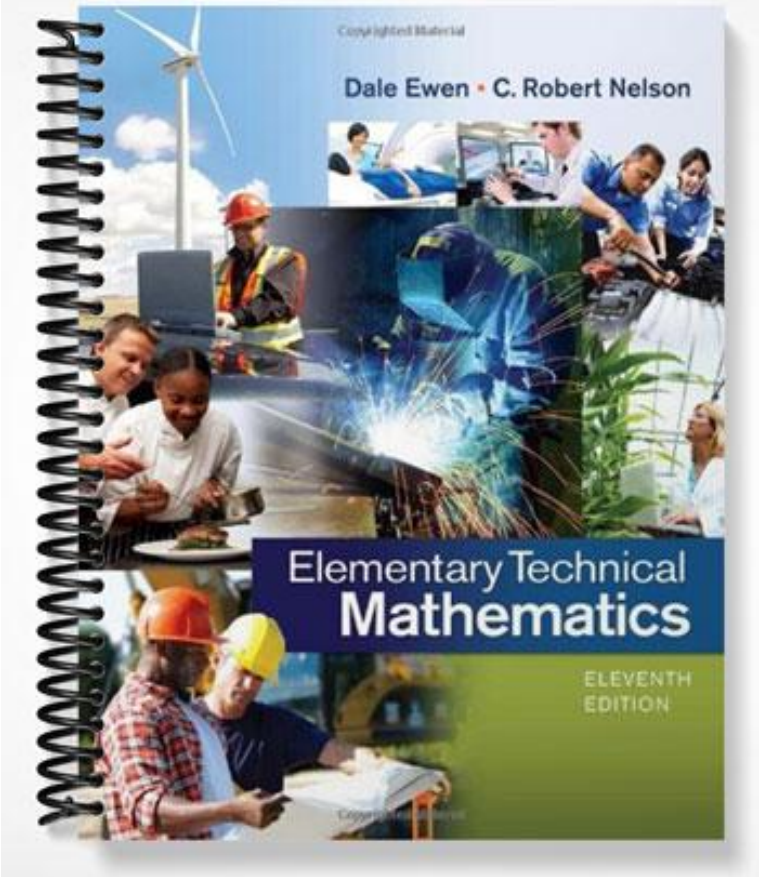
SOLUTIONS MANUAL



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

Cengage Learning
200 First Stamford Place, 4th Floor
Stamford, CT 06902
USA

Cengage Learning is a leading provider of customized learning solutions with office locations around the globe, including Singapore, the United Kingdom, Australia, Mexico, Brazil, and Japan. Locate your local office at: **www.cengage.com/global**.

Cengage Learning products are represented in Canada by Nelson Education, Ltd.

To learn more about Cengage Learning Solutions, visit **www.cengage.com**.

Purchase any of our products at your local college store or at our preferred online store **www.cengagebrain.com**.

Printed in the United States of America
1 2 3 4 5 6 7 17 16 15 14 13

Table of Contents

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. $4195\,\Omega$

14. $8615\,\Omega$

15. The sum of the lengths is 224 feet, so 224 studs are required.

16. $24\text{ ft} - 4\text{ ft} - 5\text{ ft} - 7\text{ ft} = 8\text{ ft}$

17. 39 ft

18. $125\text{ ft}^3 - 78\text{ ft}^3 = 47\text{ ft}^3$

19. Input: 1925 cm^3

Output: 1425 cm^3

$1925\text{ cm}^3 - 1425\text{ cm}^3 = 500\text{ cm}^3$

20. Yes; $31\text{ hr} + 2\text{ hr} + 3\text{ hr} + 2\text{ hr} + 3\text{ hr} = 41\text{ hr}$

21. 27,216

22. 1,699,922

23. 18,172,065

24. 486,400

25. 35,360,000

26. 122,440,800

27. 1809

28. 61,747 r 1

29. 389

30. 434 r 24

31. 844 r 40

32. 1566 r 80

33. $31\text{ mi/gal} \times 16\text{ gal} = 496\text{ mi}$

34. $65\text{ L} \times 12\text{ km/L} = 780\text{ km}$

35. $1300\text{ cm}^3 \div 4 = 325\text{ cm}^3$

36. $1274\text{ mi} \div 49\text{ gal} = 26\text{ mi/gal}$

37. $2340\text{ km} \div 180\text{ L} = 13\text{ km/L}$

38. $\$13/4\text{ ft} \times 20\text{ ft} = \$65$

39. $\$516 \div 6\text{ h} = \$86/\text{h}$

40. $\$508 \div 4 = \$127$

41. $125\text{ mi/h} \times 4\text{ h} = 500\text{ mi}$

42. $500\text{ ft/min} \times 15\text{ min} = 7500\text{ ft}$

43.

$5 \times 18\text{ ft} = 90\text{ ft}$

$42 \times 15\text{ ft} = 630\text{ ft}$

$158 \times 12\text{ ft} = 1896\text{ ft}$

$105 \times 10\text{ ft} = 1050\text{ ft}$

$79 \times 8\text{ ft} = 632\text{ ft}$

$87 \times 6\text{ ft} = 522\text{ ft}$

Total = 4820 ft

44. There are 112 boards in the order.

$36 \times 12\text{ ft} = 432\text{ ft}$

$28 \times 10\text{ ft} = 280\text{ ft}$

$36 \times 8\text{ ft} = 288\text{ ft}$

$12 \times 16\text{ ft} = 192\text{ ft}$

Total = 1192 ft

45.

First draftperson:

$8 \times 30 \times 80 = 19,200$ drawings

Second draftperson:

$8 \times 30 \times 120 = 28,800$ drawings

Difference:

$28,800 - 19,200 = 9600$ 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. $\dfrac{6864 \text{ bu}}{156 \text{ acre}} = 44 \text{ bu/acre}$

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

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

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.

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

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

56.

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

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

57.

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

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

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

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

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

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

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

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

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

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

64.

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

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

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

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

67.

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

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

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

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

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

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

68. The outer dimension of the back wall is

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

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

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

for a total of $2 \times 12 \times 13 = 312$ blocks for both walls. The outer dimensions of the side walls must fit inside the bricks of the back and front walls, so the side wall is

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

long and $8 \text{ ft} \times \dfrac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$ high so there would be $\dfrac{96 \text{ in.}}{8 \text{ in.}} = 12$ rows of $\dfrac{144 \text{ in.}}{16 \text{ in.}} = 9$ 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.

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

71.

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

72.

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

73. $50+125+110+35=320$ seats

74. a. $125 \div 11 = 11$ 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.

$$\begin{aligned}\text{Number of tables} &= 10+12\\ &= 22\\ \text{Tables per server} &= 22 \div 6\\ &= 3\text{ r }4\\ \text{Servers needed} &= 4\end{aligned}$$

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

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

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.

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

5.

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

6.

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

7.

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

8.

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

9.

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

10.

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

11.

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

12.

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

13.

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

14.

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

32.

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

33.

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

34.

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

35.

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

36.

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

37.

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

38.

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

39.

$$6\left[3+2(2+5)\right]$$
$$=6\left[3+2(7)\right]$$
$$=6\left[3+14\right]$$
$$=6\left[17\right]$$
$$=102$$

40.

$$5\left((4+6)+2(5-2)\right)$$
$$=5\left((4+6)+2(5-2)\right)$$
$$=5\left(10+2(3)\right)$$
$$=5(10+6)$$
$$=5(16)$$
$$=80$$

41.

$$5\times 2+3\left[2(5-3)+4(4+2)-3\right]$$
$$=10+3\left[2(2)+4(6)-3\right]$$
$$=10+3\left[4+24-3\right]$$
$$=10+3\left[25\right]$$
$$=10+75$$
$$=85$$

42.

$$3\left(10+2\left(1+3\left(2+6(4-2)\right)\right)\right)$$
$$=3\left(10+2\left(1+3\left(2+6(2)\right)\right)\right)$$
$$=3\left(10+2\left(1+3(2+12)\right)\right)$$
$$=3\left(10+2\left(1+3(14)\right)\right)$$
$$=3\left(10+2(1+42)\right)$$
$$=3\left(10+2(43)\right)$$
$$=3(10+86)$$
$$=3(96)$$
$$=288$$

Section 1.3: Area and Volume

1.

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

2.

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

3.

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

4.

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

5.

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

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.

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

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

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

8.

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

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

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

9.

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

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

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

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

10.

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

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

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

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

11.

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

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

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

12.

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

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

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

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

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

15.

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

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

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

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

Twenty rooms will be $20 \times 640 \text{ ft}^2 = 12{,}800 \text{ ft}^2$ so $12{,}800 \text{ ft}^2 \div 640 \text{ ft}^2 = 32$ gallons of paint will be needed.

