

Solution Manual for Elementary Technical Mathematics 11th Edition by Ewen and Nelson ISBN 1285199197 9781285199191

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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 cm³
Output: 1425 cm³
 $1925 \text{ cm}_3 - 1425 \text{ cm}_3 = 500 \text{ cm}_3$
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 r 1
29. 389
30. 434 r 24
31. 844 r 40
32. 1566 r 80
33. $31 \text{ mi/gal} \times 16 \text{ gal} = 496 \text{ mi}$
34. $65 \text{ L} \times 12 \text{ km/L} = 780 \text{ km}$
35. $1300 \text{ cm}_3 \div 4 = 325 \text{ cm}_3$
36. $1274 \text{ mi} \div 49 \text{ gal} = 26 \text{ mi/gal}$
37. $2340 \text{ km} \div 180 \text{ L} = 13 \text{ km/L}$
38. $\$13/4 \text{ ft} \times 20 \text{ ft} = \65
39. $\$516 \div 6 \text{ h} = \$86/\text{h}$
40. $\$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.

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

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

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

$$R = 24$$

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

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

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

64.

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

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

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

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

67.

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

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

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

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

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

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

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

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.

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

$$E = 220$$

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

$$R = 44$$

68. The outer dimension of the back wall is

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

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

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

$$8 \text{ in.} \quad 16 \text{ in.}$$

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

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

$$12 \text{ in.}$$

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.

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

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

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.

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

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.

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

$$\begin{aligned} & = 80 + 13 \\ & = 93 \end{aligned}$$

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.

$$\begin{aligned} & \frac{(20 - 2 \cdot 5)^2}{\frac{3_3 - 2}{(20 - 10)^2}} \\ &= \frac{27 - 2}{(10)^2} \\ &= \frac{25}{100} \\ &= \frac{100}{25} \\ &= 4 \end{aligned}$$

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.

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

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

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

8.

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

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

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

9.

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

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

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

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

12.

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

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

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

$$\underline{48 \text{ in.} \times 36 \text{ in.}} \quad 1728 \text{ in}^2$$

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

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.

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

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

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

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

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.

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

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

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

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

11.

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

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

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

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.

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

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

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

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

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

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.

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

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

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

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

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.

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

$$V = 9 \text{ ft} \times 6 \text{ ft} \times 4 \text{ ft}$$

$$= 216 \text{ ft}^3$$

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.

So, the gasoline will weigh

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

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

8 ft

=

1

2

8

f

t

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.

42.

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

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

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

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

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

$$288 \text{ containers}$$

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.

$$W = fd$$

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

$$= 57,376$$

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.

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

$$120$$

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

$$= 8$$

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.

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

$$\begin{aligned}
 24. \quad A &= \left(\frac{a+b}{2} \right) h \\
 A &= \left(\frac{450 \text{ m} + 750 \text{ m}}{2} \right) (250 \text{ m}) \\
 &= \left(\frac{1200 \text{ m}}{2} \right) (250 \text{ m}) \\
 &= (600 \text{ m})(250 \text{ m}) \\
 &= 150,000 \text{ m}^2
 \end{aligned}$$

$$\begin{aligned}
 25. \quad V &= lwh \\
 V &= (25 \text{ cm})(15 \text{ cm})(12 \text{ cm}) \\
 &= 4500 \text{ cm}^3
 \end{aligned}$$

$$\begin{aligned}
 26. \quad V &= lwh \\
 V &= (48 \text{ in.})(24 \text{ in.})(96 \text{ in.}) \\
 &= 110,592 \text{ in}^3
 \end{aligned}$$

$$\begin{aligned}
 27. \quad v &= v_0 + gt \\
 v &= 12 + (32)(5) \\
 &= 172
 \end{aligned}$$

$$\begin{aligned}
 28. \quad Q &= CV \\
 Q &= (12)(2500) \\
 &= 30,000
 \end{aligned}$$

$$\begin{aligned}
 33. \quad \text{Area of left rectangle:} \quad & 55 \text{ ft} \times 120 \text{ ft} = 6600 \text{ ft}^2 \\
 \text{Area of middle rectangle:} \quad & 160 \text{ ft} \times 60 \text{ ft} = 9600 \text{ ft}^2 \\
 \text{Area of right rectangle:} \quad & 260 \text{ ft} \times 60 \text{ ft} = \underline{21,600 \text{ ft}^2} \\
 \text{Total area:} \quad & = 31,800 \text{ ft}^2 \\
 \text{Area in tsf} &= 31,800 \text{ ft}^2 \div 1000 = 31.8 \text{ tsf}
 \end{aligned}$$

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

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

$$\begin{aligned}
 31. \quad P &= cd^2SN \\
 P &= (0.7853)(3)^2(4)(4) \\
 &= 113.1
 \end{aligned}$$

$$\begin{aligned}
 32. \quad l &= \frac{V}{cd^2} \\
 l &= \frac{47 \text{ in}^3}{(0.785)(2.98 \text{ in.})^2} \\
 &= 6.742 \text{ in.}
 \end{aligned}$$

Section 1.5: Prime Factorization

1. a. $1 + 5 = 6$ is divisible by 3, so 15 is divisible by 3.
b. 15 is not divisible by 4.
2. a. $2 + 8 = 10$ is not divisible by 3, so 28 is not divisible by 3.
b. 28 is divisible by 4.
3. a. $9 + 6 = 15$ is divisible by 3, so 96 is divisible by 3.
b. 96 is divisible by 4.
4. a. $1 + 7 + 2 = 10$ is not divisible by 3, so 172 is not divisible by 3.
b. 172 is divisible by 4.

5. a. $7 + 8 = 15$ is divisible by 3, so 78 is divisible by 3.
b. 78 is not divisible by 4.
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 lb \div 56 lb = 254 bu

7.

$6 + 2(5 \times 4 - 2)$

$= 6 + 2(20 - 2)$

$= 6 + 2(18)$

$= 6 + 23$

$= 42$

10.

