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 1 2 3 4 5 6 7 17 16 15 14 13

Table of Contents

Chapter 1: Basic Concepts	
1.1: Review of Basic Operations	1
1.2: Order of Operations	3
1.3: Area and Volume	6
1.4: Formulas	10
1.5: Prime Factorization	12
Unit 1A Review	14
1.6: Introduction to Fractions	14
1.7: Addition and Subtraction of Fractions	16
1.8: Multiplication and Division of Fractions	24
1.9: The U.S. System of Weights and Measures	34
Unit 1B Review	36
1.10: Addition and Subtraction of Decimal Fractions	38
1.11: Rounding Numbers	40
1.12: Multiplication and Division of Decimal Fractions	41
1.13: Percent	43
1.14: Rate, Base, and Part	45
1.15: Powers and Roots	51
1.16: Applications Involving Percent: Business and Personal Finance	52
Unit 1C Review	57
Chapter 1 Review	57
Chapter 1 Test	61
Chapter 2: Signed Numbers and Powers of 10	
2.1: Addition of Signed Numbers	64
2.2: Subtraction of Signed Numbers	64
2.3: Multiplication and Division of Signed Numbers	65
2.4: Signed Fractions	65
2.5: Powers of 10	70
2.6: Scientific Notation	72
2.7: Engineering Notation	76
Chapter 2 Review	77
Chapter 2 Test	79
Cumulative Review Chapters 1-2	80
Chapter 3: The Metric System	
3.1: Introduction to the Metric System	82
3.2: Length	82
3.3: Mass and Weight	83
3.4: Volume and Area	84
3.5: Time, Current, and Other Units	85
3.6: Temperature	86
3.7: Metric and U.S. Conversion	87
Chapter 3 Review	89
Chapter 3 Test	91

Chapter 4: Measurement	
4.1: Approximate Numbers and Accuracy	93
4.2: Precision and Greatest Possible Error	93
4.3A: The Vernier Caliper	94
4.3B: The Vernier Caliper	94
4.4A: The Micrometer Caliper	95
4.4B: The Micrometer Caliper	95
4.5: Addition and Subtraction of Measurements	95
4.6: Multiplication and Division of Measurements	96
4.7: Relative Error and Percent of Error	98
4.8: Color Code of Electrical Resistors	100
4.9: Reading Scales	101
Chapter 4 Review	101
Chapter 4 Test	102
Cumulative Review Chapter 1-4	103
Chapter 5: Polynomials: An Introduction to Algebra	
5.1: Fundamental Operations	105
5.2: Simplifying Algebraic Expressions	109
5.3: Addition and Subtraction of Polynomials	112
5.4: Multiplication of Monomials	114
5.5: Multiplication of Polynomials	118
5.6: Division by a Monomial	124
5.7: Division by a Polynomial	127
Chapter 5 Review	132
Chapter 5 Test	134
Chapter 6: Equations and Formulas	
6.1: Equations	136
6.2: Equations with Variables in Both Members	141
6.3: Equations with Parentheses	144
6.4: Equations with Fractions	152
6.5: Translating Words into Algebraic Symbols	160
6.6: Applications Involving Equations	161
6.7: Formulas	166
6.8: Substituting Data into Formulas	171
6.9: Reciprocal Formulas Using a Calculator	177
Chapter 6 Review	180
Chapter 6 Test	184
Cumulative Review: Chapters 1-6	187
Chapter 7: Ratio and Proportion	
7.1: Ratio	190
7.2: Proportion	192
7.3: Direct Variation	201
7.4: Inverse Variation	205
Chapter 7 Review	209
Chapter 7 Test	211
Chapter 8: Graphing Linear Equations	
8.1: Linear Equations with Two Variables	213
8.2: Graphing Linear Equations	217
8.3: The Slope of a Line	221
8.4: The Equation of a Line	223
Chapter 8 Review	231
Chapter 8 Test	235
Cumulative Review Chapters 1-8	236

Chapter 9: Systems of Linear Equations	
9.1: Solving Pairs of Linear Equations by Graphing	239
9.2: Solving Pairs of Linear Equations by Addition	242
9.3: Solving Pairs of Linear Equations by Substitution	252
9.4: Applications Involving Pairs of Linear Equations	259
Chapter 9 Review	272
Chapter 9 Test	276
Chapter 10: Factoring Algebraic Expressions	
10.1: Finding Monomial Factors	279
10.2: Finding the Product of Two Binomials Mentally	279
10.3: Finding Binomial Factors	282
10.4: Special Products	284
10.5: Finding Factors of Special Products	285
10.6: Factoring General Trinomials	286
Chapter 10 Group Activities	287
Chapter 10 Review	287
Chapter 10 Test	288
Cumulative Review Chapters 1-10	289
Chapter 11: Quadratic Equations	
11.1: Solving Quadratic Equations by Factoring	292
11.2: The Quadratic Formula	295
11.3: Applications Involving Quadratic Equations	300
11.4: Graphs of Quadratic Equations	305
11.5: Imaginary Numbers	307
Chapter 11 Group Activities	311
Chapter 11 Review	312
Chapter 11 Test	316
Chapter 12: Geometry	
12.1: Angles and Polygons	318
12.2: Quadrilaterals	319
12.3: Triangles	324
12.4: Similar Polygons	329
12.5: Circles	332
12.6: Radian Measure	338
12.7: Prisms	341
12.8: Cylinders	344
12.9: Pyramids and Cones	349
12.10: Spheres	355
Chapter 12 Group Activities	358
Chapter 12 Review	358
Chapter 12 Test	361
Cumulative Review Chapters 1-12	363
Chapter 13: Right Triangle Trigonometry	
13.1: Trigonometric Ratios	367
13.2: Using Trigonometric Ratios to Find Angles	368
13.3: Using Trigonometric Ratios to Find Sides	370
13.4: Solving Right Triangles	375
13.5: Applications Involving Trigonometric Ratios	379
Chapter 13 Review	383
Chapter 13 Test	385

Chapter 14: Trigonometry with Any Angle	
14.1: Sine and Cosine Graphs	386
14.2: Period and Phase Shift	388
14.3: Solving Oblique Triangles: Law of Sines	392
14.4: Law of Sines: The Ambiguous Case	397
14.5: Solving Oblique Triangles: Law of Cosines	405
Chapter 14 Group Activities	413
Chapter 14 Review	415
Chapter 14 Test	419
Cumulative Review Chapters 1-14	421
Chapter 15: Basic Statistics	
15.1: Bar Graphs	424
15.2: Circle Graphs	424
15.3: Line Graphs	426
15.4: Other Graphs	427
15.5: Mean Measurement	427
15.6: Other Average Measurements and Percentiles	427
15.7: Range and Standard Deviation	428
15.8: Grouped Data	428
15.9: Standard Deviation for Grouped Data	429
15.10: Statistical Process Control	430
15.11: Other Graphs for Statistical Data	430
15.12: Normal Distribution	432
15.13: Probability	434
15.14: Independent Events	434
Chapter 15 Review	435
Chapter 15 Test	436
Chapter 16: Binary and Hexadecimal Numbers	
16.1: Introduction to Binary Numbers	437
16.2: Addition of Binary Numbers	437
16.3: Subtraction of Binary Numbers	437
16.4: Multiplication of Binary Numbers	437
16.5: Conversion from Decimal to Binary System	438
16.6: Conversion from Binary to Decimal System	438
16.7: Hexadecimal System	438
16.8: Addition and Subtraction of Hexadecimal Numbers	438
16.9: Binary to Hexadecimal Conversion	439
Chapter 16 Group Activities	440
Chapter 16 Review	440
Chapter 16 Test	440
Cumulative Review Chapters 1-16	441
Appendices	
Appendix B: Exponential Equations	443
Appendix C: Simple Inequalities	446