16. Since the area of a sheet of drywall is $4 \text{ ft} \times 8 \text{ ft} = 32 \text{ ft}^2$ $12{,}800 \text{ ft}^2 \div 32 \text{ ft}^2 = 400$ pieces of drywall will be needed.

17. a.

$$A = l \times w$$
$$A = 24 \text{ ft} \times 45 \text{ ft}$$
$$= 1080 \text{ ft}^2$$
$$\text{Value} = 1080 \text{ ft}^2 \times \$110/\text{ft}^2$$
$$= \$118{,}800$$

b.

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

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

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

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

18.

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

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

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

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

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

19.

$$V = l \times w \times h$$
$$V = 3 \text{ m} \times 4 \text{ m} \times 8 \text{ m}$$
$$= 96 \text{ m}^3$$

20.

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

21.

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

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

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

22.

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

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

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

23.

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

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

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

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

24.

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

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

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

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

25.

$V = l \times w \times h$

$V = 10 \text{ cm} \times 12 \text{ cm} \times 5 \text{ cm}$

$= 600 \text{ cm}^3$

26.

$V = l \times w \times h$

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

$= 1600 \text{ ft}^3$

27.

$V = l \times w \times h$

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

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

31.

$V = l \times w \times h$

$V = 15 \text{ ft} \times 12 \text{ ft} \times 2 \text{ ft}$

$= 360 \text{ ft}^3$

So, the cement will weigh

$360 \text{ ft}^3 \times 193 \text{ lb/ft}^3 = 69{,}480 \text{ lb.}$

32.

$V = l \times w \times h$

$V = 5 \text{ ft} \times 6 \text{ ft} \times 5 \text{ ft}$

$= 150 \text{ ft}^3$

So, the coal will weigh

$150 \text{ ft}^3 \times 40 \text{ lb/ft}^3 = 6000 \text{ lb}$ which is

$6000 \text{ lb} \div 2000 \text{ lb} = 3 \text{ tons.}$

33.

$V = l \times w \times h$

$V = 8 \text{ ft} \times 5 \text{ ft} \times 6 \text{ ft}$

$= 240 \text{ ft}^3$

So, the water will weigh

$240 \text{ ft}^3 \times 62 \text{ lb/ft}^3 = 14{,}880 \text{ lb.}$

34.

$V = l \times w \times h$

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

$= 216 \text{ ft}^3$

So, the gasoline will weigh

28.

$V = l \times w \times h$

$V = 16 \text{ in.} \times 20 \text{ in.} \times 1 \text{ in.}$

$= 320 \text{ in}^3$

29.

$V = l \times w \times h$

$V = 3 \text{ ft} \times 5 \text{ ft} \times 2 \text{ ft}$

$= 30 \text{ ft}^3$

30.

$V = l \times w \times h$

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

$= 896 \text{ in}^3$

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

35.

$V = l \times w \times h$

$V = 100 \text{ ft} \times 50 \text{ ft} \times 10 \text{ ft}$

$= 50{,}000 \text{ ft}^3$

So, the cost of heating the space will be

$50{,}000 \text{ ft}^3 \div 1000 \text{ ft}^3 \times \$55 = \$2750.$

36. The remaining area is

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

$10170 \text{ ft}^2 \div 4000 \text{ ft}^2 = 2 \text{ r } 2170$ 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 be $4 \times 9 \text{ in.} + 1 \text{ in.} = 37 \text{ in.}$

38. The volume of the box is

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

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

39.

$V = l \times w \times h$

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

$= 128 \text{ ft}^3$

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.

$$8 \text{ ft} \times 12 \text{ in./ft} = 96 \text{ in.}$$
$$24 \text{ ft} \times 12 \text{ in./ft} = 288 \text{ in.}$$
$$V = l \times w \times h$$
$$= 96 \text{ in.} \times 288 \text{ in.} \times 3 \text{ in.}$$
$$= 82944 \text{ in}^3$$

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

$$I = \frac{E}{R}$$
$$I = \frac{120}{15}$$
$$= 8$$

10.

$$d = vt$$
$$d = (372)(18)$$
$$= 6696$$

11.

$$P = IE$$
$$P = (29)(173)$$
$$= 5017$$

12.

$$W = IEt$$
$$W = (11)(95)(46)$$
$$= 48,070$$

13.

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

14.

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

$$v = v_0 + gt$$
$$v = 12 + (32)(5)$$
$$= 172$$

28.

$$Q = CV$$
$$Q = (12)(2500)$$
$$= 30{,}000$$

29.

$$I = \frac{E}{Z}$$
$$I = \frac{240}{15}$$
$$= 16$$

30.

$$P = I^2R$$
$$P = (4)^2(2000)$$
$$= 32{,}000$$

31.

$$P = cd^2SN$$
$$P = (0.7853)(3)^2(4)(4)$$
$$= 113.1$$

32.

$$l = \frac{V}{cd^2}$$
$$l = \frac{47\text{ in}^3}{(0.785)(2.98\text{ in.})^2}$$
$$= 6.742\text{ in.}$$

33.

Area of left rectangle: $55\text{ ft} \times 120\text{ ft} = 6600\text{ ft}^2$

Area of middle rectangle: $160\text{ ft} \times 60\text{ ft} = 9600\text{ ft}^2$

Area of right rectangle: $260\text{ ft} \times 60\text{ ft} = \underline{21{,}600\text{ ft}^2}$

Total area: $= 31{,}800\text{ ft}^2$

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

Section 1.5: Prime Factorization

1. a. $1+5=6$ is divisible by 3, so 15 is divisible by 3.

b. 15 is not divisible by 4.

2. a. $2+8=10$ is not divisible by 3, so 28 is not divisible by **3.**

b. 28 is divisible by **4.**

3. a. $9+6=15$ is divisible by 3, so 96 is divisible by 3.

b. 96 is divisible by 4.

4. a. $1+7+2=10$ is not divisible by 3, so 172 is not divisible by 3.

b. 172 is divisible by 4.

5. a. $7+8=15$ is divisible by 3, so 78 is divisible by 3.

b. 78 is not divisible by 4.

6. a. $6+7+5=18$ is divisible by 3, so 675 is divisible by 3.

b. 675 is not divisible by 4.

7. 53 is prime

8. $57=3\cdot19$ is not prime

9. $93=3\cdot31$ is not prime

10. $121=11\cdot11$ is not prime

11. $16=2\cdot2\cdot2\cdot2$ is not prime

12. $123=3\cdot41$ is not prime

13. $39=3\cdot13$ is not prime

14. $87=3\cdot29$ is not prime

15. 458 is even, so it is divisible by 2.

16. $12,746$ is even, so it is divisible by 2.

17. $315,817$ is odd, so it is not divisible by 2.

18. $877,778$ is even, so it is divisible by 2.

19. 1367 is odd, so it is not divisible by 2.

20. 1205 is odd, so it is not divisible by 2.

21. $3+8+7=18$ is divisible by 3, so 387 is divisible by 3.

22. $1+2+5+4=12$ is divisible by 3, so 1254 is divisible by 3.

23. $4+5+3+1+2+8=23$ is not divisible by 3, so $453,128$ is not divisible by 3.

24. $1+7+8+2+1+3=22$ is not divisible by 3, so $178,213$ is not divisible by 3.

25. $2+1+8+7+4+5=27$ is divisible by 3, so $218,745$ is divisible by 3.

26. $1+5+6+9+0=21$ is divisible by 3, so $15,690$ is divisible by 3.

27. 70 ends in 0, so it is divisible by 5.

28. 145 ends in 5, so it is divisible by 5.

29. 366 does not end in 0 or 5, so it is not divisible by 5.

30. $56,665$ ends in 5, so it is divisible by 5.

31. $63,227$ does not end in 0 or 5, so it is not divisible by 5.

32. $14,601$ does not end in 0 or 5, so it is not divisible by 5.

33. 56 is even, so it is divisible by 2.

34. $4+2=6$ is divisible by 3, so 42 is divisible by 3.

35. $2+1+8=11$ is not divisible by 3, so 218 is not divisible by 3.

36. 375 ends in 5, so it is divisible by 5.

37. 528 does not end in 0 or 5, so it is not divisible by 5.

38. $2+1+8+4=15$ is divisible by 3, so 2184 is divisible by 3.

39. $1+9+8=18$ is divisible by 3, so 198 is divisible by 3.

40. $2+2+3+6=13$ is not divisible by 3, so 2236 is not divisible by 3.

41. $1,820,670$ is even, so it is divisible by 2.

42. $2,817,638$ is even, so it is divisible by 2.

43. $7,215,720$ ends in 0, so it is divisible by 5.

44. $5+2+7+5+3+4+3=29$ is not divisible by 3, so $5,275,343$ is not divisible by 3.