Area of left rectangle: 24 in. \times 11 in. = 264 in²

Area of middle rectangle: 15 in. \times 11 in. = 165 in²

Area of right rectangle: 10 in. \times 7 in. = 70 in²

Total area: = 499 in²

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

12 2 \cdot 2 \cdot 3 4

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

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

18 2 \cdot 3 \cdot 3 3

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

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

$$7. \quad \frac{13}{13} = \frac{2 \cdot 5 \cdot 5}{13} = 1$$

$$8. \quad \frac{24}{2} = \frac{3 \cdot 13 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3} =$$

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

$$10. \quad \frac{60}{3} = \frac{2 \cdot 2 \cdot 3 \cdot 5 \cdot 5}{2 \cdot 2 \cdot 2 \cdot 3} = 3$$

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

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

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

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

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

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

$$17. \quad \frac{14}{2} = \frac{2 \cdot 2 \cdot 2 \cdot 4}{2 \cdot 7} = 7$$

$$18. \quad \frac{16}{7} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 8}{7} = 1$$

$$19. \quad \frac{27}{3} = \frac{2 \cdot 2 \cdot 7 \cdot 4}{3 \cdot 3 \cdot 3} = 3$$

$$20. \quad \frac{15}{18} = \frac{2 \cdot 2 \cdot 3 \cdot 3 \cdot 4}{3 \cdot 5 \cdot 5 \cdot 6} =$$

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

$$26. \quad 54 = 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3$$

$$27. \quad \frac{112}{2} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 4} = 7$$

$$28. \quad \frac{128}{2} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 8}{2 \cdot 3 \cdot 5 \cdot 11} = 11$$

$$29. \quad \frac{360}{2} = \frac{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 12}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7} = 7$$

$$30. \quad \frac{525}{5} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 9}{3 \cdot 5 \cdot 5 \cdot 7} = 5$$

$$31. \quad \frac{1155}{15} = 3 \cdot 5 \cdot 7 \cdot 11 \cdot 11$$

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

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

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

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

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

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

$$37. \quad \frac{57}{9} = \frac{19}{3} = 6 \text{ r } 1 = 6 \frac{1}{3}$$

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

$$39. \quad 5^{15} = 5^5 = 5 + 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 6^1$$

$$40. \quad 2^{\frac{70}{4}} = 2^{\frac{35}{2}} = 2 + \frac{3}{4} = 2 \frac{3}{4} = 6 \frac{3}{4}$$

$$41. \quad \frac{16}{5} = \frac{8}{(3 \times 6) + 5} = \frac{8}{23}$$

$$41. \quad 3 = \frac{6}{2} = 3$$

$$22. \frac{16}{18} = \frac{2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 3 \cdot 3} = \frac{4}{9}$$

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

$$24. \frac{12}{18} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 3 \cdot 3} = \frac{2}{3}$$

$$25. \frac{12}{36} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{1}{3}$$

$$40 = 2 \cdot 2 \cdot 2 \cdot 5$$

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 1.7: Addition and Subtraction of Fractions

1. 16

2. 105

3. 210

4. 315

5. 48

6. 70

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

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

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

$$10. \quad 5 \frac{1}{2} - \frac{1}{2} = \frac{15}{2} + \frac{1}{2} = \frac{16}{2} = 8$$

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

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

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

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

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

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

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

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

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

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

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

$$\frac{5}{10} + \frac{11}{100} = \frac{50}{100} + \frac{11}{100} = \frac{61}{100}$$

$$24. \quad 36 \div 72 \div 6 = 72 \div 72 \div 72 = 72 \div 8 = 1 \frac{1}{8}$$

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

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

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

$$30. \frac{14}{9} - \frac{42}{24} = \frac{42}{72} - \frac{42}{72} = \frac{42}{72}$$

$$33. \begin{aligned} 2\frac{1}{2} &= 2\frac{2}{4} \\ 4\frac{3}{4} &= 4\frac{3}{4} \\ \frac{4}{4} &= 1 \\ 6\frac{5}{4} &= 7\frac{1}{4} \end{aligned}$$

$$34. \begin{aligned} 3\frac{5}{8} &= 3\frac{5}{8} \\ 5\frac{3}{8} &= 5\frac{6}{8} \\ \frac{4}{8} &= \frac{1}{2} \\ 8\frac{11}{8} &= 9\frac{3}{8} \end{aligned}$$

$$35. \begin{aligned} 3 &= 2\frac{8}{8} \\ \frac{3}{8} &= \frac{3}{8} \\ 2\frac{5}{8} & \end{aligned}$$

$$36. \begin{aligned} 8 &= 7\frac{4}{4} \\ 5\frac{3}{4} &= 5\frac{3}{4} \\ \frac{4}{4} &= 1 \\ 2\frac{1}{4} & \end{aligned}$$

$$37. \begin{aligned} 8\frac{3}{16} &= 7\frac{19}{16} \\ 3\frac{7}{7} &= 3 \\ \frac{16}{16} &= 1 \\ 4\frac{12}{16} &= 4\frac{3}{4} \end{aligned}$$

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

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

41

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

$$39. \begin{aligned} 7\frac{3}{16} &= 6\frac{19}{16} \\ 4\frac{7}{8} &= 4\frac{14}{16} \\ \frac{2}{16} &= \frac{1}{8} \end{aligned}$$

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

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

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

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.

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

$$\begin{aligned}
 & = 49\frac{8}{8} \text{ gal} - 37\frac{7}{8} \text{ gal} \\
 & = 12\frac{1}{8} \text{ gal}
 \end{aligned}$$

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.

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

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.

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

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.

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

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

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

59.

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

$$61. \text{ a. } \frac{9}{5} \text{ in.} - 1 \frac{1}{8} \text{ in.} - 1 \frac{1}{8} \text{ in.}$$

$$= 5 \frac{9}{16} \text{ in.} - 1 \frac{2}{16} \text{ in.} - 1 \frac{2}{16} \text{ in.}$$

$$= 3 \frac{5}{16} \text{ in.}$$

$$\text{ b. } 1 \frac{1}{8} \text{ in.} + 2 \frac{5}{32} \text{ in.} + 3 \frac{5}{16} \text{ in.} + 2 \frac{5}{32} \text{ in.} + 1 \frac{1}{8} \text{ in.} + 7 \frac{11}{16} \text{ in.} + 2 \frac{1}{16} \text{ in.} + 4 \frac{3}{8} \text{ in.} + 5 \frac{1}{16} \text{ in.}$$

$$= 1 \frac{4}{32} \text{ in.} + 2 \frac{5}{32} \text{ in.} + 3 \frac{10}{32} \text{ in.} + 2 \frac{5}{32} \text{ in.} + 1 \frac{4}{32} \text{ in.} + 7 \frac{22}{32} \text{ in.} + 2 \frac{2}{32} \text{ in.} + 4 \frac{12}{32} \text{ in.} + 5 \frac{2}{32} \text{ in.}$$

$$= 27 \frac{66}{32} \text{ in.} = 29 \frac{2}{32} \text{ in.} = 29 \frac{1}{16} \text{ in.}$$

62. a.

$$2 \frac{1}{16} \text{ in.} + 2 \frac{17}{32} \text{ in.}$$

$$= 2 \frac{2}{32} \text{ in.} + 2 \frac{17}{32} \text{ in.}$$

$$= 4 \frac{19}{32} \text{ in.}$$

b.