Chapter 1: Basic Concepts

Section 1.1: Review of Basic Operations

1. 3255
2. 10,793
3. 1454
4. 579
5. 795,776
6. 4,845,000
7. 5164
8. 3298
9. 26,008
10. 130,130
11. 2820
12. 50,124
13. 4195Ω
14. 8615Ω
15. The sum of the lengths is 224 feet, so 224 studs are required.
16. $24\text{ ft} - 4\text{ ft} - 5\text{ ft} - 7\text{ ft} = 8\text{ ft}$
17. 39 ft
18. $125\text{ ft}^3 - 78\text{ ft}^3 = 47\text{ ft}^3$
19. Input: 1925 cm^3
Output: 1425 cm^3
 $1925\text{ cm}^3 - 1425\text{ cm}^3 = 500\text{ cm}^3$
20. Yes; $31\text{ hr} + 2\text{ hr} + 3\text{ hr} + 2\text{ hr} + 3\text{ hr} = 41\text{ hr}$
43.
 - $5 \times 18\text{ ft} = 90\text{ ft}$
 - $42 \times 15\text{ ft} = 630\text{ ft}$
 - $158 \times 12\text{ ft} = 1896\text{ ft}$
 - $105 \times 10\text{ ft} = 1050\text{ ft}$
 - $79 \times 8\text{ ft} = 632\text{ ft}$
 - $87 \times 6\text{ ft} = \underline{522\text{ ft}}$
 - Total = 4820 ft
44. There are 112 boards in the order.
 - $36 \times 12\text{ ft} = 432\text{ ft}$
 - $28 \times 10\text{ ft} = 280\text{ ft}$
 - $36 \times 8\text{ ft} = 288\text{ ft}$
 - $12 \times 16\text{ ft} = \underline{192\text{ ft}}$
 - Total = 1192 ft
21. 27,216
22. 1,699,922
23. 18,172,065
24. 486,400
25. 35,360,000
26. 122,440,800
27. 1809
28. $61,747\text{ r } 1$
29. 389
30. $434\text{ r } 24$
31. $844\text{ r } 40$
32. $1566\text{ r } 80$
33. $31\text{ mi/gal} \times 16\text{ gal} = 496\text{ mi}$
34. $65\text{ L} \times 12\text{ km/L} = 780\text{ km}$
35. $1300\text{ cm}^3 \div 4 = 325\text{ cm}^3$
36. $1274\text{ mi} \div 49\text{ gal} = 26\text{ mi/gal}$
37. $2340\text{ km} \div 180\text{ L} = 13\text{ km/L}$
38. $\$13/4\text{ ft} \times 20\text{ ft} = \65
39. $\$516 \div 6\text{ h} = \$86/\text{h}$
40. $\$508 \div 4 = \127
41. $125\text{ mi/h} \times 4\text{ h} = 500\text{ mi}$
42. $500\text{ ft/min} \times 15\text{ min} = 7500\text{ ft}$
45.

First draftperson:
 $8 \times 30 \times 80 = 19,200\text{ drawings}$

Second draftperson:
 $8 \times 30 \times 120 = 28,800\text{ drawings}$

Difference:
 $28,800 - 19,200 = 9600\text{ drawings}$
46. $5232\text{ ft} \div 12\text{ ft} = 436$
47.
 - $17\text{ ft } 5\text{ in.} = 17\text{ ft} \times 12\text{ in./ft} + 5\text{ in.}$
 - $= 209\text{ in.}$
 - $209\text{ in.} - 75\text{ in.} = 134\text{ in.}$
 - $134\text{ in.} \div 2 = 67\text{ in.}$ from either corner
48. $260\text{ acres} \times 165\text{ bu/acre} = 42,900\text{ bu}$

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

51. a.

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

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

52.

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

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

53.

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

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

54.

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

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

55.

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

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

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

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

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

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

64.

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

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

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

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

67.

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

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

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

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

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

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

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

56.

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

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

57.

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

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

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

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

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

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

68. The outer dimension of the back wall is

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

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

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

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

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

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

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

blocks, for a total of $2 \times 9 \times 12 = 216$ blocks for both walls. A total of $312 + 216 = 528$ blocks are needed.

69.

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

70.

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

71.

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

72.

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

Section 1.2: Order of Operations

1.

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

2.

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

3.

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

4.

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

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

74. a. $125 \div 11 = 11 \text{ r } 4$ so 12 beef loins are required.b. Each beef loin has two end cuts, so $2 \times 12 = 24$ end cuts are available.

75. $2 \times 90 + 3 \times 4 + 2 \times 4 = 180 + 12 + 8 = 200$ items.

76.

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

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

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

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

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

5.

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

6.

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

7.

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

8.

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

9.

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

10.

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

11.

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

12.

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

13.

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

14.

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

32.

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

33.

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

34.

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

35.

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

36.

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

37.

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

38.

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

39.

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

Section 1.3: Area and Volume

1.

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

2.

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

3.

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

40.

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

41.

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

42.

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

4.

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

5.

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

6.

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

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

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

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

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

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

7.

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

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

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

8.

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

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

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

9.

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

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

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

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

12.

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

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

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

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

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

15.

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

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

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

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

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

10.

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

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

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

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

11.

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

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

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

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

17. a.

$$A = l \times w$$

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

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

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

$$= \$118,800$$

b.

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

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

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

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

18.

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

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

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

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

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

19.

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

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

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

21.

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

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

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

22.

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

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

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

23.

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

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

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

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

20.

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

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

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

24.

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

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

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

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

25.

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

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

$$= 600 \text{ cm}^3$$

26.

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

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

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

27.

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

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

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

31.

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

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

$$= 360 \text{ ft}^3$$

So, the cement will weigh

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

32.

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

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

$$= 150 \text{ ft}^3$$

So, the coal will weigh

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

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

33.

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

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

$$= 240 \text{ ft}^3$$

So, the water will weigh

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

34.

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

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

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

So, the gasoline will weigh

28.

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

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

$$= 320 \text{ in}^3$$

29.

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

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

$$= 30 \text{ ft}^3$$

30.

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

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

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

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

35.

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

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

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

So, the cost of heating the space will be

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

36.

The remaining area is

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

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

37.

The height of the cardboard sheet would be

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

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

38.

The volume of the box is

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

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

required.

39.

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

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

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

40.

$$A = l \times w$$

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

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

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

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

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

41.

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

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

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

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

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

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

are needed.

Section 1.4: Formulas

1.

$$W = fd$$

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

$$= 600$$

2.

$$W = fd$$

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

$$= 153$$

3.

$$W = fd$$

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

$$= 11,250$$

4.

$$W = fd$$

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

$$= 5481$$

5.

$$W = fd$$

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

$$= 57,376$$

42.

