}$$

$$0.1 \text{ oz}$$

$$4.65 \text{ oz}$$

77.

$$2.5 \text{ lb} = 2.5 \text{ lb}$$

$$12 \text{ oz} \div 16 \text{ oz/lb} = 0.75 \text{ lb}$$

$$1.5 \text{ oz} \div 16 \text{ oz/lb} = 0.9375 \text{ lb}$$

$$0.7 \text{ lb} = 0.7 \text{ lb}$$

$$14 \text{ oz} \div 16 \text{ oz/lb} = 0.875 \text{ lb}$$

$$18 \text{ oz} \div 16 \text{ oz/lb} = 1.125 \text{ lb}$$

$$= 6.0125 \text{ lb}$$

$$= 6 \text{ lb}$$

Section 1.11: Rounding Numbers

1. a. 1700
b. 1650

2. a. 1800
b. 1760

3. a. 3100
b. 3130

4. a. 100
b. 70

5. a. 18,700
b. 18,680

6. a. 6000
b. 5970

7. a. 3.1
b. 3.142

8. a. 0.2
b. 0.162

9. a. 0.1
b. 0.57

10. a. 1.0
b. 0.984

11. a. 0.1
b. 0.070

12. a. 3.8
b. 3.765

13. 600 ; 640 ; 636 ; 636.2 ; 636.18 ; 636.183

14. 1500 ; 1450 ; 1452 ; 1451.5 ; 1451.53 ; 1451.525

15. 17,200 ; 17,160 ; 17,159 ; 17,159.2 ; 17,159.17 ; 17,159.167

16. 0 ; 10 ; 8 ; 8.2 ; 8.17 ; 8.172

17. 1,543,700 ; 1,543,680 ; 1,543,679 ; N/A ; N/A ; N/A

18. 41,900 ; 41,890 ; 41,892 ; 41,892.2 ; 41,892.16 ; 41,892.157

19. 10,600 ; 10,650 ; 10,650 ; 10,649.8 ; 10,649.83 ; N/A

20. 100 ; 80 ; 84 ; 84.0 ; 84.01 ; 84.007

21. 600 ; 650 ; 650 ; 649.9 ; 649.90 ; 649.900

22. 100 ; 150 ; 148 ; 148.0 ; 148.00 ; 147.995

23. 237,000

24. 203

25. 0.0328
 26. 64,000
 27. 72
 28. 0.033
 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

19.

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

20.

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

21.

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

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

22.

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

23.

$$\frac{3.6 \text{ ft}}{3} = 1.2 \text{ ft}$$

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

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

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

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

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

29.

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

$$= 106.5 \text{ in.}$$

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

30.

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

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

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

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

32. $8 \times 4.75 \text{ mm} = 38.0 \text{ mm}$

33.

$$n = \frac{1}{p}$$

$$n = \frac{1}{0.0125}$$

$$= 80 \text{ threads/in.}$$

34.

$$\frac{78 \text{ ft}}{3.25 \text{ ft}} = 24$$

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

42. $\frac{\$535}{\$26.75} = 20 \text{ hours}$

43. $6 \times 56.25 \text{ in}^3 = 337.5 \text{ in}^3$

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

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

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

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

35.

$$32.63 \text{ in.} - 8 \times 3.56 \text{ in.} - 8 \times 0.15 \text{ in.}$$

$$= 2.95 \text{ in.}$$

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

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

38.

$$(45 \text{ ft } 3 \text{ in.})(64 \text{ ft } 6 \text{ in.})$$

$$= (45.25 \text{ ft})(64.5 \text{ ft})$$

$$= 2918.625 \text{ ft}^2$$

39.

$$V = lwh$$

$$V = (87 \text{ ft})(42 \text{ ft})(8 \text{ ft})$$

$$= 29,232 \text{ ft}^3$$

$$\text{Cost} = 29,232 \text{ ft}^3 \times \left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)^3 \times \frac{\$4.50}{1 \text{ yd}^3}$$

$$= \$4872.00$$

40.