$$4 \frac{19}{32} \text{ in.} + 1 \frac{1}{8} \text{ in.} + \frac{27}{32} \text{ in.} + 2 \frac{17}{32} \text{ in.} + 2 \text{ in.} + 1 \frac{29}{32} \text{ in.} + 1 \frac{9}{16} \text{ in.}$$

$$= 4 \frac{19}{32} \text{ in.} + 1 \frac{4}{32} \text{ in.} + \frac{27}{32} \text{ in.} + 2 \frac{17}{32} \text{ in.} + 2 \text{ in.} + 1 \frac{29}{32} \text{ in.} + 1 \frac{18}{32} \text{ in.}$$

$$= 11 \frac{114}{32} \text{ in.} = 14 \frac{18}{32} \text{ in.} = 14 \frac{9}{16} \text{ in.}$$

63. a.

$$3 \frac{1}{4} \text{ in.} - 1 \frac{3}{8} \text{ in.} - 1 \frac{5}{8} \text{ in.}$$

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

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

$$= \frac{1}{4} \text{ in.}$$

b.

$$3 \frac{1}{4} \text{ in.} + \frac{15}{16} \text{ in.} + \frac{15}{16} \text{ in.} + 1 \frac{7}{8} \text{ in.} + 1 \frac{1}{4} \text{ in.} + \frac{13}{16} \text{ in.} + 1 \frac{3}{8} \text{ in.} + 1 \frac{7}{8} \text{ in.}$$

$$= 3 \frac{4}{16} \text{ in.} + \frac{15}{16} \text{ in.} + \frac{15}{16} \text{ in.} + 1 \frac{14}{16} \text{ in.} + 1 \frac{4}{16} \text{ in.} + \frac{13}{16} \text{ in.} + 1 \frac{6}{16} \text{ in.} + 1 \frac{14}{16} \text{ in.}$$

$$= 7 \frac{85}{16} \text{ in.} = 12 \frac{5}{16} \text{ in.}$$

64.

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

65.

$$\begin{aligned}
 & 1\frac{3}{4}A + 1\frac{1}{2}A \\
 &= 1\frac{3}{4}A + 1\frac{2}{4}A \\
 &= 2\frac{4}{4}A = 3\frac{0}{4}A
 \end{aligned}$$

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.

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

68.

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

69.

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

70.

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

71. a.

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

b.

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

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

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

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

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

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

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

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

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

$$\begin{aligned}
 79. \quad & \text{One cut:} \\
 & 1\frac{7}{8} \text{ in.} - \frac{3}{16} \text{ in.} \\
 & = 1\frac{14}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 & = 1\frac{11}{16} \text{ in.}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{32}{32} \\
 & \text{Three cuts:} \\
 & 1\frac{7}{8} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 & = 1\frac{14}{16} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{3}{16} \text{ in.} - \frac{3}{16} \text{ in.} \\
 & = 1\frac{11}{16} \text{ in.}
 \end{aligned}$$

80.

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

81.

Length:

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

Width:

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

83.

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

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.

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

85. (continued)

b.

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

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.

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

89.

$$\begin{aligned} & \frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4} \\ & = \frac{7}{4} = 1\frac{3}{4} \text{ sticks} \end{aligned}$$

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.

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

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

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. 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.

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

22.

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

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.

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

25.

$$\frac{2}{3} \times 3 \frac{2}{3} \div \frac{3}{5} = \frac{2}{3} \times \frac{11}{3} \times \frac{4}{5}$$

$$\begin{aligned} & 5^3 \cdot 4^5 \cdot 3^3 \\ &= \frac{88}{45} = 1\frac{43}{45} \end{aligned}$$

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.

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

32

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.

$$A = l \times w$$

$$A = 6\frac{1}{3} \text{ ft} \times 3\frac{3}{4} \text{ ft}$$

$$= \frac{19}{3} \text{ ft} \times \frac{15}{4} \text{ ft}$$

$$= \frac{95}{4} \text{ ft}^2 = 23\frac{3}{4} \text{ ft}^2$$

b.

$$P = 2l + 2w \quad \left(\begin{array}{c} 1 \\ 3 \end{array} \right) \quad \left(\begin{array}{c} 6 \\ 3 \\ 4 \end{array} \right)$$

$$P = 2 \times \left| \frac{6}{19} \text{ ft} \right| + 2 \times \left| \frac{3}{15} \text{ ft} \right|$$

$$= 2 \times \frac{3}{3} \text{ ft} + 2 \times \frac{1}{4} \text{ ft}$$

$$= \frac{38}{3} \text{ ft} + \frac{15}{2} \text{ ft}$$

$$= \frac{76}{6} \text{ ft} + \frac{45}{6} \text{ ft}$$

$$= \frac{121}{6} \text{ ft} + \frac{45}{6} \text{ ft}$$

$$= \frac{121}{6} \text{ ft} = 20\frac{1}{6} \text{ ft}$$

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

38.

$$6 \frac{2}{4} \text{ ft} = \frac{20}{4} \text{ ft}$$

$$\frac{3}{4} \text{ ft} = \frac{3 \text{ ft}}{4} = \frac{80}{4} = 20 \text{ lengths}$$

$$1 \frac{3}{4} \text{ ft} = \frac{7}{4} \text{ ft} = 21 \text{ lengths}$$

$$1 \quad 13 \quad 65 \quad 1$$

40. $5 \times 3 \text{ h} = 5 \times \text{h} = \text{h} = 16 \text{ h}$

$$4 \quad 4 \quad 4 \quad 4$$

42.

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

$$17 \text{ ft} - 3 \times 4 \frac{1}{2} \text{ ft} = 17 \text{ ft} - 3 \times \frac{9}{2} \text{ ft}$$

$$= \frac{34}{2} \text{ ft} - \frac{27}{2} \text{ ft}$$

$$= \frac{7}{2} \text{ ft} = 3 \frac{1}{2} \text{ ft}$$

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

43.

$$\text{number} \times \text{thickness} \times \text{width} \times \text{length}$$

$$\text{bd ft} = \frac{\text{of boards} \quad (\text{in in.}) \quad (\text{in in.}) \quad (\text{in ft})}{12}$$

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

44.

$$\text{number} \times \text{thickness} \times \text{width} \times \text{length}$$

$$\text{bd ft} = \frac{\text{of boards} \quad (\text{in in.}) \quad (\text{in in.}) \quad (\text{in ft})}{12}$$

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

45.

$$\text{number} \times \text{thickness} \times \text{width} \times \text{length}$$

$$\text{bd ft} = \frac{\text{of boards} \quad (\text{in in.}) \quad (\text{in in.}) \quad (\text{in ft})}{12}$$

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

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

39.

$$684 \frac{1}{2} \text{ mi} = \frac{2737}{2} \text{ mi}$$

$$\frac{\frac{2737}{2}}{5 \frac{3}{4} \text{ h}} = \frac{\frac{2737}{2}}{\frac{17}{4} \text{ h}} = \frac{2737}{4} \times \frac{4}{17} \text{ mi/h}$$

$$= \frac{483}{4} \text{ mi/h} = 120 \frac{3}{4} \text{ mi/h}$$

$$2 \quad 11$$

41. $9 \times 3 \text{ ft} = 9 \times \text{ft} = 33 \text{ ft}$

$$3 \quad 3$$

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.