45. $2\cdot2\cdot5$

46. $2\cdot3\cdot3$

47. $2\cdot3\cdot11$

48. $2\cdot3\cdot5$

49. $2\cdot2\cdot3\cdot3$

50. $5\cdot5$

51. $3\cdot3\cdot3$

52. 59 is prime

53. $51=3\cdot17$

54. $56=2\cdot2\cdot2\cdot7$

55. $42=2\cdot3\cdot7$

56. $63=3\cdot3\cdot7$

57. $120=2\cdot2\cdot2\cdot3\cdot5$

58. $72=2\cdot2\cdot2\cdot3\cdot3$

59. $171=3\cdot3\cdot19$

60. $360=2\cdot2\cdot2\cdot3\cdot3\cdot5$

61. $105=3\cdot5\cdot7$

62. $78=2\cdot3\cdot13$

63. $252=2\cdot2\cdot3\cdot3\cdot7$

64. $444=2\cdot2\cdot3\cdot37$

Unit 1A Review

1. 241

2. 1795

3. 2,711,279

4. 620

5.

$$\begin{aligned} 3\times 12 \text{ ft} &= 36 \text{ ft} \\ 8\times 8 \text{ ft} &= 64 \text{ ft} \\ 9\times 10 \text{ ft} &= 90 \text{ ft} \\ 12\times 6 \text{ ft} &= \underline{72 \text{ ft}} \\ \text{Total} &= 262 \text{ ft} \end{aligned}$$

6. $14,244 \text{ lb} \div 56 \text{ lb} = 254 \text{ bu}$

7.

$$\begin{aligned} & 6+2(5\times 4-2) \\ &= 6+2(20-2) \\ &= 6+2(18) \\ &= 6+23 \\ &= 42 \end{aligned}$$

8.

$$\begin{aligned} & 3^2+12\div 3-2\times 3 \\ &= 9+4-6 \\ &= 7 \end{aligned}$$

9.

$$\begin{aligned} & 12+2\left[3(8-2)-2(3+1)\right] \\ &= 12+2\left[3(6)-2(4)\right] \\ &= 12+2\left[18-8\right] \\ &= 12+2\left[10\right] \\ &= 12+20 \\ &= 32 \end{aligned}$$

10.

$$\begin{aligned} \text{Area of left rectangle:} \quad & 24 \text{ in.}\times 11 \text{ in.} = 264 \text{ in}^2 \\ \text{Area of middle rectangle:} \quad & 15 \text{ in.}\times 11 \text{ in.} = 165 \text{ in}^2 \\ \text{Area of right rectangle:} \quad & 10 \text{ in.}\times 7 \text{ in.} = \underline{70 \text{ in}^2} \\ \text{Total area:} \quad & = 499 \text{ in}^2 \end{aligned}$$

11.

$$\begin{aligned} V &= lwh \\ V &= (15 \text{ ft})(8 \text{ ft})(6 \text{ ft}) \\ &= 720 \text{ ft}^3 \end{aligned}$$

12.

$$\begin{aligned} d &= vt \\ d &= (45)(4) \\ &= 180 \end{aligned}$$

13.

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

14.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 1.7: Addition and Subtraction of Fractions

1. 16

2. 105

3. 210

4. 315

5. 48

6. 70

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

33.

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

34.

$$3\frac{5}{8}=3\frac{5}{8}$$
$$\underline{5\frac{3}{4}=5\frac{6}{8}}$$
$$8\frac{11}{8}=9\frac{3}{8}$$

35.

$$3\ =2\frac{8}{8}$$
$$\underline{\frac{3}{8}=\ \frac{3}{8}}$$
$$2\frac{5}{8}$$

36.

$$8=7\frac{4}{4}$$
$$\underline{5\frac{3}{4}=5\frac{3}{4}}$$
$$2\frac{1}{4}$$

37.

$$8\frac{3}{16}=7\frac{19}{16}$$
$$\underline{3\frac{7}{16}=3\frac{7}{16}}$$
$$4\frac{12}{16}=4\frac{3}{4}$$

38.

$$5\frac{3}{8}=5\frac{3}{8}$$
$$\underline{2\frac{3}{4}=2\frac{6}{8}}$$
$$7\frac{9}{8}=8\frac{1}{8}$$

39.

$$7\frac{3}{16}=6\frac{19}{16}$$
$$\underline{4\frac{7}{8}=4\frac{14}{16}}$$
$$2\frac{5}{16}$$

40.

$$8\frac{1}{4}=7\frac{20}{16}$$
$$\underline{4\frac{7}{16}=4\frac{7}{16}}$$
$$3\frac{13}{16}$$

41.

$$3\frac{4}{5}=3\frac{36}{45}$$
$$\underline{9\frac{8}{9}=9\frac{49}{45}}$$
$$12\frac{86}{45}=13\frac{41}{45}$$

42.

$$4\frac{5}{12}=4\frac{25}{60}$$
$$\underline{6\frac{17}{20}=6\frac{51}{60}}$$
$$10\frac{76}{60}=10\frac{19}{15}=11\frac{4}{15}$$

43.

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

44.

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

45.

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

46.

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

47.

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

48.

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

49. a.

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

b.

$$6\frac{1}{4}\text{ ft}-4\frac{3}{4}\text{ ft}$$
$$=5\frac{5}{4}\text{ ft}-4\frac{3}{4}\text{ ft}$$
$$=1\frac{2}{4}\text{ ft}=1\frac{1}{2}\text{ ft}$$

50.

$$\frac{1}{8}\text{ in.}-\frac{3}{32}\text{ in.}=\frac{4}{32}\text{ in.}-\frac{3}{32}\text{ in.}$$
$$=\frac{1}{32}\text{ in.}$$

51.

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

52.

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

53.

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

54.

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

55.

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

56.

$$4\text{ ft}-3\frac{3}{4}\text{ ft}$$
$$=3\frac{4}{4}\text{ ft}-3\frac{3}{4}\text{ ft}=\frac{1}{4}\text{ ft}$$

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

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

60. a.

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

b.

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

57.

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

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

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

59.

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

61. a.

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

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.

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

65.

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

66.

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

67.

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

68.

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

69.

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

70.

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

71. a.

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

b.

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

72.

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

73. a.

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

b.

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

74.

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

75.

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

76.

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

77.

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

78.

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

79.

One cut:

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

Three cuts:

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

80.

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

81.

Length:

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

Width:

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

82.

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

83.

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

84.

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

85. a.

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

85. (continued)

b.

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

86.

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

87.

$$1\frac{1}{2}\text{ acres} - \frac{1}{2}\text{ acre} - \frac{1}{6}\text{ acre} - \frac{1}{3}\text{ acre}$$
$$= \frac{3}{2}\text{ acres} - \frac{1}{2}\text{ acre} - \frac{1}{6}\text{ acre} - \frac{1}{3}\text{ acre}$$
$$= \frac{9}{6}\text{ acres} - \frac{3}{6}\text{ acre} - \frac{1}{6}\text{ acre} - \frac{2}{6}\text{ acre}$$
$$= \frac{3}{6}\text{ acre} = \frac{1}{2}\text{ acre}$$

88.

$$1\frac{1}{2}\text{ mi} + 2\frac{3}{4}\text{ mi} + \frac{3}{4}\text{ mi} + \frac{1}{2}\text{ mi}$$
$$= 1\frac{2}{4}\text{ mi} + 2\frac{3}{4}\text{ mi} + \frac{3}{4}\text{ mi} + \frac{2}{4}\text{ mi}$$
$$= 3\frac{10}{4}\text{ mi} = 5\frac{2}{4}\text{ mi} = 5\frac{1}{2}\text{ mi}$$

89.

$$\frac{3}{4}+\frac{1}{2}=\frac{3}{4}+\frac{4}{4}$$
$$=\frac{7}{4}=1\frac{3}{4}\text{ sticks}$$

90.

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

91.

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

92.

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

93.

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

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

Section 1.8: Multiplication and Division of Fractions

1. 12

2. 4

3. 9

4.

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

5.