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

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

$$= 14 \text{ cuts}$$

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

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

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

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
 $\frac{\$312.00}{500 \text{ lb}} = \$0.625/\text{lb}$.
- 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. $(0.95 \text{ V})(0.0065 \text{ A}) = 0.006175 \text{ W}$
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. $365 \text{ days} \times 4.4 \text{ lb/day} = 1606 \text{ lb}$
69. $312,780,968 \text{ people} \times 4.4 \text{ lb/person} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 688,000 \text{ tons}$
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. $3.25 \times 0.25 \text{ gal} = 0.8125 \text{ gal}$
- 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.
- $$5.5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 88 \text{ oz}$$
- $$\frac{242 \text{ oz}}{88 \text{ oz}} = 2.75, \text{ so } 3 \text{ containers}$$
- 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. $\frac{1}{6} = 0.16\text{ r } 4 = 16\frac{4}{6}\% = 16\frac{2}{3}\%$
46. $\frac{1}{3} = 0.33\text{ r } 1 = 33\frac{1}{3}\%$
47. $\frac{4}{9} = 0.44\text{ r } 4 = 44\frac{4}{9}\%$
48. $\frac{3}{7} = 0.42\text{ r } 6 = 42\frac{6}{7}\%$
49. $\frac{3}{5} = 0.60 = 60\%$
50. $\frac{5}{6} = 0.83\text{ r } 2 = 83\frac{2}{6}\% = 83\frac{1}{3}\%$
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. $1\frac{3}{4} = 1.75 = 175\%$
58. $2\frac{1}{3} = \frac{7}{3} = 2.33\text{ r } 1 = 233\frac{1}{3}\%$
59. $2\frac{5}{12} = \frac{29}{12} = 2.41\text{ r } 8 = 241\frac{8}{12}\% = 241\frac{2}{3}\%$
60. $5\frac{3}{8} = 5.375 = 537.5\% \text{ or } 537\frac{1}{2}\%$
61. $75\% = \frac{75}{100} = \frac{3}{4}$
62. $45\% = \frac{45}{100} = \frac{9}{20}$
63. $16\% = \frac{16}{100} = \frac{4}{25}$

64. $80\% = \frac{80}{100} = \frac{4}{5}$
65. $60\% = \frac{60}{100} = \frac{3}{5}$
66. $15\% = \frac{15}{100} = \frac{3}{20}$
67. $93\% = \frac{93}{100}$
68. $32\% = \frac{32}{100} = \frac{8}{25}$
69. $275\% = \frac{275}{100} = \frac{11}{4} = 2\frac{3}{4}$
70. $325\% = \frac{325}{100} = \frac{13}{4} = 3\frac{1}{4}$
71. $125\% = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$
72. $150\% = \frac{150}{100} = \frac{3}{2} = 1\frac{1}{2}$
73. $10\frac{3}{4}\% = \frac{43}{4}\% = \frac{43}{4} \times \frac{1}{100} = \frac{43}{400}$
74. $13\frac{2}{5}\% = \frac{67}{5}\% = \frac{67}{5} \times \frac{1}{100} = \frac{67}{500}$
75. $10\frac{7}{10}\% = \frac{107}{10}\% = \frac{107}{10} \times \frac{1}{100} = \frac{107}{1000}$

76. $40\frac{7}{20}\% = \frac{807}{20}\% = \frac{807}{20} \times \frac{1}{100} = \frac{807}{2000}$
77. $17\frac{1}{4}\% = \frac{69}{4}\% = \frac{69}{4} \times \frac{1}{100} = \frac{69}{400}$
78. $6\frac{1}{3}\% = \frac{19}{3}\% = \frac{19}{3} \times \frac{1}{100} = \frac{19}{300}$
79. $16\frac{1}{6}\% = \frac{97}{6}\% = \frac{97}{6} \times \frac{1}{100} = \frac{97}{600}$
80. $72\frac{1}{8}\% = \frac{577}{8}\% = \frac{577}{8} \times \frac{1}{100} = \frac{577}{800}$

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. $P = \text{unknown}$; $R = 4\%$; $B = 28,000$
- 11.
- $$P = BR$$
- $$P = (\$32,500)(0.08)$$
- $$= \$2600$$

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

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. $P = \$90$; $R = \text{unknown}$; $B = \$500$
- 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
 $12 \times \$3042.20 = \$36,506.40$.

13. a.