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

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

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

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

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

6.

$$W = fd$$

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

$$= 288,000$$

7.

$$f = ma$$

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

$$= 38,400$$

8.

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

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

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

$$= 600$$

9.

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

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

$$= 8$$

10.

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

11.

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

12.

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

13.

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

14.

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

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

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

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

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

25.

$$V = lwh$$

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

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

26.

$$V = lwh$$

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

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

27.

$$v = v_0 + gt$$

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

$$= 172$$

28.

$$Q = CV$$

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

$$= 30,000$$

33.

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

29.

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

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

$$= 16$$

30.

$$P = I^2 R$$

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

$$= 32,000$$

31.

$$P = cd^2 SN$$

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

$$= 113.1$$

32.

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

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

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

Section 1.5: Prime Factorization

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

5. a. $7+8=15$ is divisible by 3, so 78 is divisible by 3.
b. 78 is not divisible by 4.
7. 53 is prime
8. $57=3\cdot 19$ is not prime
9. $93=3\cdot 31$ is not prime
10. $121=11\cdot 11$ is not prime
11. $16=2\cdot 2\cdot 2\cdot 2$ is not prime
12. $123=3\cdot 41$ is not prime
13. $39=3\cdot 13$ is not prime
14. $87=3\cdot 29$ is not prime
15. 458 is even, so it is divisible by 2.
16. 12,746 is even, so it is divisible by 2.
17. 315,817 is odd, so it is not divisible by 2.
18. 877,778 is even, so it is divisible by 2.
19. 1367 is odd, so it is not divisible by 2.
20. 1205 is odd, so it is not divisible by 2.
21. $3+8+7=18$ is divisible by 3, so 387 is divisible by 3.
22. $1+2+5+4=12$ is divisible by 3, so 1254 is divisible by 3.
23. $4+5+3+1+2+8=23$ is not divisible by 3, so 453,128 is not divisible by 3.
24. $1+7+8+2+1+3=22$ is not divisible by 3, so 178,213 is not divisible by 3.
25. $2+1+8+7+4+5=27$ is divisible by 3, so 218,745 is divisible by 3.
26. $1+5+6+9+0=21$ is divisible by 3, so 15,690 is divisible by 3.
27. 70 ends in 0, so it is divisible by 5.
28. 145 ends in 5, so it is divisible by 5.
29. 366 does not end in 0 or 5, so it is not divisible by 5.
30. 56,665 ends in 5, so it is divisible by 5.
31. 63,227 does not end in 0 or 5, so it is not divisible by 5.
32. 14,601 does not end in 0 or 5, so it is not divisible by 5.
33. 56 is even, so it is divisible by 2.
34. $4+2=6$ is divisible by 3, so 42 is divisible by 3.
6. a. $6+7+5=18$ is divisible by 3, so 675 is divisible by 3.
b. 675 is not divisible by 4.
35. $2+1+8=11$ is not divisible by 3, so 218 is not divisible by 3.
36. 375 ends in 5, so it is divisible by 5.
37. 528 does not end in 0 or 5, so it is not divisible by 5.
38. $2+1+8+4=15$ is divisible by 3, so 2184 is divisible by 3.
39. $1+9+8=18$ is divisible by 3, so 198 is divisible by 3.
40. $2+2+3+6=13$ is not divisible by 3, so 2236 is not divisible by 3.
41. 1,820,670 is even, so it is divisible by 2.
42. 2,817,638 is even, so it is divisible by 2.
43. 7,215,720 ends in 0, so it is divisible by 5.
44. $5+2+7+5+3+4+3=29$ is not divisible by 3, so 5,275,343 is not divisible by 3.
45. $2\cdot 2\cdot 5$
46. $2\cdot 3\cdot 3$
47. $2\cdot 3\cdot 11$
48. $2\cdot 3\cdot 5$
49. $2\cdot 2\cdot 3\cdot 3$
50. $5\cdot 5$
51. $3\cdot 3\cdot 3$
52. 59 is prime
53. $51=3\cdot 17$
54. $56=2\cdot 2\cdot 2\cdot 7$
55. $42=2\cdot 3\cdot 7$
56. $63=3\cdot 3\cdot 7$
57. $120=2\cdot 2\cdot 2\cdot 3\cdot 5$
58. $72=2\cdot 2\cdot 2\cdot 3\cdot 3$
59. $171=3\cdot 3\cdot 19$
60. $360=2\cdot 2\cdot 2\cdot 3\cdot 3\cdot 5$
61. $105=3\cdot 5\cdot 7$
62. $78=2\cdot 3\cdot 13$
63. $252=2\cdot 2\cdot 3\cdot 3\cdot 7$
64. $444=2\cdot 2\cdot 3\cdot 37$

Unit 1A Review

1. 241

2. 1795

5.

$3 \times 12 \text{ ft} = 36 \text{ ft}$

$8 \times 8 \text{ ft} = 64 \text{ ft}$

$9 \times 10 \text{ ft} = 90 \text{ ft}$

$12 \times 6 \text{ ft} = \underline{72 \text{ ft}}$

Total = 262 ft

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

7.

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

$= 6 + 2(20 - 2)$

$= 6 + 2(18)$

$= 6 + 23$

$= 42$

10.

Area of left rectangle: $24 \text{ in.} \times 11 \text{ in.} = 264 \text{ in}^2$

Area of middle rectangle: $15 \text{ in.} \times 11 \text{ in.} = 165 \text{ in}^2$

Area of right rectangle: $10 \text{ in.} \times 7 \text{ in.} = \underline{70 \text{ in}^2}$

Total area: $= 499 \text{ in}^2$

11.

$V = lwh$

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

$= 720 \text{ ft}^3$

12.

$d = vt$

$d = (45)(4)$

$= 180$

13.

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

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

$= 10$

3. 2,711,279

4. 620

8.

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

$= 9 + 4 - 6$

$= 7$

9.

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

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

$= 12 + 2[18 - 8]$

$= 12 + 2[10]$

$= 12 + 20$

$= 32$

14.

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

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

$= 300$

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

16. 47 is prime.