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

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

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

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

9. 10

10.
$$\begin{aligned}&\frac{9}{16}\times\frac{2}{3}\times1\frac{6}{15}\\&=\frac{9}{16}\times\frac{2}{3}\times\frac{21}{15}\\&=\frac{9}{16}\times\frac{2}{3}\times\frac{7}{5}\\&=\frac{21}{40}\end{aligned}$$

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

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

13.
$$\begin{aligned}&2\frac{1}{3}\times\frac{5}{8}\times\frac{6}{7}\\&=\frac{7}{3}\times\frac{5}{8}\times\frac{6}{7}\\&=\frac{5}{4}=1\frac{1}{4}\end{aligned}$$

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

15.
$$\begin{aligned}&\frac{6}{11}\times\frac{26}{35}\times1\frac{9}{13}\times\frac{7}{12}\\&=\frac{6}{11}\times\frac{26}{35}\times\frac{22}{13}\times\frac{7}{12}\\&=\frac{2}{5}\end{aligned}$$

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.
$$\begin{aligned}18\frac{2}{3}\div6&=\frac{56}{3}\div6\\&=\frac{56}{3}\times\frac{1}{6}\\&=\frac{28}{9}=3\frac{1}{9}\end{aligned}$$

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

22.
$$\begin{aligned}\frac{77}{6}\div6&=\frac{77}{6}\times\frac{1}{6}\\&=\frac{77}{36}=2\frac{5}{36}\end{aligned}$$

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

24.
$$\begin{aligned}7\div3\frac{1}{8}&=7\div\frac{25}{8}\\&=7\times\frac{8}{25}\\&=\frac{56}{25}=2\frac{6}{25}\end{aligned}$$

25.
$$\begin{aligned}\frac{2}{5}\times3\frac{2}{3}\div\frac{3}{4}&=\frac{2}{5}\times\frac{11}{3}\times\frac{4}{3}\\&=\frac{88}{45}=1\frac{43}{45}\end{aligned}$$

26.

$$\frac{7}{8}\times\frac{1}{2}\div\frac{2}{7}=\frac{7}{8}\times\frac{1}{2}\times\frac{7}{2}$$
$$=\frac{49}{32}=1\frac{17}{32}$$

27.

$$\frac{16}{5}\times\frac{3}{2}\times\frac{10}{4}\div5\frac{1}{3}$$
$$=\frac{16}{5}\times\frac{3}{2}\times\frac{10}{4}\div\frac{16}{3}$$
$$=\frac{16}{5}\times\frac{3}{2}\times\frac{10}{4}\times\frac{3}{16}$$
$$=\frac{9}{4}=2\frac{1}{4}$$

28.

$$6\times6\times\frac{21}{7}\div48$$
$$=6\times6\times\frac{21}{7}\times\frac{1}{48}$$
$$=\frac{9}{4}=2\frac{1}{4}$$

29.

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

30.

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

31.

$$\frac{2}{7}\times\frac{5}{9}\times\frac{3}{10}\div6$$
$$=\frac{2}{7}\times\frac{5}{9}\times\frac{3}{10}\times\frac{1}{6}$$
$$=\frac{1}{126}$$

32.

$$\frac{9}{4}\times\frac{9}{4}\times\frac{21}{7}\div81$$
$$=\frac{9}{4}\times\frac{9}{4}\times\frac{21}{7}\times\frac{1}{81}$$
$$=\frac{3}{16}$$

33.

$$\frac{7}{16}\div\frac{3}{8}\times\frac{1}{2}$$
$$=\frac{7}{16}\times\frac{8}{3}\times\frac{1}{2}$$
$$=\frac{7}{12}$$

34.

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

35. $\frac{3}{4}\times42\text{ gal}=\frac{126}{4}\text{ gal}=\frac{63}{2}\text{ gal}=31\frac{1}{2}\text{ gal}$

36. a.

$$A=l\times w$$
$$A=6\frac{1}{3}\text{ ft}\times3\frac{3}{4}\text{ ft}$$
$$=\frac{19}{3}\text{ ft}\times\frac{15}{4}\text{ ft}$$
$$=\frac{95}{4}\text{ ft}^2=23\frac{3}{4}\text{ ft}^2$$

b.

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

37. $7\times6\frac{1}{2}\text{ in.}=7\times\frac{13}{2}\text{ in.}=\frac{91}{2}\text{ in.}=45\frac{1}{2}\text{ in.}$

38.

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

39.

$$\frac{684\frac{1}{4}\text{ mi}}{5\frac{2}{3}\text{ h}} = \frac{\frac{2737}{4}\text{ mi}}{\frac{17}{3}\text{ h}} = \frac{2737}{4} \times \frac{3}{17}\text{ mi/h}$$

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

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

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

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.

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

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

44.

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

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

45.

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

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

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

47.

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

48. There will be 8 spaces between the rivets.

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

49. There will be 15 spaces between the rivets.

$$\frac{28\frac{1}{8}\text{ in.}}{15} = 28\frac{1}{8}\text{ in.}\times\frac{1}{15}$$
$$= \frac{15}{8}\text{ in.} = 1\frac{7}{8}\text{ in.}$$

50.

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

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

Total lengths of the pieces:

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

Remaining length:

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

52. a.

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

52. (continued)

b.

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

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

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

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

53.

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

$$=\frac{\frac{585}{64}\text{ in.}}{\frac{3}{128}\text{ in.}}$$

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

$$=390\text{ revolutions}$$

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

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

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

55.

$V=lwh$

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

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

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

56.

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

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

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

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

57.

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

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

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

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

59.

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

$$\text{Power}=12\frac{1}{2}\times220$$

$$=\frac{25}{2}\times220$$

$$=2750\text{ W}$$

60.

$V=IR$

$$V=4\frac{1}{4}\times24\frac{1}{2}$$

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

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

61.

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

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

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

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

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

$$= 420 \text{ ft}$$

62.

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

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

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

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

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

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.

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

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

$$= 80 \text{ lengths}$$

65. There will be 18 spaces between the outlets.

$$\frac{130\frac{1}{2} \text{ ft}}{18} = \frac{\frac{261}{2} \text{ ft}}{18}$$

$$= \frac{261}{2} \text{ ft} \times \frac{1}{18}$$

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

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.

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

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

$$= \frac{200}{9} \text{ ft}^3 = 22\frac{2}{9} \text{ ft}^3$$

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

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

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

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

69.

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

70. a.

Gravel: $V = lwh$

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

Concrete: $V = lwh$

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

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.

$$\frac{1}{5} \times 2\frac{1}{2} \text{ lb} = \frac{1}{5} \times \frac{5}{2} \text{ lb}$$
$$= \frac{1}{2} \text{ oz}$$

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.

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

76.

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

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

78.

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

79.

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

80.

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

81. a.

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

b.

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

82.

Area of face = Outer area − Inner area
$$= 3\text{ in.}\times 2\frac{3}{4}\text{ in.} - 1\frac{1}{2}\text{ in.}\times 2\text{ in.}$$
$$= 3\text{ in.}\times\frac{11}{4}\text{ in.} - \frac{3}{2}\text{ in.}\times 2\text{ in.}$$
$$= \frac{33}{4}\text{ in}^2 - 3\text{ in}^2$$
$$= \frac{33}{4}\text{ in}^2 - \frac{12}{4}\text{ in}^2 = \frac{21}{4}\text{ in}^2$$

Volume $= Al$
$$= \frac{21}{4}\text{ in}^2\times 12\text{ in.} = 63\text{ in}^3$$
$$= 11\text{ whole cuts}$$

83.

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

84.

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

85.

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

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

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

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

86. There will be 4 cuts.

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

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

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

87.

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

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

88.

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

89.

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

90.

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

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

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

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

91.

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

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

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

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

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

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

Number of whole steaks $= 12$

92.

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

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

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

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

93.

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

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

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

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

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

94.

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

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

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

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

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

3. $5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} + 3 \text{ oz} = 83 \text{ oz}$

4.
$$7 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 252 \text{ in.}$$
$$3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 36 \text{ in.}$$
$$6 \text{ in.} = \underline{6 \text{ in.}}$$
$$= 294 \text{ in.}$$

5. $4 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} + 1 \text{ pt} = 9 \text{ pt}$

6.
$$6 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 48 \text{ pt}$$
$$3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = \underline{6 \text{ pt}}$$
$$= 54 \text{ pt}$$

7. $3 \text{ tbs} \times \frac{3 \text{ tsp}}{1 \text{ tbs}} = 9 \text{ tsp}$

8. $2 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 16 \text{ pt}$

9. $8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$

10. $5 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 15 \text{ ft}$

11. $3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 6 \text{ pt}$

12. $4 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 21{,}120 \text{ ft}$

13. $96 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 8 \text{ ft}$

14. $72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$

15. $10 \text{ pt} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 5 \text{ qt}$

16. $54 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 4\frac{1}{2} \text{ ft}$

17. $88 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 5\frac{1}{2} \text{ lb}$

18. $32 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 2 \text{ pt}$

19. $14 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 3\frac{1}{2} \text{ gal}$

20. $3 \text{ bu} \times \frac{4 \text{ pk}}{1 \text{ bu}} = 12 \text{ pk}$

21. $56 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 3\frac{1}{2} \text{ pt}$

22. $7040 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 1\frac{1}{3} \text{ mi}$

23. $92 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 30\frac{2}{3} \text{ yd}$

24. $9000 \text{ lb} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 4\frac{1}{2} \text{ tons}$

25. $2 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 3520 \text{ yd}$

26. $6000 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 46\frac{7}{8} \text{ gal}$

27. $500 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 15\frac{5}{8} \text{ qt}$

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

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

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

31. $12\frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = \frac{51}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 153 \text{ in.}$

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

33.

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

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

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

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

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

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

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

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

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

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

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

44.

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

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

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

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

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

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

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

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

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

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

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

53.