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

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

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

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

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

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

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

$$\text{b. } 137.96 + 0.0625 \times 137.96 = \$146.58$$

14.

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

$$B = \frac{2040}{0.75}$$

$$= 2720$$

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.

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

$$R = \frac{3.5}{7.15}$$

$$= 0.490 = 49.0\%$$

19.

$$P = BR$$

$$P = (48)(2.35)$$

$$= 112.8$$

20.

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

$$R = \frac{\frac{1}{15}}{\frac{1}{8}}$$

$$= \frac{8}{15} = 0.533 = 53.3\%$$

21.

$$P = BR$$

$$P = (32 \text{ V})(0.28)$$

$$= 8.96 \text{ V}$$

22.

$$P = BR$$

$$P = (50)(1.10)$$

$$= 55$$

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.

$$\text{Total hours} = 1.5 \text{ h} + 0.4 \text{ h} = 1.9 \text{ h}$$

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

$$R = \frac{0.4 \text{ h}}{1.9 \text{ h}}$$

$$= 0.211 = 21.1\%$$

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.

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

$$= 191 \text{ ft}^2$$

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

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

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.

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

$$= 440 \text{ lb}$$

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

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

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.

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

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

36.

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

$$= 11,040 \text{ ft}^2$$

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

$$= 22 \text{ lb}$$

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.

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

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

$$= 0.025 = 2.5\%$$

43.

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

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

$$= 53.3\%$$

44.

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

$$\text{Percent decrease} = \frac{\$93,500 - \$75,400}{\$93,500} \times 100\%$$

$$= 19.4\%$$

45.

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

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

$$= 14.2\%$$

46.

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

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

$$= 23.2\%$$

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.

$$P = BR$$

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

$$= \$7.09$$

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

49.

$$P = BR$$

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

$$= 1558 \text{ lb}$$

42.

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

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

$$= 11.3\%$$

50.

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

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

$$= 0.472 = 47.2\%$$

51.

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

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

$$= 0.748 = 74.8\%$$

52.

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

$$= 152$$

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

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

$$= 0.126 = 12.6\%$$

53. a.

$$P = BR$$

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

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

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

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

53. (continued)

b.

$$P = BR$$

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

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

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

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

54. a.

$$P = BR$$

$$P = (4.6 \text{ lb})(0.25)$$

$$= 1.15 \text{ lb}$$

$$\text{Average per day} = 4.6 \text{ lb} - 1.15 \text{ lb} = 3.45 \text{ lb}$$

b.

$$3.45 \text{ lb} \times 75,000 \times 365 \times \frac{1 \text{ ton}}{2000 \text{ lb}}$$

$$= 47,200 \text{ tons}$$

c.

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

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

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

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

55.

$$\text{Total cost} = \$5.66$$

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

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

$$= \$16.65$$

56.

$$P = BR$$

$$P = (70 \text{ lb})(0.17)$$

$$= 11.9 \text{ lb}$$

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

57.

Total Cost	
22 × \$1.33 =	\$29.26
14 × \$3.89 =	\$54.46
12 × \$6.49 =	\$77.88
6 × \$7.43 =	\$44.58
6 × \$8.76 =	\$52.56
6 × \$5.54 =	\$33.24
5 × \$6.45 =	\$32.25
4 × \$2.09 =	\$8.36
120 × \$1.69 =	\$202.80
32 × \$48.00 =	\$1536
Total	\$2,071.39
Less 5% Cash Discount Net 30 Days	\$103.57
Net Total	\$1,967.82

58.