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

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

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

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

Section 1.6: Introduction to Fractions

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

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

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

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

5. $\frac{9}{48} = \frac{3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{16}$
6. $\frac{8}{10} = \frac{2 \cdot 2 \cdot 2}{2 \cdot 5} = \frac{4}{5}$
7. $\frac{13}{39} = \frac{13}{3 \cdot 13} = \frac{1}{3}$
8. $\frac{24}{36} = \frac{2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{2}{3}$
9. $\frac{48}{60} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 5} = \frac{4}{5}$
10. $\frac{72}{96} = \frac{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \frac{3}{4}$
11. $\frac{9}{9} = 1$
12. $\frac{15}{1} = 15$
13. $\frac{0}{8} = 0$
14. $\frac{6}{6} = 1$
15. $\frac{9}{0}$ is undefined
16. $\frac{6}{8} = \frac{2 \cdot 3}{2 \cdot 2 \cdot 2} = \frac{3}{4}$
17. $\frac{14}{16} = \frac{2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$
18. $\frac{7}{28} = \frac{7}{2 \cdot 2 \cdot 7} = \frac{1}{4}$
19. $\frac{27}{36} = \frac{3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$
20. $\frac{15}{18} = \frac{3 \cdot 5}{2 \cdot 3 \cdot 3} = \frac{5}{6}$
21. $\frac{12}{16} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2} = \frac{3}{4}$
22. $\frac{9}{18} = \frac{3 \cdot 3}{2 \cdot 3 \cdot 3} = \frac{1}{2}$
23. $\frac{20}{25} = \frac{2 \cdot 2 \cdot 5}{5 \cdot 5} = \frac{4}{5}$
24. $\frac{12}{36} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{1}{3}$
25. $\frac{12}{40} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 5} = \frac{3}{10}$
26. $\frac{54}{72} = \frac{2 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{3}{4}$
27. $\frac{112}{128} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{7}{8}$
28. $\frac{330}{360} = \frac{2 \cdot 3 \cdot 5 \cdot 11}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5} = \frac{11}{12}$
29. $\frac{112}{144} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} = \frac{7}{9}$
30. $\frac{525}{1155} = \frac{3 \cdot 5 \cdot 5 \cdot 7}{3 \cdot 5 \cdot 7 \cdot 11} = \frac{5}{11}$
31. $\frac{78}{5} = 15 \text{ r } 3 = 15\frac{3}{5}$
32. $\frac{11}{4} = 2 \text{ r } 3 = 2\frac{3}{4}$
33. $\frac{28}{3} = 9 \text{ r } 1 = 9\frac{1}{3}$
34. $\frac{21}{3} = 7 \text{ r } 0 = 7$
35. $\frac{45}{36} = \frac{5}{4} = 1 \text{ r } 1 = 1\frac{1}{4}$
36. $\frac{67}{16} = 4 \text{ r } 3 = 4\frac{3}{16}$
37. $\frac{57}{6} = \frac{19}{2} = 9 \text{ r } 1 = 9\frac{1}{2}$
38. $\frac{84}{9} = \frac{28}{3} = 9 \text{ r } 1 = 9\frac{1}{3}$
39. $5\frac{15}{12} = 5\frac{5}{4} = 5 + \left(1\frac{1}{4}\right) = 6\frac{1}{4}$
40. $2\frac{70}{16} = 2\frac{35}{8} = 2 + \left(4\frac{3}{8}\right) = 6\frac{3}{8}$
41. $3\frac{5}{6} = \frac{(3 \times 6) + 5}{6} = \frac{23}{6}$
42. $6\frac{3}{4} = \frac{(6 \times 4) + 3}{4} = \frac{27}{4}$
43. $2\frac{1}{8} = \frac{(2 \times 8) + 1}{8} = \frac{17}{8}$
44. $5\frac{2}{3} = \frac{(5 \times 3) + 2}{3} = \frac{17}{3}$
45. $1\frac{7}{16} = \frac{(1 \times 16) + 7}{16} = \frac{23}{16}$

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

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

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

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

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

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

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

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

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

Section 1.7: Addition and Subtraction of Fractions

1. 16

2. 105

3. 210

4. 315

5. 48

6. 70

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

22.

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

23.

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

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

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

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

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

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

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

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

33.

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

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

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

34.

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

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

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

35.

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

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

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

36.

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

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

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

37.

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

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

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

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

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

38.

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

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

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

39.

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

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

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

40.

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

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

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

41.

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

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

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

42.

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

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

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

43.

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

44.

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

45.

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

46.

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

47.

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

48.

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

49. a.

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

b.

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

50.

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

51.

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

52.

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

53.

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

54.

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

55.

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

56.

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

60. a.

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

b.

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

57.

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

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

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

59.

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

61. a.

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

b.

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

62. a.

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

b.

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

63. a.

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

b.

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

64.

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

65.

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

66.

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

67.

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

68.

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

69.

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

70.

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

71. a.

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

b.

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

72.

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

73. a.

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

b.

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

74.

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

75.

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

76.

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

77.

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

78.

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

79.

One cut:

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

Three cuts:

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

80.

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

81.

Length:

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

Width:

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

83.

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

84.

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

85. a.

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

82.

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

85. (continued)

b.

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

86.

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

87.

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

88.

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

89.

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

90.

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

91.

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

92.

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

93.

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

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

Section 1.8: Multiplication and Division of Fractions

1. 12

2. 4

3. 9

4.

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

5.

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

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

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

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

$$9. 10$$

10.

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

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

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

13.

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

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

15.

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

16.

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

17.

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

18.

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

19.

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

20.

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

21.

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

22.

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

23.

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

24.

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

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

32.

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

33.

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

34.

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

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

36. a.

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

b.

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

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

38.

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

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

42.

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

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

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

43.

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

44.

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

45.

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

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

39.

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

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

47.

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

48. There will be 8 spaces between the rivets.

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

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

Total lengths of the pieces:

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

52. a.

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

49. There will be 15 spaces between the rivets.

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

50.

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

Remaining length:

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

52. (continued)

b.

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

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

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

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

53.

$$\begin{aligned} \text{Number of revolutions} &= \frac{9\frac{9}{64} \text{ in.}}{\frac{3}{128} \text{ in.}} \\ &= \frac{585}{64} \text{ in.} \\ &= \frac{3}{128} \text{ in.} \\ &= \frac{585}{64} \times \frac{128}{3} \\ &= 390 \text{ revolutions} \end{aligned}$$

$$\begin{aligned} \text{Time} &= 390 \text{ revolutions} \times \frac{1 \text{ min}}{45 \text{ revolutions}} \\ &= \frac{26}{3} \text{ min} = 8\frac{2}{3} \text{ min} \end{aligned}$$

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

55.

$$V = lwh$$

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

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

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

56.

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

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

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

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

57.

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

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

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

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

59.

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

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

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

$$= 2750 \text{ W}$$

60.

$$V = IR$$

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

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

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

61.

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

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

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

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

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

$$= 420 \text{ ft}$$

62.

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

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

63.

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

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

64.

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

65. There will be 18 spaces between the outlets.

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

66.

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

67.

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

68.

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

69.

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

70. a.

Gravel: $V = lwh$

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

Concrete: $V = lwh$

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

b.

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

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

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

71.

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

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

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

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

75.

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

76.

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

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

78.

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

79.

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

80.

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

81. a.

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

b.

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

82.

Area of face = Outer area – Inner area

$$\begin{aligned} &= 3 \text{ in.} \times 2 \frac{3}{4} \text{ in.} - 1 \frac{1}{2} \text{ in.} \times 2 \text{ in.} \\ &= 3 \text{ in.} \times \frac{11}{4} \text{ in.} - \frac{3}{2} \text{ in.} \times 2 \text{ in.} \\ &= \frac{33}{4} \text{ in}^2 - 3 \text{ in}^2 \\ &= \frac{33}{4} \text{ in}^2 - \frac{12}{4} \text{ in}^2 = \frac{21}{4} \text{ in}^2 \end{aligned}$$

Volume = Al

$$\begin{aligned} &= \frac{21}{4} \text{ in}^2 \times 12 \text{ in.} = 63 \text{ in}^3 \\ &= 11 \text{ whole cuts} \end{aligned}$$

83.