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

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

54.

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

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

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

56.

$$36 \ \frac{\text{in.}}{\text{s}} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}}$$

$$= 2\frac{1}{22} \ \frac{\text{mi}}{\text{h}}$$

57.

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

58.

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

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

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.

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

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

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

$$\begin{aligned}\frac{1}{2} \text{ gal} &= \underline{\frac{1}{2} \text{ gal}}\\ &= 3\frac{3}{8} \text{ gal}\end{aligned}$$

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

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

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

Unit 1B Review

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

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

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

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

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

6.

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

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

8.

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

9.

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

10.

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

11.

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

12.

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

13.

$$P = 2l + 2w$$

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

14.

$$A = lw$$

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

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

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

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

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

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

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

Section 1.10: Addition and Subtraction of Decimal Fractions

1. four thousandths

2. twenty-one thousandths

3. five ten-thousandths

4. seven and one-tenth

5. one and four hundred twenty-one hundred-thousandths

6. one thousand forty-two and seven thousandths

7. six and ninety-two thousandths

8. eight and one thousand four hundred sixty-one ten-thousandths

9. $5.02\,;\ 5\dfrac{2}{100} = 5\dfrac{1}{50}$

10. $123.006\,;\ 123\dfrac{6}{1999} = 123\dfrac{3}{500}$

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

12. $0.065\,;\ \dfrac{65}{1000} = \dfrac{13}{200}$

13. $43.0101\,;\ 43\dfrac{101}{10,000}$

14. $0.000563\,;\ \dfrac{563}{1,000,000}$

15. 0.375

16. 0.64

17. $0.7\overline{3}$

18. 0.4

19. 0.34

20. $1.\overline{2}$

21. $1.\overline{27}$

22. 5.12

23. $18.\overline{285714}$

24. 15.125

25. $34.\overline{2}$

26. $38.\overline{3}$

27. $\dfrac{7}{10}$

28. $\dfrac{6}{10} = \dfrac{3}{5}$

29. $\dfrac{11}{100}$

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

31. $\dfrac{8425}{10,000} = \dfrac{337}{400}$

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

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

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

35. 150.000

36. 207.165

37. 163.204

38. 244.037

39. 86.6

40. 1.58

41. 15.308

42. 123.588

43. 8.68

44. 8.94

45. 4.862

46. 130.09

47. 10.0507

48. 0.92454

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

50. $10.25 \text{ ft} + 15.4 \text{ ft} + 14.1 \text{ ft} = 39.75 \text{ ft}$

51. $2.3\text{ h} + 3.1\text{ h} + 5.4\text{ h} = 10.8\text{ h}$

52. $125.5\text{ mi} + 110.3\text{ mi} + 97.8\text{ mi} = 333.6\text{ mi}$

53.

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

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

55.

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

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

56.

$$\begin{array}{r} 3.45\text{ cm} \\ 1.87\text{ cm} \\ 4.87\text{ cm} \\ 2.69\text{ cm} \\ 8.32\text{ cm} \\ \underline{4.56\text{ cm}} \\ 25.76\text{ cm} \end{array}$$

57.

$$\begin{array}{r} 4.17\text{ in.} \\ 1.30\text{ in.} \\ 1.00\text{ in.} \\ \underline{1.47\text{ in.}} \\ 7.94\text{ in.} \end{array}$$

58. $6.573\text{ in.} - 0.938\text{ in.} - 0.688\text{ in.} - 1.313\text{ in.} - 0.625\text{ in.} - 1.501\text{ in.} = 1.508\text{ in.}$

59.

$$9.625\text{ in.} = 9\frac{5}{8}\text{ in.}$$

$$9\frac{5}{8}\text{ in.} \div 2 = 4\frac{5}{32}\text{ in.} = 4.8125\text{ in.}$$

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

61.

$$\begin{array}{r} 0.3\text{ A} \\ 0.105\text{ A} \\ 0.45\text{ A} \\ 0.93\text{ A} \\ 0.27\text{ A} \\ \underline{0.55\text{ A}} \\ 2.605\text{ A} \end{array}$$

62.

$$\begin{array}{r} 21.5\ \Omega \\ 42.6\ \Omega \\ 62.3\ \Omega \\ 19.8\ \Omega \\ \underline{32.2\ \Omega} \\ 178.4\ \Omega \end{array}$$

63.

$$\begin{array}{r} 15.7\ \Omega \\ 40\ \Omega \\ 25.5\ \Omega \\ 0.6\ \Omega \\ 1200\ \Omega \\ \underline{115\ \Omega} \\ 1396.8\ \Omega \end{array}$$

64.

$$\begin{array}{r} 3.2\text{ V} \\ 5.1\text{ V} \\ 0.45\text{ V} \\ 0.03\text{ V} \\ 0.8\text{ V} \\ 0.007\text{ V} \\ \underline{2\text{ V}} \\ 11.587\text{ V} \end{array}$$

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

66.

$a = 13.47\text{ cm} - 6.74\text{ cm} - 4.89\text{ cm}$
$= 1.84\text{ cm}$

$b = 1.23\text{ cm} + 1.79\text{ cm}$
$= 3.02\text{ cm}$

$c = (2.62\text{ cm} - 0.98\text{ cm}) \div 2$
$= 0.82\text{ cm}$

67. $(1.94\text{ in.} - 1.50\text{ in.}) \div 2 = 0.22\text{ in.}$

68.

$$l = 2.375 \text{ in.} + 3.375 \text{ in.}$$
$$= 5.75 \text{ in.}$$
$$A = 1.250 \text{ in.} + 3.750 \text{ in.} + 1.250 \text{ in.}$$
$$= 6.25 \text{ in.}$$

69. $4.125 \text{ in.} - 0.007 \text{ in.} = 4.118 \text{ in.}$

70. $0.2573 \text{ in.} - 0.2476 \text{ in.} = 0.0097 \text{ in.}$

71. $11.20 \text{ billion} - 6.11 \text{ billion} = 5.09 \text{ billion}$

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

73. 1317.5 bbl

74.

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

75.

$$1\frac{3}{4} \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal}$$
$$= 1.75 \text{ gal} + 0.4 \text{ gal} + 0.75 \text{ gal} + 0.5 \text{ gal}$$
$$= 3.4 \text{ gal}$$

76.

$$\begin{array}{r} 0.75 \text{ oz} \\ 1.3 \text{ oz} \\ 2.5 \text{ oz} \\ 0.1 \text{ oz} \\ \hline 4.65 \text{ oz} \end{array}$$

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
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

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

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

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

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

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

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

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

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

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

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

29.

$$12 \times 8\frac{7}{8} \text{ in.} = 12 \times 8.875 \text{ in.}$$
$$= 106.5 \text{ in.}$$
$$\frac{106.5 \text{ in.}}{11} = 9.682 \text{ in.}$$

30.

$$\frac{\$24.96}{4 \text{ ft}} = \$6.24/\text{ft}$$
$$\$6.24/\text{ft} \times \frac{1 \text{ ft}}{12 \text{ in.}} = \$0.52/\text{in.}$$

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

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

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

33.

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

34.

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

35.

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

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

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

38.

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

39.

$$V = lwh$$
$$V = (87 \text{ ft})(42 \text{ ft})(8 \text{ ft})$$
$$= 29,232 \text{ ft}^3$$
$$\text{Cost} = 29,232 \text{ ft}^3 \times \left(\frac{1 \text{ yd}}{3 \text{ ft}}\right)^3 \times \frac{\$4.50}{1 \text{ yd}^3}$$
$$= \$4872.00$$

40.

$$\frac{2.640 \text{ in.} - 2.640 \text{ in.}}{0.018 \text{ in.}}$$
$$= \frac{0.252 \text{ in.}}{0.018 \text{ in.}}$$
$$= 14 \text{ cuts}$$

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

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

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

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

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 $\dfrac{\$312.00}{500 \text{ lb}} = \$0.625/\text{lb}$.

52.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

68. $365 \text{ days} \times 4.4 \text{ lb/day} = 1606 \text{ lb}$

69. $312,780,968 \text{ people} \times 4.4 \text{ lb/person} \times \dfrac{1 \text{ ton}}{2000 \text{ lb}} = 688,000 \text{ tons}$

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

71.

$V = lwh$

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

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

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

73.

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

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

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

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

b.