Net Weight Pound	No. of Bushels	Amount
12400	207	\$1,173.69
$26720 - 9240 = 17480$	$17480/60 = 291$	$291 \times \$5.71 = \1661.61
$20240 - 7480 = 12760$	$12760/60 = 213$	$213 \times \$5.74 = \1222.62
$28340 - 9200 = 19140$	$19140/60 = 319$	$319 \times \$5.81 = \1853.39
$26760 - 9160 = 17600$	$17600/60 = 293$	$293 \times \$5.76 = \1687.68
$17880 - 7485 = 10395$	$10395/60 = 173$	$173 \times \$5.76 = \996.48
$25620 - 9080 = 16540$	$16540/60 = 276$	$276 \times \$11.72 = \3234.72
$21560 - 7640 = 13920$	$13920/60 = 232$	$232 \times \$11.69 = \2712.08
$26510 - 9060 = 17450$	$17450/60 = 291$	$291 \times \$11.68 = \3398.88
$22630 - 7635 = 14995$	$14995/60 = 250$	$250 \times \$11.65 = \2912.5
$22920 - 9220 = 13700$	$13700/60 = 228$	$228 \times \$11.72 = \2672.16
$20200 - 7660 = 12540$	$12540/60 = 209$	$209 \times \$11.81 = \2468.29
$25880 - 9160 = 16720$	$16720/60 = 279$	$279 \times \$11.9 = \3320.1
$21300 - 7675 = 13625$	$13625/60 = 227$	$227 \times \$11.84 = \2687.68
$18200 - 7665 = 10535$	$10535/60 = 176$	$176 \times \$11.79 = \2075.04
$26200 - 9150 = 17050$	$17050/56 = 304$	$304 \times \$4.68 = \1422.72
$22600 - 7650 = 14950$	$14950/56 = 267$	$267 \times \$4.65 = \1241.55
$27100 - 9080 = 18020$	$18020/56 = 322$	$322 \times \$4.66 = \1500.52
$22550 - 7635 = 14915$	$14915/56 = 266$	$266 \times \$4.61 = \1226.26
$23600 - 7680 = 15920$	$15920/56 = 284$	$284 \times \$4.59 = \1303.56
$26780 - 9160 = 17620$	$17620/56 = 315$	$315 \times \$4.63 = \1458.45
$28310 - 9200 = 19110$	$19110/56 = 341$	$341 \times \$4.69 = \1599.29
$21560 - 7665 = 13895$	$13895/56 = 248$	$248 \times \$4.67 = \1158.16
$25750 - 9160 = 16590$	$16590/56 = 296$	$296 \times \$4.65 = \1376.4
	Total	45190.14

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
	$4 \times \$12.10 = \48.40
	$9 \times \$5.39 = \48.51
	$7 \times \$4.97 = \34.79
	$10 \times \$11.97 = \119.70
	$6 \times \$16.89 = \101.34
	$11 \times \$18.55 = \204.05
	$15 \times \$24.25 = \363.75
	$27 \times \$16.95 = \457.65
	$7 \times \$14.39 = \100.73
	$1 \times \$24.96 = \24.96
	$10 \times \$10.37 = \103.7
	$27 \times \$19.85 = \535.95
	$7 \times \$12.25 = \85.75
	$1 \times \$17.85 = \17.85
	$7 \times \$12.19 = \85.33
	$8 \times \$3.49 = \27.92
	$3 \times \$17.65 = \52.95
	$80 \times \$17.29 = \1383.2
	$7 \times \$20.65 = \144.55
	$\$5428.59 - \108.57
	$1 \times \$33.59 = \33.59
	$3 \times \$34.97 = \104.91
	$250 \times \$2.18 = \545
Subtotal	\$5428.59
Less 2% Discount	$\$5428.59 \times 0.02 = \108.57
Subtotal	$\$5428.59 - \$108.57 = \$5320.02$
5 $\frac{3}{4}$ % Sales Tax	$\$5320.02 \times 0.0575 = \305.90
NET TOTAL	$\$5320.02 + \$305.90 = \$5625.92$

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

- | | |
|---------------|------------------|
| 1. 225 | 6. 2,940,000,000 |
| 2. 625 | 7. 729 |
| 3. 222 | 8. 2740 |
| 4. 0.000778 | 9. 562 |
| 5. 0.00000661 | 10. 0.0000114 |

11. 0.00483
 12. 15,300
 13. 157
 14. 276,000
 15. 2.96
 16. 112

17. 68.9
 18. 0.0806
 19. 42.4
 20. 2.12
 21. 0.198
 22. 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.

$$i = prt$$

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

$$= \$225$$

3.

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

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

$$= \$7500(1.01625)^{16}$$

$$= \$9706.67$$

4.

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

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

$$= \$10,500(1.02875)^{12}$$

$$= \$14,753.92$$

5.

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

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

$$= \$15,000(1.0275)^{16}$$

$$= \$23,152.64$$

6.