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

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:

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

52. (continued)

b.

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

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

$$\frac{\quad}{16} \text{ in.}$$

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

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

53.

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

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

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

$$= \frac{585}{128}$$

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

$$= 390 \text{ revolutions}$$

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

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

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

55.

$$V = lwh$$

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

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

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

56.

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

$$\frac{1 \text{ ft}}{5 \frac{1}{2} \text{ in.}} = \frac{72}{21}$$

$$4 \quad 4$$

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

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

57.

7 $\frac{1}{2}$ h $\frac{15}{4}$ h

$\frac{2}{6} = \frac{2}{6}$

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

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

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

59.

Power = (voltage) \times (current)

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

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

= 2750 W

60.

$V = IR$

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

$$= \frac{17}{8} \times \frac{49}{2}$$

$$= \frac{843}{8} = 104\frac{3}{8} \text{ V}$$

8 8

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.

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

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

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

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

$$= \frac{16}{7} \text{ A} = 1 \frac{2}{7} \text{ A}$$

63.

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

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

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

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

$$= \frac{16}{7} \text{ A} = 1 \frac{2}{7} \text{ A}$$

64.

$$\frac{25 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}}}{3 \frac{3}{4} \text{ in.}} = \frac{300 \text{ in.}}{4 \frac{15}{4} \text{ in.}}$$

$$= 300 \times \frac{4}{15}$$

$$= 80 \text{ lengths}$$

65. There will be 18 spaces between the outlets.

$$\frac{130 \frac{1}{2} \text{ ft}}{2} = \frac{261 \text{ ft}}{2}$$

$$= 130 \frac{1}{2} \text{ ft}$$

$$= 7 \frac{1}{4} \text{ ft or } 7 \frac{1}{4} \text{ ft } 3 \text{ in.}$$

66.

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

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

$$= 210 \text{ gal}$$

67.

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

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

68.

$$\frac{500 \text{ lb}}{22 \frac{1}{2} \text{ lb}} = \frac{500}{45}$$

$$= 500 \times \frac{2}{45}$$

$$= \frac{200}{9} \text{ ft} = 22 \frac{2}{9} \text{ ft}$$

$$15 \text{ tons} = 15 \text{ tons} \times \frac{2000 \text{ lb}}{1 \text{ ton}} = 30,000 \text{ lb}$$

$$\frac{30,000 \text{ lb}}{22 \frac{1}{2} \text{ lb}} = \frac{30,000}{45}$$

$$= 30,000 \times \frac{2}{45}$$

$$= \frac{4000}{3} \text{ ft} = 1333 \frac{1}{3} \text{ ft}$$

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.

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

76.

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

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

85.

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

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

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

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

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.

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

90.

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

91.

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

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

$$= 10\frac{3}{4} \text{ lb} = 10\frac{43}{48} \text{ lb}$$

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

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.

$$10\frac{1}{3} \text{ gal} - 3 \times 2\frac{5}{2} \text{ gal}$$

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

$$= \frac{31}{6} \text{ gal} - \frac{15}{2} \text{ gal}$$

$$= \frac{31}{6} \text{ gal} - \frac{45}{6} \text{ gal}$$

$$= -\frac{14}{6} \text{ gal} = -\frac{7}{3} \text{ gal}$$

$$= 2 - \frac{1}{6} \text{ gal}$$

94.

$$\frac{5}{4} + \frac{1}{8} = \frac{5}{4} + \frac{1}{8} = \frac{11}{8} \text{ loin remaining}$$

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

$$\begin{aligned} \text{Number of pies} &= \frac{\frac{1}{4} \text{ lb} + \frac{3}{8} \text{ lb}}{\frac{3}{8} \text{ lb}} \\ &= 12 \times \frac{8}{3} = 32 \text{ pies} \end{aligned}$$

$$\frac{8}{1} \times \frac{4}{8} = \frac{8}{3} \text{ loin for soup}$$

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. $7 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 252 \text{ in.}$
 $3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 36 \text{ in.}$
 $\frac{1 \text{ ft}}{6 \text{ in.}} = \underline{6 \text{ in.}}$
 $= 294 \text{ in.}$
5. $4 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} + 1 \text{ pt} = 9 \text{ pt}$
6. $6 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 48 \text{ pt}$
 $3 \text{ qt} \times \frac{\quad}{1 \text{ qt}} = 6 \text{ pt}$
 $= 54 \text{ pt}$
7. $3 \text{ tbs} \times \frac{3 \text{ tsp}}{1 \text{ tbs}} = 9 \text{ tsp}$
8. $2 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 16 \text{ pt}$
 $1 \text{ gal} \quad 1 \text{ qt}$
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. $32 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = \underline{2 \text{ pt}}$
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. $56 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = \underline{3 \text{ pt}}$
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. $6000 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 46 \frac{7}{8} \text{ gal}$

$$27. \quad 500 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = \frac{5}{8} \text{ qt}$$

$$28. \quad 3 \text{ mi} \times \frac{320 \text{ rods}}{1 \text{ mi}} = 960 \text{ rods}$$

$$29. \quad \frac{80 \text{ in.}}{12 \text{ in.}} = 6 \text{ r } 8 = 6 \text{ ft } 8 \text{ in.}$$

$$30. \quad 22,000 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 4 \frac{1}{6} \text{ mi}$$

$$31. \quad 12 \frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 153 \text{ in.}$$

$$32. \quad 15 \times 24 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 22 \frac{1}{2} \text{ lb}$$

33.

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

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

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

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.

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

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

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

$$2 \frac{3 \text{ ft}}{6}$$

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

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

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

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

$$16 \text{ oz}$$

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

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

$$1 \text{ yd}$$

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

44.

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

$$72 \text{ ft}^3 \times 62.4 \frac{\text{lb}}{\text{ft}^3}$$

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

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

$$27 \frac{17}{10} \text{ grains}$$

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

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

$$49. 4500 \frac{\text{ft}}{\text{s}} \times \frac{1 \text{ h}}{3600 \text{ s}} = 75 \frac{\text{ft}}{\text{min}}$$

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

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

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

53.

$$40 \frac{\text{mi}}{\text{h}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}}$$

$$= 58 \frac{2}{3} \frac{\text{ft}}{\text{s}}$$

54.