$5.5 \text{ lb} \times \dfrac{16 \text{ oz}}{1 \text{ lb}} = 88 \text{ oz}$

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

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

Section 1.13: Percent

1. 0.27

2. 0.15

3. 0.06

4. 0.05

5. 1.56

6. 2.32

7. 0.292

8. 0.362

9. 0.087

10. 1.287

11. 9.478

12. 0.6829

13. 0.0028

14. 0.0078

15. 0.00068

16. 0.000093

17. $4\frac{1}{4}\% = 4.25\% = 0.0425$

18. $9\frac{1}{2}\% = 9.5\% = 0.095$

19. $\frac{3}{8}\% = 0.375\% = 0.00375$

20. $50\frac{1}{3}\% = 50.\overline{3}\% = 0.50\overline{3}$

21. 54%

22. 25%

23. 8%

24. 2%

25. 62%

26. 79%

27. 217%

28. 34.5%

29. 435%

30. 22.5%

31. 18.5%

32. 625%

33. 29.7%

34. 711%

35. 519%

36. 81.5%

37. 1.87%

38. 3.42%

39. 0.29%

40. 0.062%

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

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

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

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

45. $\frac{1}{6} = 0.16 \text{ r } 4 = 16\frac{4}{6}\% = 16\frac{2}{3}\%$

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

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

48. $\frac{3}{7} = 0.42 \text{ r } 6 = 42\frac{6}{7}\%$

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

50. $\frac{5}{6} = 0.83 \text{ r } 2 = 83\frac{2}{6}\% = 83\frac{1}{3}\%$

51. $\frac{13}{40} = 0.325 = 32.5\%$ 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. $2\frac{1}{3} = \frac{7}{3} = 2.33 \text{ r } 1 = 233\frac{1}{3}\%$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

81.

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

Section 1.14: Rate, Base, and Part

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

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

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

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

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

6. $P = 25$; R = unknown; $B = 28$

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

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

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

10. $P = \$90$; R = unknown; $B = \$500$

11.

$P = BR$

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

$= \$2600$

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

12.

$P = BR$

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

$= \$172.20$

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

13. a.

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

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

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

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

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

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

Total; $\$16.30 + \$42.06 + \$79.61 = \$137.96$

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

14.

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

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

$$= 2720$$

15.

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

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

$$R = \frac{2650 \text{ ft}}{5280 \text{ ft}}$$

$$= 0.5 = 50\%$$

16.

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

$$B = \frac{0.35 \text{ mi}}{0.04}$$

$$= 8.75 \text{ mi}$$

17.

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

$$B = \frac{\$72}{0.045}$$

$$= \$1600$$

18.

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

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

$$= 0.490 = 49.0\%$$

19.

$$P = BR$$

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

$$= 112.8$$

20.

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

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

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

21.

$$P = BR$$

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

$$= 8.96 \text{ V}$$

22.

$$P = BR$$

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

$$= 55$$

23.

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

$$R = \frac{97}{130}$$

$$= 0.746 = 74.6\%$$

24.

$$P = BR$$

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

$$= 106 \text{ welds}$$

25.

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

$$R = \frac{24 \text{ h}}{65 \text{ h}}$$

$$= 0.369 = 36.9\%$$

26.

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

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

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

$$= 0.211 = 21.1\%$$

27.

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

28.

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

29.

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

30.

$$\text{Window area} = 78\frac{1}{2} \text{ ft} \times 12\frac{1}{6} \text{ ft} \times 0.20$$
$$= 191 \text{ ft}^2$$
$$\text{Area of 1 window} = (2 \text{ ft})(6 \text{ ft}) = 12 \text{ ft}^2$$
$$\frac{191 \text{ ft}^2}{12 \text{ ft}^2} = 15.9$$

Fifteen windows could be drawn on the wall.

31.

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

32.

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

33.

$$\text{Chemical: } 160 \text{ acre} \times \frac{2\frac{3}{4} \text{ lb}}{1 \text{ acre}}$$
$$= 440 \text{ lb}$$
$$\text{Active ingredients: } 440 \text{ lb} \times 0.80 = 352 \text{ lb}$$
$$\text{Inert ingredients: } 440 \text{ lb} - 352 \text{ lb} = 88 \text{ lb}$$

34.

$$60 \text{ lb} \times 0.39 = 23.4 \text{ lb}$$
$$120 \text{ acre} \times \frac{45 \text{ bu}}{1 \text{ acre}} \times \frac{23.4 \text{ lb}}{1000 \text{ ft}^2} = 126,360 \text{ lb}$$

35.

$$7310 \text{ lb} \times \frac{1 \text{ gal}}{8.6 \text{ lb}} = 850 \text{ gal}$$
$$\text{Butterfat} = 850 \text{ gal} \times 0.42 = 35.7 \text{ gal}$$

36.

$$\text{Seeded area} = (18,400 \text{ ft}^2)(0.60)$$
$$= 11,040 \text{ ft}^2$$
$$\text{Seed required} = 11,040 \text{ ft}^2 \times \frac{2 \text{ lb}}{1000 \text{ ft}^2}$$
$$= 22 \text{ lb}$$

37.

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

38.

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

39.

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

40.

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

41.

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

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

$$= 0.025 = 2.5\%$$

42.

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

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

$$= 11.3\%$$

43.

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

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

$$= 53.3\%$$

44.

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

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

$$= 19.4\%$$

45.

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

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

$$= 14.2\%$$

46.

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

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

$$= 23.2\%$$

47. First item: $\$100.00 - 0.55 \times \$100.00 = \$45.$

Second item:

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

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

48.

$$P = BR$$

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

$$= \$7.09$$

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

49.

$$P = BR$$

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

$$= 1558 \text{ lb}$$

50.

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

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

$$= 0.472 = 47.2\%$$

51.

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

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

$$= 0.748 = 74.8\%$$

52.

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

$$= 152$$

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

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

$$= 0.126 = 12.6\%$$

53. a.

$$P = BR$$

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

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

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

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

53. (continued)

b.

$$P = BR$$
$$P = \left(35 \text{ deer/mi}^2\right)(0.40)$$
$$= 14 \text{ deer/mi}^2$$
$$\text{Population} = 35 \text{ deer/mi}^2 + 14 \text{ deer/mi}^2$$
$$= 45 \text{ deer/mi}^2$$

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
	$22 \times \$1.33 = \$29.26$
	$14 \times \$3.89 = \$54.46$
	$12 \times \$6.49 = \$77.88$
	$6 \times \$7.43 = \$44.58$
	$6 \times \$8.76 = \$52.56$
	$6 \times \$5.54 = \$33.24$
	$5 \times \$6.45 = \$32.25$
	$4 \times \$2.09 = \$8.36$
	$120 \times \$1.69 = \$202.80$
	$32 \times \$48.00 = \$1536$
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 × $5.71 = $1661.61
20240 − 7480 = 12760	12760 / 60 = 213	213 × $5.74 = $1222.62
28340 − 9200 = 19140	19140 / 60 = 319	319 × $5.81 = $1853.39
26760 − 9160 = 17600	17600 / 60 = 293	293 × $5.76 = $1687.68
17880 − 7485 = 10395	10395 / 60 = 173	173 × $5.76 = $996.48
25620 − 9080 = 16540	16540 / 60 = 276	276 × $11.72 = $3234.72
21560 − 7640 = 13920	13920 / 60 = 232	232 × $11.69 = $2712.08
26510 − 9060 = 17450	17450 / 60 = 291	291 × $11.68 = $3398.88
22630 − 7635 = 14995	14995 / 60 = 250	250 × $11.65 = $2912.5
22920 − 9220 = 13700	13700 / 60 = 228	228 × $11.72 = $2672.16
20200 − 7660 = 12540	12540 / 60 = 209	209 × $11.81 = $2468.29
25880 − 9160 = 16720	16720 / 60 = 279	279 × $11.9 = $3320.1
21300 − 7675 = 13625	13625 / 60 = 227	227 × $11.84 = $2687.68
18200 − 7665 = 10535	10535 / 60 = 176	176 × $11.79 = $2075.04
26200 − 9150 = 17050	17050 / 56 = 304	304 × $4.68 = $1422.72
22600 − 7650 = 14950	14950 / 56 = 267	267 × $4.65 = $1241.55
27100 − 9080 = 18020	18020 / 56 = 322	322 × $4.66 = $1500.52
22550 − 7635 = 14915	14915 / 56 = 266	266 × $4.61 = $1226.26
23600 − 7680 = 15920	15920 / 56 = 284	284 × $4.59 = $1303.56
26780 − 9160 = 17620	17620 / 56 = 315	315 × $4.63 = $1458.45
28310 − 9200 = 19110	19110 / 56 = 341	341 × $4.69 = $1599.29
21560 − 7665 = 13895	13895 / 56 = 248	248 × $4.67 = $1158.16
25750 − 9160 = 16590	16590 / 56 = 296	296 × $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 ¾% 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.

$$P = \$150,000$$
$$i = 0.065/12$$
$$n = 30 \times 12 = 360$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$150,000\left(\frac{\left(\frac{0.065}{12}\right)\left(1 + \frac{0.065}{12}\right)^{360}}{\left(1 + \frac{0.065}{12}\right)^{360} - 1}\right)$$
$$= \$948.10$$

8.

$$P = \$75,000$$
$$i = 0.0625/12$$
$$n = 15 \times 12 = 180$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$75,000\left(\frac{\left(\frac{0.0625}{12}\right)\left(1+\frac{0.0625}{12}\right)^{180}}{\left(1+\frac{0.0625}{12}\right)^{180} - 1}\right)$$
$$= \$643.07$$

9.

$$\text{Price} = 275 \text{ acres} \times \$4100/\text{acre}$$
$$= \$1,127,500$$
$$P = \$1,127,500 \times 0.75 = \$845,625$$
$$i = 0.0675$$
$$n = 20$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$845,625\left(\frac{0.0675(1+0.0675)^{20}}{(1+0.0675)^{20} - 1}\right)$$
$$= \$78,276.71$$

The annual payment is $\$6429.83 \times 12$
$= \$77,157.96$.