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

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

$$= \$6000(1.01875)^{20}$$

$$= \$8699.69$$

7.

$$P = \$150,000$$

$$i = 0.065/12$$

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

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

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

$$= \$948.10$$

8.

$$P = \$75,000$$

$$i = 0.0625/12$$

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

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

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

$$= \$643.07$$

9.

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

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

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

$$i = 0.0675$$

$$n = 20$$

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

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

$$= \$78,276.71$$

The annual payment is $\$6429.83 \times 12$

$$= \$77,157.96.$$

11. a.

$$P = \$24,000$$

$$i = 0.0075/12$$

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

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

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

$$= \$674.40$$

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

10.

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

$$i = 0.0725/12$$

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

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

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

$$= \$653.36$$

11. (continued)

b.

$$P = \$24,000 - \$1500 = \$22,500$$

$$i = 0.085/12$$

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

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

$$A = \$22,500 \left(\frac{\left(\frac{0.085}{12} \right) \left(1 + \frac{0.085}{12} \right)^{36}}{\left(1 + \frac{0.085}{12} \right)^{36} - 1} \right)$$

$$= \$710.27$$

$$\text{Total payment} = \$710.27 \times 36 = \$25,569.71$$

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.

$$P = \$220,500 - \$4500 - \$9500 - \$8000 = \$198,500$$

$$i = 0.08$$

$$n = 4$$

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

$$\begin{aligned} A &= \$198,500 \left(\frac{(0.08)(1+0.08)^4}{(1+0.08)^4 - 1} \right) \\ &= \$59,931.28 \end{aligned}$$

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.

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

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{1} \right)^{(1)(3)} \\ &= \$30,000(1.05)^3 \\ &= \$34,728.75 \end{aligned}$$

16.

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

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{12} \right)^{(12)(3)} \\ &= \$34,844.17 \end{aligned}$$

17.

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

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{365} \right)^{(365)(3)} \\ &= \$34,854.67 \end{aligned}$$

18.

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

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{52} \right)^{(52)(3)} \\ &= \$34,852.52 \end{aligned}$$

19.

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

$$\begin{aligned} A &= \$8400 \left(1 + \frac{0.035}{12} \right)^{(12)(5)} \\ &= \$10,003.92 \end{aligned}$$

20.

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

$$\begin{aligned} A &= \$4000 \left(1 + \frac{0.055}{52} \right)^{(52)(4)} \\ &= \$4983.73 \end{aligned}$$

21.

$$P = \$37,500 - \$37,500 \times 0.10 + \$37,500 \times 0.06$$

$$= \$36,000$$

$$i = 0.042/12 = 0.0035$$

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

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

$$A = \$36,000 \left(\frac{0.0035(1+0.0035)^{36}}{(1+0.0035)^{36} - 1} \right)$$

$$= \$1066.07$$

22.

$$\text{Discount amount} = (0.02)(\$12,000) = \$240$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$12,000 - \$240} \times \frac{365}{20} = 37.2\%$$

23.

$$\text{Discount amount} = (0.03)(\$15,870) = \$476.10$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$476.10}{\$15,870 - \$476.10} \times \frac{365}{20} = 56.4\%$$

24.

$$\text{Discount amount} = (0.02)(\$3000) = \$60$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$60}{\$3000 - \$60} \times \frac{365}{18} = 41.4\%$$

25.

$$\text{Discount amount} = (0.025)(\$129,115.23) = \$3227.88$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$3227.88}{\$129,115.23 - \$3227.88} \times \frac{365}{20} = 46.8\%$$

26.

$$\text{Discount amount} = (0.02)(\$22,000) = \$440$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$440}{\$22,000 - \$440} \times \frac{365}{30} = 24.8\%$$

27.

$$\text{Discount amount} = (0.01)(\$21,500) = \$215$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$215}{\$21,500 - \$215} \times \frac{365}{10} = 36.9\%$$

28.

$$\text{Discount amount} = (0.015)(\$16,000) = \$240$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$16,000 - \$240} \times \frac{365}{20} = 27.8\%$$