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

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

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

56.

$$\begin{aligned}
 & \frac{1 \text{ gal}}{8.34 \text{ lb}} = 538.7 \text{ gal} \\
 & \text{ft}^3 \\
 45. \quad 561 \text{ ft} \times \frac{1 \text{ chain}}{66 \text{ ft}} &= 8 \frac{1}{2} \text{ chains}
 \end{aligned}$$

$$\begin{aligned}
 & 36 \frac{\text{in.}}{\text{s}} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}} \text{_____} \\
 & = 2 \frac{1}{22} \frac{\text{mi}}{\text{h}}
 \end{aligned}$$

57.

$$14 \text{ yd } 5 \text{ ft } 34 \text{ in.}$$

$$= 14 \text{ yd } 7 \text{ ft } 10 \text{ in.}$$

$$= 16 \text{ yd } 1 \text{ ft } 10 \text{ in.}$$

58.

$$(8 \text{ yd } 1 \text{ ft } 3 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$$

$$= (8 \text{ yd } 0 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$$

$$= (7 \text{ yd } 3 \text{ ft } 15 \text{ in.}) - (2 \text{ yd } 2 \text{ ft } 6 \text{ in.})$$

$$= 5 \text{ yd } 1 \text{ ft } 9 \text{ in.}$$

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

64.

$$1 \frac{1}{4} \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} \times \frac{2 \text{ cups}}{1 \text{ pt}} \times \frac{8 \text{ fl oz}}{1 \text{ cup}} = 160 \text{ fl oz}$$

$$\frac{160 \text{ fl oz}}{1 \frac{1}{3} \text{ fl oz}} = 120 \text{ servings}$$

65.

$$2 \text{ gal} = 2 \text{ gal}$$

$$2 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = \frac{1}{2} \text{ gal}$$

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

$$\frac{1}{2} \text{ gal} = \frac{4}{8} \text{ gal}$$

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

Unit 1B Review

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

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

$$3. \quad \frac{54}{6} = 4 \text{ r } 3 = 4 \frac{3}{6} = 4 \frac{1}{2}$$

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

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

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

61.

$$4 \text{ rods} \times \frac{16.5 \text{ ft}}{1 \text{ rod}} = 66 \text{ ft}$$

$$\frac{66 \text{ ft}}{3 \text{ ft}} = 22 \text{ paces}$$

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

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

6.

$$5 \frac{3}{8} - 2 \frac{5}{12}$$

$$= 5 \frac{9}{24} - 2 \frac{10}{24}$$

$$= 4 \frac{33}{24} - 2 \frac{10}{24}$$

$$4 \frac{23}{24}$$

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

8.

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

$$= \frac{6}{13}$$

9.

$$1 \frac{2}{3} + 3 \frac{5}{6} - 2 \frac{1}{4}$$

$$= \frac{8}{8} + \frac{10}{8} - \frac{3}{4}$$

$$\begin{aligned} &= 1 \frac{12}{12} + 3 \frac{12}{12} - 2 \frac{3}{4} \\ &= 4 \frac{18}{12} - 2 \frac{3}{4} \\ &= 2 \frac{12}{12} - 2 \frac{12}{12} = 3 \frac{1}{4} \end{aligned}$$

12.

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

13.

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

10.

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

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

11.

$$7 \text{ in.} - 1 \frac{7}{8} \text{ in.} - 1 \frac{1}{2} \text{ in.} - 1 \frac{1}{3} \text{ in.} - 1 \frac{5}{12} \text{ in.}$$

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

14.

$$\begin{aligned} A &= lw \\ A &= \left(6 \frac{1}{4} \text{ in.} \right) \left(2 \frac{2}{3} \text{ in.} \right) \\ &= \left(\frac{25}{4} \text{ in.} \right) \left(\frac{8}{3} \text{ in.} \right) \\ &= \frac{50}{3} \text{ in}^2 = 16 \frac{2}{3} \text{ in}^2 \\ &= \underline{12 \text{ in.}} \\ &\text{in. } \mathbf{15.} \quad 4 \text{ ft} \times \end{aligned}$$

1 ft = 48 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

- four thousandths
- twenty-one thousandths
- five ten-thousandths
- seven and one-tenth
- one and four hundred twenty-one hundred-thousandths
- one thousand forty-two and seven thousandths
- six and ninety-two thousandths
- eight and one thousand four hundred sixty-one ten-thousandths

$$9. 5.02 ; 5 \overset{2}{\underline{5}} \overset{1}{\underline{}} \text{ —}$$

$$10. 123.006 ; 123 \overset{6}{\underline{1999}} = 123 \overset{3}{\underline{500}}$$

$$11. 71.0021 ; 71 \overset{21}{\underline{10,000}}$$

$$12. 0.065 ; \overset{65}{\underline{1000}} = \overset{13}{\underline{200}}$$

$$13. 43.0101 ; 43 \overset{101}{\underline{10,000}} \\ \underline{563}$$

$$14. 0.000563 ; \underline{1,000,000}$$

$$15. 0.375$$

$$16. 0.64$$

$$17. 0.\overline{73}$$

$$18. 0.4$$

$$19. 0.34$$

$$20. 1.2 \underline{\quad}$$

$$21. 1.27$$

$$22. 5.12$$

$$23. 18.285714$$

$$24. 15.125$$

$$25. 34.2 \underline{\quad}$$

$$26. 38.3 \overline{\quad}$$

7

$$27. \overline{\quad}$$

10

$$\frac{6}{10} = \frac{3}{5}$$

$$28. \frac{10}{11} = \frac{5}{11}$$

11

$$29. \overline{\quad}$$

100

$$30. \frac{75}{100} = \frac{3}{4}$$

$$31. \underline{8425} = \underline{337}$$

$$10,000 \quad 400$$

$$32. 3 \frac{14}{100} = 3 \frac{7}{50}$$

$$33. 10 \frac{76}{100} = 10 \frac{19}{25}$$

$$34. 148 \overset{255}{\underline{1000}} = 148 \overset{51}{\underline{200}}$$

$$35. 150.000$$

$$36. 207.165$$

$$37. 163.204$$

$$38. 244.037$$

$$39. 86.6$$

$$40. 1.58$$

$$41. 15.308$$

$$42. 123.588$$

$$43. 8.68$$

$$44. 8.94$$

$$45. 4.862$$

$$46. 130.09$$

$$47. 10.0507$$

$$48. 0.92454$$

$$49. 6.25 \text{ ft} - 2.4 \text{ ft} - 2.4 \text{ ft} = 1.45 \text{ ft}, \text{ so the remaining piece will be } 1.45 \text{ ft} \times 2.4 \text{ ft}.$$

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.

$$\begin{aligned} 9.625 \text{ in.} &= 9 \frac{5}{8} \text{ in.} \\ &= 9 \frac{5}{8} \text{ in.} \div 2 = 4 \frac{5}{32} \text{ in.} = 4.8125 \text{ in.} \end{aligned}$$

60. $1.125 \text{ in.} - 0.046 \text{ in.} - 0.046 \text{ in.} = 1.033 \text{ in.}$

61.

0.3 A
0.105 A
0.45 A
0.93 A
0.27 A
0.55 A
2.605 A

62.