10.

$$P = \left(\left[\$45,500 - \$4500\right]\right) \times 0.80 = \$32,800$$
$$i = 0.0725/12$$
$$n = 5 \times 12 = 60$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$32,800\left(\frac{\left(\frac{0.0725}{12}\right)\left(1+\frac{0.0725}{12}\right)^{60}}{\left(1+\frac{0.0725}{12}\right)^{60} - 1}\right)$$
$$= \$653.36$$

11. a.

$$P = \$24,000$$
$$i = 0.0075/12$$
$$n = 3 \times 12 = 36$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$24,000\left(\frac{\left(\frac{0.0075}{12}\right)\left(1+\frac{0.0075}{12}\right)^{36}}{\left(1+\frac{0.0075}{12}\right)^{36} - 1}\right)$$
$$= \$674.40$$

Total payment $= \$674.40 \times 36 = \$24,278.40$

11. (continued)

b.

$$P = \$24,000 - \$1500 = \$22,500$$
$$i = 0.085/12$$
$$n = 3 \times 12 = 36$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$22,500\left(\frac{\left(\frac{0.0.085}{12}\right)\left(1+\frac{0.0.085}{12}\right)^{36}}{\left(1+\frac{0.0.085}{12}\right)^{36} - 1}\right)$$
$$= \$710.27$$

Total payment $= \$710.27 \times 36 = \$25,569.71$

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

12. a.

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

Total payment $= \$556.40 \times 36 = \$20,030.40$

b.

$$P = \$19,500 - \$2500 = \$17,000$$
$$i = 0.065/12$$
$$n = 3 \times 12 = 36$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$17,000\left(\frac{\left(\frac{0.065}{12}\right)\left(1+\frac{0.065}{12}\right)^{36}}{\left(1+\frac{0.065}{12}\right)^{36} - 1}\right)$$
$$= \$521.03$$

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

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

13.

$$P = \$220,500 - \$4500 - \$9500 - \$8000 = \$198,500$$
$$i = 0.08$$
$$n = 4$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$198,500\left(\frac{(0.08)(1+0.08)^4}{(1+0.08)^4 - 1}\right)$$
$$= \$59,931.28$$

14.

$$\text{Dealer price} = \$150,500 \times (1 + 0.035 + 0.0095) = \$157,197.25$$
$$P = \$157,197.25 - \$7500 - \$10,000 = \$139,697.25$$
$$i = 0.0725$$
$$n = 5$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$139,697.25\left(\frac{(0.0725)(1+0.0725)^5}{(1+0.0725)^5 - 1}\right)$$
$$= \$34,299.23$$

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.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$
$$A = \$30,000\left(1 + \frac{0.05}{365}\right)^{(365)(3)}$$
$$= \$34,854.67$$

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.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$
$$A = \$4000\left(1 + \frac{0.055}{52}\right)^{(52)(4)}$$
$$= \$4983.73$$

21.

$$P = \$37,500 - \$37,500 \times 0.10 + \$37,500 \times 0.06$$
$$= \$36,000$$
$$i = 0.042/12 = 0.0035$$
$$n = 3 \times 12 = 36$$
$$A = P\left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$
$$A = \$36,000\left(\frac{0.0035(1+0.0035)^{36}}{(1+0.0035)^{36} - 1}\right)$$
$$= \$1066.07$$

22.

$$\text{Discount amount} = (0.02)(\$12,000) = \$240$$
$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$
$$\text{Interest} = \frac{\$240}{\$12,000 - \$240} \times \frac{365}{20} = 37.2\%$$

23.

$$\text{Discount amount} = (0.03)(\$15,870) = \$476.10$$
$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$
$$\text{Interest} = \frac{\$476.10}{\$15,870 - \$476.10} \times \frac{365}{20} = 56.4\%$$

24.

$$\text{Discount amount} = (0.02)(\$3000) = \$60$$
$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$
$$\text{Interest} = \frac{\$60}{\$3000 - \$60} \times \frac{365}{18} = 41.4\%$$

25.

$$\text{Discount amount} = (0.025)(\$129,115.23) = \$3227.88$$
$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$
$$\text{Interest} = \frac{\$3227.88}{\$129,115.23 - \$3227.88} \times \frac{365}{20} = 46.8\%$$

26.

$$\text{Discount amount} = (0.02)(\$22,000) = \$440$$
$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$
$$\text{Interest} = \frac{\$440}{\$22,000 - \$440} \times \frac{365}{30} = 24.8\%$$

27.

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

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

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

28.

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

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

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

Unit 1C Review

1. 1.625

2. $\frac{45}{100} = \frac{9}{20}$

3. 10.129

4. 116.935

5. 5.854

6. $55.6 \text{ ft} - 15.0 \text{ ft} - 15.0 \text{ ft} = 25.6 \text{ ft}$

7.

55.6 ft
15.0 ft
15.0 ft
9.5 ft
25.6 ft
9.5 ft
15.0 ft
15.0 ft
160.2 ft

8. a. 45.1
b. 45.06

9. a. 45.1
b. 45.06

10. 0.11515

11. 18.85

12. $18.5 \text{ in.} \div 2.75 \text{ in.} = 6 \text{ r } 2$. Six cables could be cut and there would be 2 in. remaining.

13. 0.25

14. 72.4

15.

$$P = BR$$
$$P = (420)(0.165)$$
$$= 69.3$$

16.

$$B = \frac{P}{R}$$
$$B = \frac{240}{0.12}$$
$$= 2000$$

17.

$$R = \frac{P}{B}$$
$$R = \frac{96 \text{ yd}}{240 \text{ yd}}$$
$$= 40.0\%$$

18.

$$P = BR$$
$$P = (\$16.50)(0.06)$$
$$= \$0.99$$

Her new salary is
$\$16.50 + \$0.99 = \$17.49/\text{h}$.

19. 2110

20. 9.40

Chapter 1 Review

1. 8243

2. 55,197

3. $9{,}178{,}000$

4. $226 \text{ r } 240$

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

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

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

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

10.
$$\begin{aligned} &\text{Volume of left box: } 10 \text{ cm}\times 1 \text{ cm}\times 1 \text{ cm} = 10 \text{ cm}^3 \\ &\text{Volume of middle box: } 10 \text{ cm}\times 1 \text{ cm}\times 1 \text{ cm} = 10 \text{ cm}^2 \\ &\text{Volume of right box: } 10 \text{ cm}\times 1 \text{ cm}\times 1 \text{ cm} = \underline{10 \text{ cm}^2} \\ &\text{Total Volume: } = 30 \text{ cm}^2 \end{aligned}$$

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

12.
$$\begin{aligned} P &= \frac{Fs}{t} \\ P &= \frac{(600)(50)}{10} \\ &= \frac{30{,}000}{10} \\ &= 3000 \end{aligned}$$

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

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

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

19. $3\dfrac{18}{5} = 3+\dfrac{18}{5} = 3+3\dfrac{3}{5} = 6\dfrac{3}{5}$

20. $2\dfrac{5}{8} = \dfrac{(2\times 8)+5}{8} = \dfrac{21}{8}$

21. $3\dfrac{7}{16} = \dfrac{(3\times 16)+7}{16} = \dfrac{55}{16}$

22. $\dfrac{16}{8} = 2$

23.