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

15.0 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

$$\begin{aligned}
 5. \quad & 12 - 3(5 - 2) \\
 & = 12 - 3(3) \\
 & = 12 - 9 \\
 & = 3
 \end{aligned}$$

$$\begin{aligned}
 6. \quad & (6 + 4)8 \div 2 + 3 \\
 & = (10)8 \div 2 + 3 \\
 & = 80 \div 2 + 3 \\
 & = 40 + 3 \\
 & = 43
 \end{aligned}$$

$$\begin{aligned}
 9. \quad & \text{Area of upper rectangle: } 12 \text{ cm} \times 5 \text{ cm} = 60 \text{ cm}^2 \\
 & \text{Area of lower rectangle: } 10 \text{ cm} \times 28 \text{ cm} = \underline{280 \text{ cm}^2} \\
 & \text{Total area: } \quad \quad \quad = 340 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 10. \quad & \text{Volume of left box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^3 \\
 & \text{Volume of middle box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^3 \\
 & \text{Volume of right box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = \underline{10 \text{ cm}^3} \\
 & \text{Total Volume: } \quad \quad \quad = 30 \text{ cm}^3
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & C = \frac{5}{9}(F - 32) \\
 & C = \frac{5}{9}(50 - 32) \\
 & = \frac{5}{9}(18) \\
 & = 10
 \end{aligned}$$

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. $4\frac{1}{6}$

$$\begin{aligned}
 7. \quad & 18 \div 2 \times 5 \div 3 - 6 + 4 \times 7 \\
 & = 9 \times 5 \div 3 - 6 + 28 \\
 & = 45 \div 3 - 6 + 28 \\
 & = 15 - 6 + 28 \\
 & = 37
 \end{aligned}$$

$$\begin{aligned}
 8. \quad & 18 / (5 - 3) + (6 - 2) \times 8 - 10 \\
 & = 18 / 2 + 4 \times 8 - 10 \\
 & = 9 + 32 - 10 \\
 & = 31
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & P = \frac{Fs}{t} \\
 & P = \frac{(600)(50)}{10} \\
 & = \frac{30,000}{10} \\
 & = 3000
 \end{aligned}$$

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.

$$\begin{aligned} & \frac{1}{4} + \frac{5}{12} + \frac{5}{6} \\ &= \frac{3}{12} + \frac{5}{12} + \frac{10}{12} \\ &= \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2} \end{aligned}$$

24.

$$\begin{aligned} & \frac{29}{36} - \frac{7}{30} \\ &= \frac{145}{180} - \frac{42}{180} \\ &= \frac{103}{180} \end{aligned}$$

25.

$$\begin{aligned} & 5\frac{3}{16} + 9\frac{5}{12} \\ &= 5\frac{9}{48} + 9\frac{20}{48} \\ &= 14\frac{29}{48} \end{aligned}$$

26.

$$\begin{aligned} & 6\frac{3}{8} - 4\frac{7}{12} \\ &= 6\frac{9}{24} - 4\frac{14}{24} \\ &= 5\frac{33}{24} - 4\frac{14}{24} \\ &= 1\frac{19}{24} \end{aligned}$$

27.

$$\begin{aligned} & 18 - 6\frac{2}{5} \\ &= 17\frac{5}{5} - 6\frac{2}{5} \\ &= 11\frac{3}{5} \end{aligned}$$

28.

$$\begin{aligned} & 16\frac{2}{3} + 1\frac{1}{4} - 12\frac{11}{12} \\ &= 16\frac{8}{12} + 1\frac{3}{12} - 12\frac{11}{12} \\ &= 17\frac{11}{12} - 12\frac{11}{12} \\ &= 5 \end{aligned}$$

29. $\frac{1}{4}$

30.

$$\begin{aligned} & 3\frac{6}{7} \times 4\frac{2}{3} \\ &= \frac{27}{7} \times \frac{14}{3} \\ &= 18 \end{aligned}$$

31.

$$\begin{aligned} & \frac{3}{8} \div 6 \\ &= \frac{3}{8} \times \frac{1}{6} \\ &= \frac{1}{16} \end{aligned}$$

32.

$$\begin{aligned} & \frac{2}{3} \div 1\frac{7}{9} \\ &= \frac{2}{3} \div \frac{16}{9} \\ &= \frac{2}{3} \times \frac{9}{16} \\ &= \frac{3}{8} \end{aligned}$$