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

84.

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

85.

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

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

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

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

86. There will be 4 cuts.

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

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

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

87.

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

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

88.

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

89.

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

90.

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

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

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

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

91.

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

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

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

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

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

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

Number of whole steaks = 12

92.

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

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

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

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

93.

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

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

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

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

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

94.

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

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

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

1. $3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} + 7 \text{ in.} = 43 \text{ in.}$
2. $6 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} + 4 \text{ ft} = 22 \text{ ft}$
3. $5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} + 3 \text{ oz} = 83 \text{ oz}$
4. $7 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 252 \text{ in.}$
 $3 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 36 \text{ in.}$
 $6 \text{ in.} = \underline{6 \text{ in.}}$
 $= 294 \text{ in.}$
5. $4 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} + 1 \text{ pt} = 9 \text{ pt}$
6. $6 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 48 \text{ pt}$
 $3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = \underline{6 \text{ pt}}$
 $= 54 \text{ pt}$
7. $3 \text{ tbs} \times \frac{3 \text{ tsp}}{1 \text{ tbs}} = 9 \text{ tsp}$
8. $2 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 16 \text{ pt}$
9. $8 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 96 \text{ in.}$
10. $5 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 15 \text{ ft}$
11. $3 \text{ qt} \times \frac{2 \text{ pt}}{1 \text{ qt}} = 6 \text{ pt}$
12. $4 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 21,120 \text{ ft}$
13. $96 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 8 \text{ ft}$
14. $72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$
15. $10 \text{ pt} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 5 \text{ qt}$
16. $54 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} = 4\frac{1}{2} \text{ ft}$
17. $88 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 5\frac{1}{2} \text{ lb}$
18. $32 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 2 \text{ pt}$
19. $14 \text{ qt} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 3\frac{1}{2} \text{ gal}$
20. $3 \text{ bu} \times \frac{4 \text{ pk}}{1 \text{ bu}} = 12 \text{ pk}$
21. $56 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} = 3\frac{1}{2} \text{ pt}$
22. $7040 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 1\frac{1}{3} \text{ mi}$
23. $92 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 30\frac{2}{3} \text{ yd}$
24. $9000 \text{ lb} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 4\frac{1}{2} \text{ tons}$
25. $2 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 3520 \text{ yd}$
26. $6000 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 46\frac{7}{8} \text{ gal}$
27. $500 \text{ fl oz} \times \frac{1 \text{ cup}}{8 \text{ fl oz}} \times \frac{1 \text{ pt}}{2 \text{ cups}} \times \frac{1 \text{ qt}}{2 \text{ pt}} = 15\frac{5}{8} \text{ qt}$
28. $3 \text{ mi} \times \frac{320 \text{ rods}}{1 \text{ mi}} = 960 \text{ rods}$
29. $\frac{80 \text{ in.}}{12 \text{ in.}} = 6 \text{ r } 8 = 6 \text{ ft } 8 \text{ in.}$
30. $22,000 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} = 4\frac{1}{6} \text{ mi}$
31. $12\frac{3}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = \frac{51}{4} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 153 \text{ in.}$
32. $15 \times 24 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 22\frac{1}{2} \text{ lb}$

33.

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

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

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

36.

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

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

37.

$$3 \frac{3}{4} \text{ ft} \times 4 \frac{2}{3} \text{ ft} = \frac{15}{4} \text{ ft} \times \frac{14}{3} \text{ ft} = \frac{35}{2} \text{ ft}$$

$$\frac{35}{2} \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 2520 \text{ in}^2$$

38. a.

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

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

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

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

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

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

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

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

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

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

44.

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

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

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

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

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

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

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

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

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

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

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

53.

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

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

54.

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

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

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

56.

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

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

57.

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

58.

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

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

64.

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

65.

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

Unit 1B Review

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

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

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

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

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

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

61.

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

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

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

6.

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

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

8.

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

9.

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

12.

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

13.

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

10.

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

11.

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

14.

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

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

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

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

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

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

20.

$14 \text{ ft } 4 \text{ in.} = 13 \text{ ft } 16 \text{ in.}$

$\underline{8 \text{ ft } 8 \text{ in.}} = \underline{8 \text{ ft } 8 \text{ in.}}$

$= 5 \text{ ft } 8 \text{ in.}$

Section 1.10: Addition and Subtraction of Decimal Fractions

1. four thousandths

2. twenty-one thousandths

3. five ten-thousandths

4. seven and one-tenth

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

6. one thousand forty-two and seven thousandths

7. six and ninety-two thousandths

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

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

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

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

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

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

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

15. 0.375

16. 0.64

17. $0.\overline{73}$

18. 0.4

19. 0.34

20. $1.\overline{2}$ 21. $1.\overline{27}$

22. 5.12

23. $18.\overline{285714}$

24. 15.125

25. $34.\overline{2}$ 26. $38.\overline{3}$ 27. $\frac{7}{10}$ 28. $\frac{6}{10} = \frac{3}{5}$ 29. $\frac{11}{100}$ 30. $\frac{75}{100} = \frac{3}{4}$ 31. $\frac{8425}{10,000} = \frac{337}{400}$ 32. $3\frac{14}{100} = 3\frac{7}{50}$ 33. $10\frac{76}{100} = 10\frac{19}{25}$ 34. $148\frac{255}{1000} = 148\frac{51}{200}$

35. 150.000

36. 207.165

37. 163.204

38. 244.037

39. 86.6

40. 1.58

41. 15.308

42. 123.588

43. 8.68

44. 8.94

45. 4.862

46. 130.09

47. 10.0507

48. 0.92454

49. $6.25 \text{ ft} - 2.4 \text{ ft} - 2.4 \text{ ft} = 1.45 \text{ ft}$, so the remaining piece will be $1.45 \text{ ft} \times 2.4 \text{ ft}$.50. $10.25 \text{ ft} + 15.4 \text{ ft} + 14.1 \text{ ft} = 39.75 \text{ ft}$

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

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

53.

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

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

55.

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

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

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

59.

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

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

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

61.

$$0.3 \text{ A}$$

$$0.105 \text{ A}$$

$$0.45 \text{ A}$$

$$0.93 \text{ A}$$

$$0.27 \text{ A}$$

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

$$2.605 \text{ A}$$

62.

$$21.5 \Omega$$

$$42.6 \Omega$$

$$62.3 \Omega$$

$$19.8 \Omega$$

$$\underline{32.2 \Omega}$$

$$178.4 \Omega$$

56.

$$3.45 \text{ cm}$$

$$1.87 \text{ cm}$$

$$4.87 \text{ cm}$$

$$2.69 \text{ cm}$$

$$8.32 \text{ cm}$$

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

$$25.76 \text{ cm}$$

57.

$$4.17 \text{ in.}$$

$$1.30 \text{ in.}$$

$$1.00 \text{ in.}$$

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

$$7.94 \text{ in.}$$

63.

$$15.7 \Omega$$

$$40 \Omega$$

$$25.5 \Omega$$

$$0.6 \Omega$$

$$1200 \Omega$$

$$\underline{115 \Omega}$$

$$1396.8 \Omega$$

64.

$$3.2 \text{ V}$$

$$5.1 \text{ V}$$

$$0.45 \text{ V}$$

$$0.03 \text{ V}$$

$$0.8 \text{ V}$$

$$0.007 \text{ V}$$

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

$$11.587 \text{ V}$$

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

66.