21.5 Ω
42.6 Ω
62.3 Ω

19.8 Ω
32.2 Ω

178.4 Ω

56.

3.45 cm
1.87 cm
4.87 cm
2.69 cm
8.32 cm
4.56 cm
25.76 cm

57.

4.17 in.
1.30 in.
1.00 in.
1.47 in.
7.94 in.

63.

15.7 Ω
40 Ω
25.5 Ω
0.6 Ω
1200 Ω
115 Ω
1396.8 Ω

64.

3.2 V
5.1 V
0.45 V
0.03 V
0.8 V
0.007 V
2 V
11.587 V

65. $1.625 \text{ in.} - 1.093 \text{ in.} = 0.532 \text{ in.}$

66.

$$\begin{aligned} a &= 13.47 \text{ cm} - 6.74 \text{ cm} - 4.89 \text{ cm} \\ &= 1.84 \text{ cm} \\ b &= 1.23 \text{ cm} + 1.79 \text{ cm} \\ &= 3.02 \text{ cm} \\ c &= (2.62 \text{ cm} - 0.98 \text{ cm}) \div 2 \\ &= 0.82 \text{ cm} \end{aligned}$$

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.

$$\begin{aligned} & 2\frac{1}{3} \text{ qt} + 1\frac{1}{6} \text{ qt} + 3\frac{1}{4} \text{ qt} \\ &= 2\frac{4}{12} \text{ qt} + 1\frac{2}{12} \text{ qt} + 3\frac{3}{12} \text{ qt} \\ &= 6\frac{9}{12} \text{ qt} = 6\frac{3}{4} \text{ qt} = 6.75 \text{ qt} \end{aligned}$$

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.

$$0.75 \text{ oz}$$

$$1.3 \text{ oz}$$

$$2.5 \text{ oz}$$

$$\underline{0.1 \text{ oz}}$$

$$4.65 \text{ oz}$$

77.

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

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

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

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

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

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

$$= 6.0125 \text{ lb}$$

$$= 6 \text{ lb}$$

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.

$$\frac{82 - 62}{4 \cdot 8 + (7 + 9)}$$

$$= \frac{64 - 36}{32 + 16}$$

$$= \frac{28}{48} = \frac{7}{12}$$

20.

$$\frac{148 - 3 \cdot 42}{53 - 2 \cdot 52}$$

$$= \frac{148 - 3 \cdot 16}{148 - 3 \cdot 16}$$

$$= \frac{125 - 2 \cdot 25}{148 - 48}$$

$$= \frac{100}{75}$$

$$= \frac{4}{3} = 1\frac{1}{3}$$

21.

$$\frac{4 \cdot 5 \cdot 6 - 5 \cdot 23}{42 \cdot 5 + 5 \cdot 22}$$

$$= \frac{20 \cdot 6 - 5 \cdot 8}{16 \cdot 5 + 5 \cdot 4}$$

$$= \frac{120 - 40}{80 + 20} = \frac{80}{100} = \frac{4}{5}$$

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.

$$\frac{23 + (2 + 3 \cdot 6)^2}{(2 \cdot 5 - 4)^2 + 3 \cdot 5}$$

$$= \frac{8 + (2 + 18)^2}{(10 - 4)^2 + 15}$$

$$\frac{8 + 202}{62 + 15}$$

$$= \frac{8 + 400}{36 + 15} = \frac{408}{51} = 8$$

23.

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

$$7 \text{ ft}$$

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

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.

1

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

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

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

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.

$$V = lwh$$

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

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

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

$$= \$4872.00$$

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

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

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

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

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

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

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. $365 \text{ days} \times 4.4 \text{ lb/day} = 1606 \text{ lb}$

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. $3\frac{3}{4}\% = 3.75\% = 0.0375$

20. $50\frac{1}{3}\% = 50.3\bar{3}\% = 0.503\bar{3}$

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%

43. $\frac{1}{8} = 0.125 = 12\frac{1}{2}\%$ or 12.5%

44. $\frac{2}{5} = 0.4 = 40\%$

45. $\frac{1}{6} = 0.16\bar{6} = 16\frac{2}{3}\%$

46. $\frac{1}{3} = 0.33\bar{3} = 33\frac{1}{3}\%$

47. $\frac{4}{9} = 0.44\bar{4} = 44\frac{4}{9}\%$

48. $\frac{3}{7} = 0.428\bar{5} = 42\frac{6}{7}\%$

49. $\frac{3}{5} = 0.60 = 60\%$

50. $\frac{5}{6} = 0.83\bar{3} = 83\frac{1}{3}\%$

51. $\frac{13}{40} = 0.325 = 32.5\%$ or $32\frac{1}{2}\%$

52. $\frac{17}{50} = 0.34 = 34\%$

53. $\frac{7}{16} = 0.4375 = 43.75\%$ or $43\frac{3}{4}\%$

54. $\frac{15}{16} = 0.9375 = 93.75\%$ 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. $2\frac{1}{3} = 2.33\bar{3} = 233\frac{1}{3}\%$

59. $2\frac{5}{8} = 2.625 = 262.5\%$ or $262\frac{1}{2}\%$

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

$$41. \frac{4}{5} = 0.8 = 80\%$$

$$42. \frac{3}{4} = 0.75 = 75\%$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$78. \frac{1}{6}\% = \frac{19}{6}\% = \frac{19}{6} \times \frac{1}{100} = \frac{19}{600}$$

$$79. 16\frac{1}{3}\% = \frac{97}{3}\% = \frac{97}{3} \times \frac{1}{100} = \frac{97}{300}$$

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

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

$$\begin{aligned} &12 \times \$3042.20 \\ &= \$36,506.40. \end{aligned}$$

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.

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

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

$$R = \frac{2650 \text{ ft}}{5.2}$$

$$\frac{5280 \text{ ft}}{10.56} \\ = 0.5 = 50\%$$

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.

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

$$R = \frac{15}{\frac{1}{8}} \\ = \frac{8}{15} = 0.533 = 53.3\%$$

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.

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

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

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

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.

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

$$= 440 \text{ lb}$$

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

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

34.

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

$$45 \text{ bu}$$

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

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.

$$P = BR$$

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

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.

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

$$= 152$$

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

$$\frac{152 - 135}{135}$$

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

$$= 0.126 = 12.6\%$$

53. a.

$$P = BR$$

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

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

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

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

= 1558 lb

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

2. 625

3. 222

4. 0.000778

5. 0.00000661

6. 2, 940, 000, 000

7. 729

8. 2740

9. 562

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.

$$P = \$150,000$$

$$i = 0.065 / 12$$

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

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

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

$$= \$948.10$$

8.

$$P = \$75,000$$

$$i = 0.0625 / 12$$

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

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

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

$$= \$643.07$$

9.