33.

$$\begin{aligned} & 1\frac{4}{5} \div 1\frac{9}{16} \times 11\frac{2}{3} \\ &= \frac{9}{5} \div \frac{25}{16} \times \frac{35}{3} \\ &= \frac{9}{5} \times \frac{16}{25} \times \frac{35}{3} \\ &= \frac{144}{125} \times \frac{35}{3} \\ &= \frac{336}{25} = 13\frac{11}{25} \end{aligned}$$

34.

$$\begin{aligned}
 A &= 12\frac{5}{16} \text{ in.} - 4\frac{3}{8} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 4\frac{6}{16} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 11\frac{21}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 3\frac{6}{16} \text{ in.} = 3\frac{3}{8} \text{ in.} \\
 B &= 9\frac{3}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} + 2\frac{1}{2} \text{ in.} \\
 &= 9\frac{3}{32} \text{ in.} + 2\frac{16}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 11\frac{19}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 5\frac{14}{32} \text{ in.} = 5\frac{7}{16} \text{ in.}
 \end{aligned}$$

$$35. \quad 6 \text{ lb } 9 \text{ oz} = \left(6 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}}\right) + 9 \text{ oz} = 105 \text{ oz}$$

$$36. \quad 168 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 2016 \text{ in.}$$

$$37. \quad 72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$$

$$38. \quad 36 \text{ mi} \times \frac{1760 \text{ yd}}{3 \text{ mi}} = 63,360 \text{ yd}$$

$$39. \quad 0.5625$$

$$40. \quad 0.416$$

$$41. \quad \frac{45}{100} = \frac{9}{20}$$

$$42. \quad 19\frac{625}{1000} = 19\frac{5}{8}$$

$$43. \quad 168.278$$

$$44. \quad 17.25$$

$$45. \quad 68.665$$

$$46. \quad 33.72$$

$$47. \quad 3206.5$$

$$48. \quad 1.9133$$

$$49. \quad 3.18$$

$$50. \quad 20.6$$

51. a. 200

b. 248.2

c. 250

52. a. 5.6

b. 5.65

c. 5.6491

$$53. \quad 15\% = \frac{15}{100} = 0.15$$

$$54. \quad 8\frac{1}{4}\% = 8.25\% = 0.0825$$

55. 6.5%

56. 120%

57.

$$P = BR$$

$$P = (\$12,000)(0.0875)$$

$$= \$1050$$

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.

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

$$R = \frac{\$32,000}{\$84,000}$$

$$= 38.1\%$$

60.

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

$$R = \frac{\frac{11}{64}}{\frac{13}{32}} = \frac{11}{64} \times \frac{32}{13}$$

$$= 42.3\%$$

61. $60 \text{ tons} \times 0.80 = 48 \text{ tons}$

62.

$$\begin{aligned} & 6 \times \left(3\frac{1}{16} \text{ in.} \right) + 5 \times \left(\frac{1}{4} \text{ in.} \right) + 2 \times \left(1\frac{1}{8} \text{ in.} \right) \\ &= 6 \times \left(\frac{49}{16} \text{ in.} \right) + 5 \times \left(\frac{1}{4} \text{ in.} \right) + 2 \times \left(\frac{9}{8} \text{ in.} \right) \\ &= \frac{147}{8} \text{ in.} + \frac{5}{4} \text{ in.} + \frac{9}{4} \text{ in.} \\ &= \frac{147}{8} \text{ in.} + \frac{10}{8} \text{ in.} + \frac{18}{8} \text{ in.} \\ &= 21\frac{7}{8} \text{ in.} \end{aligned}$$

Chapter 1 Test

1. 5729

2. 3516

5.

$$\begin{aligned} & 8 + 2(5 \times 6 + 8) \\ &= 8 + 2(30 + 8) \\ &= 8 + 2(38) \\ &= 8 + 76 = 84 \end{aligned}$$

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: $\quad\quad\quad = 750 \text{ m}^2$

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: $\quad\quad\quad = 2160 \text{ in}^3$

9. $\frac{120 \text{ V}}{40 \Omega} = 3 \text{ A}$

10.

$$\begin{aligned} P &= 2l + 2w \\ P &= 2(20) + 2(15) \\ &= 40 + 30 \\ &= 70 \end{aligned}$$

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 $30 \text{ in.} \times 41 \text{ in.}$

65. 4020

66. 139

3. 2,584.450

4. 1600

6.

$$\begin{aligned} & 15 - 9 \div 3 + 3 \times 4 \\ &= 15 - 3 + 12 = 24 \end{aligned}$$

11.

$$t = \frac{d}{r}$$

$$\begin{aligned} t &= \frac{1050}{21} \\ &= 50 \end{aligned}$$

12.