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

$$= 1.84 \text{ cm}$$

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

$$= 3.02 \text{ cm}$$

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

$$= 0.82 \text{ cm}$$

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

68.

$$l = 2.375 \text{ in.} + 3.375 \text{ in.}$$

$$= 5.75 \text{ in.}$$

$$A = 1.250 \text{ in.} + 3.750 \text{ in.} + 1.250 \text{ in.}$$

$$= 6.25 \text{ in.}$$

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

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

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

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

73. 1317.5 bbl

74.

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

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

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

75.

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

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

$$= 3.4 \text{ gal}$$

76.

$$0.75 \text{ oz}$$

$$1.3 \text{ oz}$$

$$2.5 \text{ oz}$$

$$0.1 \text{ oz}$$

$$4.65 \text{ oz}$$

77.

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

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

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

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

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

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

$$= 6.0125 \text{ lb}$$

$$= 6 \text{ lb}$$

Section 1.11: Rounding Numbers

1. a. 1700

b. 1650

2. a. 1800

b. 1760

3. a. 3100

b. 3130

4. a. 100

b. 70

5. a. 18,700

b. 18,680

6. a. 6000

b. 5970

7. a. 3.1

b. 3.142

8. a. 0.2

b. 0.162

9. a. 0.1

b. 0.57

10. a. 1.0

b. 0.984

11. a. 0.1

b. 0.070

12. a. 3.8

b. 3.765

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

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

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

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

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

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

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

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

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

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

23. 237,000

24. 203

25. 0.0328
 26. 64,000
 27. 72
 28. 0.033
 29. 1,462,000

30. 23.23
 31. 0.0003376
 32. 20,700
 33. 1.01
 34. 0.00119

Section 1.12: Multiplication and Division of Decimal Fractions

1. 0.555
 2. 23.97
 3. 10.5126
 4. 27,000
 5. 9,280,000
 6. 634.5
 7. 30
 8. 3
 9. 15

19.

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

20.

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

21.

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

10. 19.4
 11. 248.23
 12. 5197.37
 13. 3676.47
 14. 2466.67
 15. 7.80
 16. 0.984
 17. 6.59
 18. 72.8

22.

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

23.

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

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

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

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

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

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

29.

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

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

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

30.

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

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

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

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

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

33.

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

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

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

34.

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

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

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

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

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

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

b.

$$60,000 \text{ mi} \times \frac{0.062 \text{ in.}}{15,000 \text{ mi}} = 0.248 \text{ in.}$$

$$\text{Thickness} = 0.375 \text{ in.} - 0.248 \text{ in.}$$

$$= 0.127 \text{ in.}$$

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

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

35.

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

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

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

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

38.

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

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

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

39.

$$V = lwh$$

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

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

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

$$= \$4872.00$$

40.

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

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

$$= 14 \text{ cuts}$$

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

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

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

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

51. The cost of one head of cattle is
 $550 \text{ lb} \times \$1.45/\text{lb} = \797.50 .
 The revenue of one head of cattle is
 $(550 \text{ lb} + 500 \text{ lb}) \times \$1.20/\text{lb} = \$1260.00$.
 The expected profit is \$150, so the cost of the weight gain is
 $\$1260.00 - \$797.50 - \$150.00 = \312.00 .
 The cost of weight gain per pound is
 $\frac{\$312.00}{500 \text{ lb}} = \$0.625/\text{lb}$.
- 52.
- $$20 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 0.4 \text{ pt}$$
- $$60 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 1.2 \text{ pt}$$
- $$150 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 3 \text{ pt}$$
- $$350 \text{ gal} \times \frac{2 \text{ pt}}{100 \text{ gal}} = 7 \text{ pt}$$
53. $2 \times \pi \times 60 \text{ Hz} \times 0.25 \text{ H} = 94.2 \Omega$
54. $2 \times \pi \times 60 \text{ Hz} \times 0.035 \text{ H} = 13.2 \Omega$
55. $(6.4 \text{ V})(0.045 \text{ A}) = 0.288 \text{ W}$
56. $(0.95 \text{ V})(0.0065 \text{ A}) = 0.006175 \text{ W}$
57. $\frac{220 \text{ V}}{35.5 \Omega} = 6.20 \text{ A}$
58. $\frac{1.5 \text{ V}}{0.25 \text{ A}} = 6 \Omega$
59. $\frac{115 \text{ V}}{0.84 \text{ A}} = 136.9 \Omega$
60. $\frac{115 \text{ V}}{18 \Omega} = 6.39 \text{ A}$
61. $3 \times 0.1 \text{ mg} = 0.3 \text{ mg}$
62. $2 \times 0.25 \text{ g} = 0.5 \text{ g}$
63. $\frac{0.5 \text{ mg}}{0.1 \text{ mg}} = 5 \text{ tablets}$
64. $\frac{1.25 \text{ mg}}{0.25 \text{ mg}} = 5 \text{ tablets}$
65. $350 \text{ mi} \times \frac{0.868 \text{ naut. mi}}{1 \text{ mi}} = 303.8 \text{ naut. mi}$
66. $5 \times 16.0 \text{ A} + 4 \times 13.8 \text{ A} = 135.2 \text{ A}$
67. $4.00 \text{ ft} \times 8.00 \text{ ft} \times 40.32 \frac{\text{lb}}{\text{ft}^2} = 1290 \text{ lb}$
68. $365 \text{ days} \times 4.4 \text{ lb/day} = 1606 \text{ lb}$
69. $312,780,968 \text{ people} \times 4.4 \text{ lb/person} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 688,000 \text{ tons}$
70. $\frac{10,240 \text{ ft}^3}{1.2445 \text{ ft}^3/\text{bu}} = 8228 \text{ bu}$
- 71.
- $$V = lwh$$
- $$V = (4 \text{ ft})(8 \text{ ft})(16 \text{ in.}) \times \frac{1 \text{ ft}}{12 \text{ in.}}$$
- $$= \frac{512}{12} \text{ ft}^3 = 42.7 \text{ ft}^3$$
72. $3.25 \times 0.25 \text{ gal} = 0.8125 \text{ gal}$
- 73.
- $$200 \times 1.5 \text{ oz} = 300 \text{ oz}$$
- $$5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz}$$
- $$\frac{300 \text{ oz}}{80 \text{ oz}} = 3.75 \text{ bags}$$
74. a. $110 \times 2.2 \text{ oz} = 242 \text{ oz}$
- b.
- $$5.5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 88 \text{ oz}$$
- $$\frac{242 \text{ oz}}{88 \text{ oz}} = 2.75, \text{ so } 3 \text{ containers}$$
- c. $3 \times 88 \text{ oz} - 242 \text{ oz} = 22 \text{ oz}$