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

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

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

$$i = 0.0675$$

$$n = 20 \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

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

$$A = \$845,625 \frac{0.0675 \left(1 + \frac{0.0675}{12} \right)^{20}}{\left(1 + \frac{0.0675}{12} \right)^{20} - 1}$$

$$= \$78,276.71$$

$$\text{The annual payment is } \$6429.83 \times 12$$

$$= \$77,157.96.$$

11. a.

$$P = \$24,000$$

$$i = 0.0075 / 12$$

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

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

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

$$= \$674.40$$

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

10.

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

$$i = 0.0725 / 12$$

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

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

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

$$= \$653.36$$

11. (continued)

b.

$$\begin{aligned}
 P &= \$24,000 - \$1500 = \$22,500 \\
 i &= 0.085 / 12 \\
 n &= 3 \times 12 = 36 \\
 A &= P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right) \\
 A &= \$22,500 \left(\frac{0.00708\overline{3}}{(1.00708\overline{3})^{36} - 1} \right) \\
 &= \$710.27
 \end{aligned}$$

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

Choice a costs $\$25,569.71 - \$24,278.51 = \$1291.20$ less.

12. a.

$$\begin{aligned}
 P &= \$19,500 \\
 i &= 0.0175 / 12 \\
 n &= 3 \times 12 = 36 \\
 A &= P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right) \\
 A &= \$19,500 \left(\frac{0.001458\overline{3}}{(1.001458\overline{3})^{36} - 1} \right) \\
 &= \$556.40
 \end{aligned}$$

$$\text{Total payment} = \$556.40 \times 36 = \$20,030.40$$

b.

$$\begin{aligned}
 P &= \$19,500 - \$2500 = \$17,000 \\
 i &= 0.065 / 12 \\
 n &= 3 \times 12 = 36 \\
 A &= P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right) \\
 A &= \$17,000 \left(\frac{0.00541\overline{6}}{(1.00541\overline{6})^{36} - 1} \right) \\
 &= \$521.03
 \end{aligned}$$

Total payment = $\$521.03 \times 36 = \$18,757.08$

Choice b costs $\$20,030.57 - \$18,757.19 = \$1273.38$ less.

13.

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

$$i = 0.08$$

$$n = 4 \left(i(1+i)^n \right)$$

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

$$A = \$198,500 \left(\frac{(0.08)(1+0.08)^4}{(1+0.08)^4 - 1} \right)$$

$$= \$59,931.28$$

14.

$$\text{Dealer price} = \$150,500 \times (1 + 0.035 + 0.0095) = \$157,197.25$$

$$P = \$157,197.25 - \$7500 - \$10,000 = \$139,697.25$$

$$i = 0.0725$$

$$n = 5 \left(i(1+i)^n \right)$$

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

$$A = \$139,697.25 \left(\frac{(0.0725)(1+0.0725)^5}{(1+0.0725)^5 - 1} \right)$$

$$= \$34,299.23$$

15.

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

$$A = \$30,000 \left(1 + \frac{0.05}{1} \right)^{(1)(3)}$$

$$= \$30,000(1.05)^3$$

$$= \$34,728.75$$

16.

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

$$A = \$30,000 \left(1 + \frac{0.05}{12} \right)^{(12)(3)}$$

$$= \$34,844.17$$

17.

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

$$A = \$30,000 \left(1 + \frac{0.05}{365} \right)^{(365)(3)}$$

$$A = \$30,000 \left(1 + \frac{0.05}{365} \right)^{(365)(3)}$$

18.

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

$$A = \$30,000 \left(1 + \frac{0.05}{52} \right)^{(52)(3)}$$

$$= \$34,852.52$$

19.

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

$$A = \$8400 \left(1 + \frac{0.035}{12} \right)^{(12)(5)}$$

$$= \$10,003.92$$

20.

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

$$A = \$4000 \left(1 + \frac{0.055}{52} \right)^{(52)(4)}$$

$$= \$34,854.67 \quad 365 \quad \text{)}'$$

$$= \$4983.73$$

21.

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

$$= \$36,000$$

$$i = 0.042 / 12 = 0.0035$$

$$n = 3 \times \left(\begin{array}{l} 12 = 36 \\ i(1+i)^n \end{array} \right)$$

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

$$A = \$36,000 \left(\frac{0.0035(1.0035)^{36} - 1}{0.0035} \right)$$

$$= \$1066.07$$

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

5.

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

6.

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

9.

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

10.

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

11.

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

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. $36 = \frac{9 \cdot 4}{56} \frac{9}{14 \cdot 4} = 14$

17. $\frac{180}{216} = \frac{5 \cdot 36}{6 \cdot 36} = \frac{5}{6}$

18. $4 \frac{1}{6}$

7.

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

8.

$$\begin{aligned} & 18 / (5 - 3) + (6 - 2) \times 8 - 10 \\ &= 18 / 2 + 4 \times 8 - 10 \\ &= 9 + 32 - 10 \\ &= 31 \end{aligned}$$

12.

$$\begin{aligned} P &= \frac{Fs}{10} t \\ P &= \frac{(600)(50)}{10} \\ &= \frac{30,000}{10} \\ &= 3000 \end{aligned}$$

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.

$$\begin{aligned} & 16\frac{2}{3} + 1\frac{1}{4} - 12\frac{11}{12} \\ &= 16\frac{8}{12} + 1\frac{3}{12} - 12\frac{11}{12} \\ &= 17\frac{11}{12} - 12\frac{11}{12} \end{aligned}$$

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

30.

$$\begin{aligned} & 3\frac{6}{7} \times 4\frac{2}{3} \\ &= \frac{27}{7} \times \frac{14}{3} \end{aligned}$$

= 18

31.

$$\begin{aligned} & \frac{3}{8} \div 6 \\ &= \frac{3}{8} \times \frac{1}{6} \\ &= \frac{1}{16} \end{aligned}$$

32.