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

24.

$$\begin{aligned}&\frac{29}{36}-\frac{7}{30}\\&=\frac{145}{180}-\frac{42}{180}\\&=\frac{103}{180}\end{aligned}$$

25.

$$\begin{aligned}&5\frac{3}{16}+9\frac{5}{12}\\&=5\frac{9}{48}+9\frac{20}{48}\\&=14\frac{29}{48}\end{aligned}$$

26.

$$\begin{aligned}&6\frac{3}{8}-4\frac{7}{12}\\&=6\frac{9}{24}-4\frac{14}{24}\\&=5\frac{33}{24}-4\frac{14}{24}\\&=1\frac{19}{24}\end{aligned}$$

27.

$$\begin{aligned}&18-6\frac{2}{5}\\&=17\frac{5}{5}-6\frac{2}{5}\\&=11\frac{3}{5}\end{aligned}$$

28.

$$\begin{aligned}&16\frac{2}{3}+1\frac{1}{4}-12\frac{11}{12}\\&=16\frac{8}{12}+1\frac{3}{12}-12\frac{11}{12}\\&=17\frac{11}{12}-12\frac{11}{12}\\&=5\end{aligned}$$

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

30.

$$\begin{aligned}&3\frac{6}{7}\times4\frac{2}{3}\\&=\frac{27}{7}\times\frac{14}{3}\\&=18\end{aligned}$$

31.

$$\begin{aligned}&\frac{3}{8}\div6\\&=\frac{3}{8}\times\frac{1}{6}\\&=\frac{1}{16}\end{aligned}$$

32.

$$\begin{aligned}&\frac{2}{3}\div1\frac{7}{9}\\&=\frac{2}{3}\div\frac{16}{9}\\&=\frac{2}{3}\times\frac{9}{16}\\&=\frac{3}{8}\end{aligned}$$

33.

$$\begin{aligned}&1\frac{4}{5}\div1\frac{9}{16}\times11\frac{2}{3}\\&=\frac{9}{5}\div\frac{25}{16}\times\frac{35}{3}\\&=\frac{9}{5}\times\frac{16}{25}\times\frac{35}{3}\\&=\frac{144}{125}\times\frac{35}{3}\\&=\frac{336}{25}=13\frac{11}{25}\end{aligned}$$

34.

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

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

36. $168\text{ ft} \times \frac{12\text{ in.}}{1\text{ ft}} = 2016\text{ in.}$

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

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

39. 0.5625

40. 0.416

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

42. $19\frac{625}{1000} = 19\frac{5}{8}$

43. 168.278

44. 17.25

45. 68.665

46. 33.72

47. 3206.5

48. 1.9133

49. 3.18

50. 20.6

51. a. 200

b. 248.2

c. 250

52. a. 5.6

b. 5.65

c. 5.6491

53. $15\% = \frac{15}{100} = 0.15$

54. $8\frac{1}{4}\% = 8.25\% = 0.0825$

55. 6.5%

56. 120%

57.

$$P = BR$$
$$P = (\$12{,}000)(0.0875)$$
$$= \$1050$$

58.

Fraction	Decimal	Percent
$\frac{1}{4}$	0.25	25%
$\frac{3}{8}$	0.375	$37\frac{1}{2}\%$
$\frac{5}{6}$	$0.83\frac{1}{3}$	$83\frac{1}{3}\%$
$8\frac{3}{4}$	8.75	875%
$2\frac{2}{5}$	2.4	240%
$\frac{3}{2000}$	0.0015	0.15%

59.

$$R = \frac{P}{B}$$
$$R = \frac{\$32{,}000}{\$84{,}000}$$
$$= 38.1\%$$

60.

$$R = \frac{P}{B}$$
$$R = \frac{\frac{11}{64}}{\frac{13}{32}} = \frac{11}{64} \times \frac{32}{13}$$
$$= 42.3\%$$

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

62.

$$6 \times \left(3\frac{1}{16} \text{ in.}\right) + 5 \times \left(\frac{1}{4} \text{ in.}\right) + 2 \times \left(1\frac{1}{8} \text{ in.}\right)$$
$$= 6 \times \left(\frac{49}{16} \text{ in.}\right) + 5 \times \left(\frac{1}{4} \text{ in.}\right) + 2 \times \left(\frac{9}{8} \text{ in.}\right)$$
$$= \frac{147}{8} \text{ in.} + \frac{5}{4} \text{ in.} + \frac{9}{4} \text{ in.}$$
$$= \frac{147}{8} \text{ in.} + \frac{10}{8} \text{ in.} + \frac{18}{8} \text{ in.}$$
$$= 21\frac{7}{8} \text{ in.}$$

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.

$\text{Height} = 20 \text{ in.} + 2 \times 5 \text{ in.} = 30 \text{ in.}$

$\text{Length} = 4 \times 10 \text{ in.} + 1 \text{ in.} = 41 \text{ in.}$

The sheet of cardboard would have to be $30 \text{ in.} \times 41 \text{ in.}$

65. 4020

66. 139

Chapter 1 Test

1. 5729

2. 3516

3. 2,584.450

4. 1600

5.

$$8 + 2(5 \times 6 + 8)$$
$$= 8 + 2(30 + 8)$$
$$= 8 + 2(38)$$
$$= 8 + 76 = 84$$

6.

$$15 - 9 \div 3 + 3 \times 4$$
$$= 15 - 3 + 12 = 24$$

7.

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

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

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

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

8.

Volume of outer box: $10 \text{ in.} \times 12 \text{ in.} \times 20 \text{ in.} = 2400 \text{ in}^3$

Volume of missing corner: $3 \text{ in.} \times 4 \text{ in.} \times 20 \text{ in.} = \underline{240 \text{ in}^3}$

Total Volume: $= 2160 \text{ in}^3$

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

10.

$$P = 2l + 2w$$
$$P = 2(20) + 2(15)$$
$$= 40 + 30$$
$$= 70$$

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

16. $\dfrac{28}{42} = \dfrac{2 \cdot 14}{3 \cdot 14} = \dfrac{2}{3}$

17. $\dfrac{23}{6} = 3 \text{ r } 5 = 3\dfrac{5}{6}$

18. $3\dfrac{1}{4} = \dfrac{3 \times 4 + 1}{4} = \dfrac{13}{4}$

19. $\dfrac{3}{8} + \dfrac{1}{4} = \dfrac{3}{8} + \dfrac{2}{8} = \dfrac{5}{8}$

20. $\dfrac{5}{16} - \dfrac{5}{32} = \dfrac{10}{32} - \dfrac{5}{32} = \dfrac{5}{32}$

21.

$$3\frac{1}{8} = 3\frac{1}{8}$$
$$2\frac{1}{2} = 2\frac{4}{8}$$
$$\underline{4\frac{3}{4} = 4\frac{6}{8}}$$
$$9\frac{11}{8} = 10\frac{3}{8}$$

22.

$$10\frac{1}{8} - 3\frac{5}{16}$$
$$= 10\frac{2}{16} - 3\frac{5}{16}$$
$$= 9\frac{18}{16} - 3\frac{5}{16}$$
$$= 6\frac{13}{16}$$

23.

$$3\frac{5}{8} + 2\frac{3}{16} - 1\frac{1}{4}$$
$$= 3\frac{10}{16} + 2\frac{3}{16} - 1\frac{4}{16}$$
$$= 5\frac{13}{16} - 1\frac{4}{16}$$
$$= 4\frac{9}{16}$$

24. $\dfrac{3}{8} \times \dfrac{16}{27} = \dfrac{3}{8} \times \dfrac{8 \cdot 2}{9 \cdot 3} = \dfrac{2}{9}$

25.

$$\frac{3}{8} \div 3\frac{5}{16} = \frac{3}{8} \div \frac{53}{16}$$
$$= \frac{3}{8} \times \frac{16}{53}$$
$$= \frac{6}{53}$$

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

27.

$$3\frac{5}{8} + 1\frac{3}{4} \times 6\frac{1}{5} = \frac{29}{8} + \frac{7}{4} \times \frac{31}{5}$$
$$= \frac{29}{8} + \frac{217}{20}$$
$$= \frac{145}{40} + \frac{434}{40}$$
$$= \frac{579}{40} = 14\frac{19}{40}$$

28.

$$P = 2l + 2w$$
$$P = 2\left(4\frac{3}{4}\right) + 2\left(2\frac{1}{2}\right)$$
$$= 2\left(\frac{19}{4}\right) + 2\left(\frac{5}{2}\right)$$
$$= \frac{19}{2} + \frac{10}{2}$$
$$= \frac{29}{2} = 14\frac{1}{2}$$

29.

$$3\frac{5}{8} \text{ A} + 2\frac{3}{4} \text{ A} + 4\frac{5}{16} \text{ A}$$
$$= 3\frac{10}{16} \text{ A} + 2\frac{12}{16} \text{ A} + 4\frac{5}{16} \text{ A}$$
$$= 9\frac{27}{16} \text{ A} = 10\frac{11}{16} \text{ A}$$

30.

$$120 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 40 \text{ yd}$$

31. $3 \text{ lb } 5 \text{ oz} = \left(3 \text{ lb} \times \dfrac{16 \text{ oz}}{1 \text{ lb}}\right) + 5 \text{ oz} = 53 \text{ oz}$

32. $\dfrac{5}{8} = 0.625$

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

34. 65.024

35. 397.19

36. a. 27.3

b. 27.28

37. 8.0784

38. 0.05

39.

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

$$B = \frac{59.45}{0.41}$$

$$= 145$$

40.

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

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

$$= 31.0\%$$

41.

$$P = BR$$

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

$$= \$41$$

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

42. 0.0552

43. 6.73