Section 1.13: Percent

1. 0.27
2. 0.15
3. 0.06
4. 0.05
5. 1.56
6. 2.32
7. 0.292
8. 0.362

9. 0.087
10. 1.287
11. 9.478
12. 0.6829
13. 0.0028
14. 0.0078
15. 0.00068
16. 0.000093
17. $4\frac{1}{4}\% = 4.25\% = 0.0425$
18. $9\frac{1}{2}\% = 9.5\% = 0.095$
19. $\frac{3}{8}\% = 0.375\% = 0.00375$
20. $50\frac{1}{3}\% = 50.\bar{3}\% = 0.50\bar{3}$
21. 54%
22. 25%
23. 8%
24. 2%
25. 62%
26. 79%
27. 217%
28. 34.5%
29. 435%
30. 22.5%
31. 18.5%
32. 625%
33. 29.7%
34. 711%
35. 519%
36. 81.5%
37. 1.87%
38. 3.42%
39. 0.29%
40. 0.062%
41. $\frac{4}{5} = 0.8 = 80\%$
42. $\frac{3}{4} = 0.75 = 75\%$
43. $\frac{1}{8} = 0.125 = 12\frac{1}{2}\% \text{ or } 12.5\%$
44. $\frac{2}{5} = 0.4 = 40\%$
45. $\frac{1}{6} = 0.16\text{ r } 4 = 16\frac{4}{6}\% = 16\frac{2}{3}\%$
46. $\frac{1}{3} = 0.33\text{ r } 1 = 33\frac{1}{3}\%$
47. $\frac{4}{9} = 0.44\text{ r } 4 = 44\frac{4}{9}\%$
48. $\frac{3}{7} = 0.42\text{ r } 6 = 42\frac{6}{7}\%$
49. $\frac{3}{5} = 0.60 = 60\%$
50. $\frac{5}{6} = 0.83\text{ r } 2 = 83\frac{2}{6}\% = 83\frac{1}{3}\%$
51. $\frac{13}{40} = 0.325 = 32.5\% \text{ or } 32\frac{1}{2}\%$
52. $\frac{17}{50} = 0.34 = 34\%$
53. $\frac{7}{16} = 0.4375 = 43.75\% \text{ or } 43\frac{3}{4}\%$
54. $\frac{15}{16} = 0.9375 = 93.75\% \text{ or } 93\frac{3}{4}\%$
55. $\frac{96}{40} = 2.40 = 240\%$
56. $\frac{100}{16} = 6.25 = 625\%$
57. $1\frac{3}{4} = 1.75 = 175\%$
58. $2\frac{1}{3} = \frac{7}{3} = 2.33\text{ r } 1 = 233\frac{1}{3}\%$
59. $2\frac{5}{12} = \frac{29}{12} = 2.41\text{ r } 8 = 241\frac{8}{12}\% = 241\frac{2}{3}\%$
60. $5\frac{3}{8} = 5.375 = 537.5\% \text{ or } 537\frac{1}{2}\%$
61. $75\% = \frac{75}{100} = \frac{3}{4}$
62. $45\% = \frac{45}{100} = \frac{9}{20}$
63. $16\% = \frac{16}{100} = \frac{4}{25}$

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

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

81.

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

Section 1.14: Rate, Base, and Part

- $P = 60$; $R = 25\%$; $B = 240$
- $P = \$100$; $R = 33\frac{1}{3}\%$; $B = \$300$
- $P = 108$; $R = 40\%$; $B = 270$
- $P = 72$; $R = 15\%$; $B = 480$
- $P = \text{unknown}$; $R = 4\%$; $B = 28,000$
- $P = 25$; $R = \text{unknown}$; $B = 28$
- $P = 21$; $R = 60\%$; $B = \text{unknown}$
- $P = \text{unknown}$; $R = 10\%$; $B = 15,000$
- $P = 2050$; $R = 6\%$; $B = \text{unknown}$
- $P = \$90$; $R = \text{unknown}$; $B = \$500$

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.

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

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

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

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

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

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

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

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

14.

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

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

$$= 2720$$

15.

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

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

$$R = \frac{2650 \text{ ft}}{5280 \text{ ft}}$$

$$= 0.5 = 50\%$$

16.

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

$$B = \frac{0.35 \text{ mi}}{0.04}$$

$$= 8.75 \text{ mi}$$

17.

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

$$B = \frac{\$72}{0.045}$$

$$= \$1600$$

18.

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

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

$$= 0.490 = 49.0\%$$

19.

$$P = BR$$

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

$$= 112.8$$

20.

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

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

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

21.

$$P = BR$$

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

$$= 8.96 \text{ V}$$

22.

$$P = BR$$

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

$$= 55$$

23.

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

$$R = \frac{97}{130}$$

$$= 0.746 = 74.6\%$$

24.

$$P = BR$$

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

$$= 106 \text{ welds}$$

25.

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

$$R = \frac{24 \text{ h}}{65 \text{ h}}$$

$$= 0.369 = 36.9\%$$

26.

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

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

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

$$= 0.211 = 21.1\%$$

27.

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

$$R = \frac{0.3 \text{ qt}}{4.5 \text{ qt}}$$

$$= 0.067 = 6.7\%$$

28.

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

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

$$= 0.75 = 75\%$$

29.

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

$$R = \frac{2400 \text{ ft}^3 - 1920 \text{ ft}^3}{2400 \text{ ft}^3}$$

$$= \frac{480 \text{ ft}^3}{2400 \text{ ft}^3}$$

$$= 0.20 = 20\%$$

30.

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

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

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

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

Fifteen windows could be drawn on the wall.

31.

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

$$B = \frac{20 \text{ ft}}{0.03}$$

$$= 666.7 \text{ ft}$$

$$A = 666.7 \text{ ft} + 100 \text{ ft} = 766.7 \text{ ft}$$

32.

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

$$= 49 \text{ ft } 9 \text{ in.}$$

33.

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

$$= 440 \text{ lb}$$

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

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

34.

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

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

35.

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

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

36.

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

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

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

$$= 22 \text{ lb}$$

37.

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

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

$$= 74\%$$

38.

$$P = BR$$

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

$$= 75 \text{ ml}$$

39.

$$P = BR$$

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

$$= 7.5 \text{ ml}$$

40.

$$P = BR$$

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

$$= 3 \text{ ml}$$

41.

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

$$R = \frac{25 \text{ ml}}{1000 \text{ ml}} \\ = 0.025 = 2.5\%$$

43.

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

$$\text{Percent increase} = \frac{115 \text{ lb/in}^2 - 75 \text{ lb/in}^2}{75 \text{ lb/in}^2} \times 100\% \\ = 53.3\%$$

44.

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

$$\text{Percent decrease} = \frac{\$93,500 - \$75,400}{\$93,500} \times 100\% \\ = 19.4\%$$

45.

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

$$\text{Percent decrease} = \frac{\$25.50 - \$21.88}{\$25.50} \times 100\% \\ = 14.2\%$$

46.

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

$$\text{Percent increase} = \frac{6500 \text{ ft}^2}{28,000 \text{ ft}^2} \times 100\% \\ = 23.2\%$$

47. First item: $\$100.00 - 0.55 \times \$100.00 = \$45$.

Second item:

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

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

48.

$$P = BR$$

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

$$= \$7.09$$

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

49.

$$P = BR$$

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

$$= 1558 \text{ lb}$$

42.