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

= $\frac{6}{7}$

= $\frac{3}{8}$

33.

$$1\frac{4}{5} \div 1\frac{9}{16} \times 11\frac{2}{3}$$

$$= \frac{9}{5} \div \frac{25}{16} \times \frac{35}{3}$$

$$= \frac{9}{5} \times \frac{16}{25} \times \frac{35}{3}$$

$$= \frac{144}{125} \times \frac{35}{3}$$

$$= \frac{336}{25} = 13\frac{11}{25}$$

= 5

34.

$$\begin{aligned}
 A &= 12 \frac{5}{16} \text{ in.} - 4 \frac{3}{8} \text{ in.} - 4 \frac{9}{16} \text{ in.} \\
 &= 12 \frac{5}{16} \text{ in.} - 4 \frac{6}{15} \text{ in.} - 4 \frac{9}{16} \text{ in.} \\
 &= 12 \frac{\quad}{16} \text{ in.} - 8 \frac{\quad}{16} \text{ in.} \\
 &= 11 \frac{21}{16} \text{ in.} - 8 \frac{15}{16} \text{ in.} \\
 &= 3 \frac{6}{16} \text{ in.} = 3 \frac{3}{8} \text{ in.} \\
 B &= 9 \frac{3}{32} \text{ in.} - 6 \frac{5}{32} \text{ in.} + 2 \frac{1}{2} \text{ in.} \\
 &= 9 \frac{3}{32} \text{ in.} + 2 \frac{16}{32} \text{ in.} - 6 \frac{5}{32} \text{ in.} \\
 &= 11 \frac{19}{32} \text{ in.} - 6 \frac{5}{32} \text{ in.} \\
 &= 5 \frac{14}{32} \text{ in.} = 5 \frac{7}{16} \text{ in.}
 \end{aligned}$$

$$35. \quad 6 \text{ lb } 9 \text{ oz} = \left(6 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} \right) + 9 \text{ oz} = 105 \text{ oz}$$

$$36. \quad 168 \text{ ft} \times \frac{\quad}{1 \text{ ft}} = 2016 \text{ in.}$$

$$37. \quad 72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$$

$$38. \quad 36 \text{ mi} \times \frac{1760 \text{ yd}}{3 \text{ mi}} = 63,360 \text{ yd}$$

$$39. \quad 0.5625$$

$$40. \quad 0.416$$

$$41. \quad \frac{45}{100} = \frac{9}{20}$$

$$42. \quad 19 \frac{\quad}{1000} = 19 \frac{5}{8}$$

$$43. \quad 168.278$$

$$44. \quad 17.25$$

$$45. \quad 68.665$$

$$46. \quad 33.72$$

$$47. \quad 3206.5$$

$$48. \quad 1.9133$$

$$49. \quad 3.18$$

$$50. \quad 20.6$$

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.

$$\begin{aligned}
 P &= BR \\
 P &= (\$12,000)(0.0875) \\
 &= \$1050
 \end{aligned}$$

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.

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

$$\begin{aligned}
 R &= \frac{\$32,000}{\$84,000} \\
 &= 38.1\%
 \end{aligned}$$

60.

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

$$\begin{aligned}
 R &= \frac{64}{13} = \frac{11 \cancel{1} \times 32}{64 \times 13} \\
 &= 42.3\%
 \end{aligned}$$

61. $60 \text{ tons} \times 0.80 = 48 \text{ tons}$

62.
$$6 \times \left(3 \frac{1}{16} \text{ in.} \right) + 5 \times \left(1 \frac{1}{4} \text{ in.} \right) + 2 \times \left(1 \frac{1}{8} \text{ in.} \right)$$

$$= 6 \times \left(\frac{49}{16} \text{ in.} \right) + 5 \times \left(\frac{5}{4} \text{ in.} \right) + 2 \times \left(\frac{9}{8} \text{ in.} \right)$$

$$= \frac{147}{8} \text{ in.} + \frac{5}{2} \text{ in.} + \frac{9}{4} \text{ in.}$$

$$= \frac{147}{8} \text{ in.} + \frac{10}{8} \text{ in.} + \frac{18}{8} \text{ in.}$$

$$= 21 \frac{7}{8} \text{ in.}$$

Chapter 1 Test

1. 5729

2. 3516

5.

$$8 + 2(5 \times 6 + 8)$$

$$= 8 + 2(30 + 8)$$

$$= 8 + 2(38)$$

$$= 8 + 76 = 84$$

7.

Area of upper rectangle: $10 \text{ m} \times 40 \text{ m} = 400 \text{ m}^2$

Area of middle rectangle: $10 \text{ m} \times 15 \text{ m} = 150 \text{ m}^2$

Area of lower rectangle: $10 \text{ m} \times 20 \text{ m} = \underline{200 \text{ m}^2}$

Total area: $\qquad\qquad\qquad = 750 \text{ m}^2$

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: $\qquad\qquad\qquad = 2160 \text{ in}^3$

9. $\frac{120 \text{ V}}{40 \Omega} = 3 \text{ A}$

10.

$$P = 2l + 2w$$

$$P = 2(20) + 2(15)$$

$$= 40 + 30$$

$$= 70$$

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.

$$15 - 9 \div 3 + 3 \times 4$$

$$= 15 - 3 + 12 = 24$$

11.

$$t = \frac{d}{r}$$

$$t = \frac{1050}{21}$$

$$= 50$$

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.
$$\frac{30}{64} = \frac{\overline{15} \cdot 2}{32 \cdot 2} = \frac{\overline{15}}{32}$$

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.
$$3 \frac{1}{8} = 3 \frac{1}{8}$$

$$2 \frac{1}{2} = 2 \frac{4}{8}$$

$$4 \frac{3}{8} = 4 \frac{6}{8}$$
$$\frac{4}{9} = \frac{8}{18}$$
$$\frac{11}{8} = 10 \frac{3}{8}$$

22.
$$\frac{1}{10} - 3 \frac{5}{16}$$

$$= 10 \frac{2}{16} - 3 \frac{5}{16}$$
$$= 9 \frac{18}{16} - 3 \frac{5}{16}$$
$$= 6 \frac{13}{16}$$

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.
$$\frac{3}{8} \times \frac{16}{8} = \frac{3}{8} \times \frac{8 \cdot 2}{8} = \frac{2}{8}$$

25.

$$\frac{3}{8} \div 3 \frac{5}{16} = \frac{3}{8} \div \frac{53}{16}$$

$$= \frac{3}{8} \times \frac{16}{53}$$

$$= \frac{6}{53}$$

$$= \frac{6}{53}$$

26.
$$\frac{3}{40}$$

27.

$$3 \frac{5}{8} + 1 \frac{3}{4} \times 6 \frac{1}{5} = \frac{29}{8} + \frac{7}{4} \times \frac{31}{5}$$

$$= \frac{29}{8} + \frac{217}{20}$$

$$= \frac{145}{40} + \frac{434}{40}$$

$$= \frac{579}{40} = 14 \frac{19}{40}$$

$$= 14 \frac{19}{40}$$

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.

$$3 \frac{5}{8} A + 2 \frac{3}{4} A + 4 \frac{5}{16} A$$
$$= 3 \frac{10}{16} A + 2 \frac{12}{16} A + 4 \frac{5}{16} A$$

$$= 9 \frac{27}{16} A = 10 \frac{11}{16} A$$

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.
$$\frac{5}{8} = 0.625$$

8 27 8 9.3 9

$$33. 2.12 = 2 \frac{12}{100} = 2 \frac{3}{25}$$

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.

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

$$R = \frac{88}{284}$$

41. = 31.0%

$$P = BR$$

$$P = (\$612)(0.067)$$

$$= \$41$$

Her new salary is $\$612 + \$41 = \$653$.

42. 0.0552

43. 6.73