$P = 2a + b$

$P = 2(36) + 15$

$= 72 + 15$

$= 87$

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. $\frac{28}{42} = \frac{2 \cdot 14}{3 \cdot 14} = \frac{2}{3}$

17. $\frac{23}{6} = 3 \text{ r } 5 = 3\frac{5}{6}$

18. $3\frac{1}{4} = \frac{3 \times 4 + 1}{4} = \frac{13}{4}$

19. $\frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{2}{8} = \frac{5}{8}$

20. $\frac{5}{16} - \frac{5}{32} = \frac{10}{32} - \frac{5}{32} = \frac{5}{32}$

21.

$3\frac{1}{8} = 3\frac{1}{8}$

$2\frac{1}{2} = 2\frac{4}{8}$

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

$9\frac{11}{8} = 10\frac{3}{8}$

22.

$10\frac{1}{8} - 3\frac{5}{16}$

$= 10\frac{2}{16} - 3\frac{5}{16}$

$= 9\frac{18}{16} - 3\frac{5}{16}$

$= 6\frac{13}{16}$

23.

$3\frac{5}{8} + 2\frac{3}{16} - 1\frac{1}{4}$

$= 3\frac{10}{16} + 2\frac{3}{16} - 1\frac{4}{16}$

$= 5\frac{13}{16} - 1\frac{4}{16}$

$= 4\frac{9}{16}$

24. $\frac{3}{8} \times \frac{16}{27} = \frac{3}{8} \times \frac{8 \cdot 2}{9 \cdot 3} = \frac{2}{9}$

25.

$\frac{3}{8} \div 3\frac{5}{16} = \frac{3}{8} \div \frac{53}{16}$

$= \frac{3}{8} \times \frac{16}{53}$

$= \frac{6}{53}$

26. $\frac{3}{40}$

27.

$3\frac{5}{8} + 1\frac{3}{4} \times 6\frac{1}{5} = \frac{29}{8} + \frac{7}{4} \times \frac{31}{5}$

$= \frac{29}{8} + \frac{217}{20}$

$= \frac{145}{40} + \frac{434}{40}$

$= \frac{579}{40} = 14\frac{19}{40}$

28.

$P = 2l + 2w$

$P = 2\left(4\frac{3}{4}\right) + 2\left(2\frac{1}{2}\right)$

$= 2\left(\frac{19}{4}\right) + 2\left(\frac{5}{2}\right)$

$= \frac{19}{2} + \frac{10}{2}$

$= \frac{29}{2} = 14\frac{1}{2}$

29.

$3\frac{5}{8} \text{ A} + 2\frac{3}{4} \text{ A} + 4\frac{5}{16} \text{ A}$

$= 3\frac{10}{16} \text{ A} + 2\frac{12}{16} \text{ A} + 4\frac{5}{16} \text{ A}$

$= 9\frac{27}{16} \text{ A} = 10\frac{11}{16} \text{ A}$

30.

$120 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 40 \text{ yd}$

31. $3 \text{ lb } 5 \text{ oz} = \left(3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}}\right) + 5 \text{ oz} = 53 \text{ oz}$

32. $\frac{5}{8} = 0.625$

33. $2.12 = 2\frac{12}{100} = 2\frac{3}{25}$

34. 65.024

35. 397.19

36. a. 27.3
b. 27.28

37. 8.0784

38. 0.05

39.

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

$$B = \frac{59.45}{0.41}$$
$$= 145$$

40.

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

$$R = \frac{88}{284}$$
$$= 31.0\%$$

41.

$$P = BR$$

$$P = (\$612)(0.067)$$
$$= \$41$$

Her new salary is $\$612 + \$41 = \$653$.

42. 0.0552

43. 6.73