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

$$\text{Percent increase} = \frac{128 \text{ V} - 115 \text{ V}}{115 \text{ V}} \times 100\% \\ = 11.3\%$$

50.

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

$$R = \frac{59}{125} \\ = 0.472 = 47.2\%$$

51.

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

$$R = \frac{187}{250} \\ = 0.748 = 74.8\%$$

52.

$$\text{Population} = 135 + 42 - 7 - 3 - 5 - 10 \\ = 152$$

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

$$\text{Percent increase} = \frac{152 - 135}{135} \times 100\% \\ = 0.126 = 12.6\%$$

53. a.

$$P = BR$$

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

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

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

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

53. (continued)

b.

$$P = BR$$

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

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

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

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

54. a.

$$P = BR$$

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

$$= 1.15 \text{ lb}$$

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

b.

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

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

c.

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

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

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

$$= 105,000 \text{ tons}$$

55.

$$\text{Total cost} = \$5.66$$

$$B = \frac{P}{R}$$

$$B = \frac{\$5.66}{0.34}$$

$$= \$16.65$$

56.

$$P = BR$$

$$P = (70 \text{ lb})(0.17)$$

$$= 11.9 \text{ lb}$$

$$\text{Remaining} = 70 \text{ lb} - 11.9 \text{ lb} = 58.1 \text{ lb}$$

57.

Total Cost	
	$22 \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 \times \$5.71 = \1661.61
$20240 - 7480 = 12760$	$12760/60 = 213$	$213 \times \$5.74 = \1222.62
$28340 - 9200 = 19140$	$19140/60 = 319$	$319 \times \$5.81 = \1853.39
$26760 - 9160 = 17600$	$17600/60 = 293$	$293 \times \$5.76 = \1687.68
$17880 - 7485 = 10395$	$10395/60 = 173$	$173 \times \$5.76 = \996.48
$25620 - 9080 = 16540$	$16540/60 = 276$	$276 \times \$11.72 = \3234.72
$21560 - 7640 = 13920$	$13920/60 = 232$	$232 \times \$11.69 = \2712.08
$26510 - 9060 = 17450$	$17450/60 = 291$	$291 \times \$11.68 = \3398.88
$22630 - 7635 = 14995$	$14995/60 = 250$	$250 \times \$11.65 = \2912.5
$22920 - 9220 = 13700$	$13700/60 = 228$	$228 \times \$11.72 = \2672.16
$20200 - 7660 = 12540$	$12540/60 = 209$	$209 \times \$11.81 = \2468.29
$25880 - 9160 = 16720$	$16720/60 = 279$	$279 \times \$11.9 = \3320.1
$21300 - 7675 = 13625$	$13625/60 = 227$	$227 \times \$11.84 = \2687.68
$18200 - 7665 = 10535$	$10535/60 = 176$	$176 \times \$11.79 = \2075.04
$26200 - 9150 = 17050$	$17050/56 = 304$	$304 \times \$4.68 = \1422.72
$22600 - 7650 = 14950$	$14950/56 = 267$	$267 \times \$4.65 = \1241.55
$27100 - 9080 = 18020$	$18020/56 = 322$	$322 \times \$4.66 = \1500.52
$22550 - 7635 = 14915$	$14915/56 = 266$	$266 \times \$4.61 = \1226.26
$23600 - 7680 = 15920$	$15920/56 = 284$	$284 \times \$4.59 = \1303.56
$26780 - 9160 = 17620$	$17620/56 = 315$	$315 \times \$4.63 = \1458.45
$28310 - 9200 = 19110$	$19110/56 = 341$	$341 \times \$4.69 = \1599.29
$21560 - 7665 = 13895$	$13895/56 = 248$	$248 \times \$4.67 = \1158.16
$25750 - 9160 = 16590$	$16590/56 = 296$	$296 \times \$4.65 = \1376.4
	Total	45190.14

59.

	$66 \times \$7.97 = \526.02
	$30 \times \$3.95 = \118.50
	$14 \times \$3.39 = \47.46
	$17 \times \$6.59 = \112.03
	$4 \times \$12.10 = \48.40
	$9 \times \$5.39 = \48.51
	$7 \times \$4.97 = \34.79
	$10 \times \$11.97 = \119.70
	$6 \times \$16.89 = \101.34
	$11 \times \$18.55 = \204.05
	$15 \times \$24.25 = \363.75
	$27 \times \$16.95 = \457.65
	$7 \times \$14.39 = \100.73
	$1 \times \$24.96 = \24.96
	$10 \times \$10.37 = \103.7
	$27 \times \$19.85 = \535.95
	$7 \times \$12.25 = \85.75
	$1 \times \$17.85 = \17.85
	$7 \times \$12.19 = \85.33
	$8 \times \$3.49 = \27.92
	$3 \times \$17.65 = \52.95
	$80 \times \$17.29 = \1383.2
	$7 \times \$20.65 = \144.55
	$\$5428.59 - \108.57
	$1 \times \$33.59 = \33.59
	$3 \times \$34.97 = \104.91
	$250 \times \$2.18 = \545
Subtotal	\$5428.59
Less 2% Discount	$\$5428.59 \times 0.02 = \108.57
Subtotal	$\$5428.59 - \$108.57 = \$5320.02$
5 $\frac{3}{4}$ % Sales Tax	$\$5320.02 \times 0.0575 = \305.90
NET TOTAL	$\$5320.02 + \$305.90 = \$5625.92$

60.

Net Price	
	$3(\$18.58 - 0.40 \times \$18.58) = \$33.44$
	$5(\$65.10 - 0.25 \times \$65.10) = \$244.13$
	$5(\$73.95 - 0.25 \times \$73.95) = \$277.31$
	$8(\$43.90 - 0.25 \times \$43.90) = \$263.40$
	$2(\$124.60 - 0.20 \times \$124.60) = \$199.36$
	$5(\$18.80 - 0.15 \times \$18.80) = \$79.90$
Subtotal	\$1097.54
Less 5% if paid in 30 days	$\$1097.54 \times 0.05 = \54.877
Total	\$1042.66

Section 1.15: Powers and Roots

- | | |
|---------------|------------------|
| 1. 225 | 6. 2,940,000,000 |
| 2. 625 | 7. 729 |
| 3. 222 | 8. 2740 |
| 4. 0.000778 | 9. 562 |
| 5. 0.00000661 | 10. 0.0000114 |

11. 0.00483
 12. 15,300
 13. 157
 14. 276,000
 15. 2.96
 16. 112

17. 68.9
 18. 0.0806
 19. 42.4
 20. 2.12
 21. 0.198
 22. 8.78

Section 1.16: Applications Involving Percent: Business and Personal Finance

1. a.

$$i = prt$$

$$i = (\$2000)(0.05)(3)$$

$$= \$300$$

b.

$$\text{payment} = \frac{\text{principle} + \text{interest}}{\text{loan period}}$$

$$\text{payment} = \frac{\$2000 + \$300}{36}$$

$$= \$63.89$$

2.

$$i = prt$$

$$i = (\$2500)(0.045)(2)$$

$$= \$225$$

3.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$7500 \left(1 + \frac{0.065}{4} \right)^{(4)(4)}$$

$$= \$7500(1.01625)^{16}$$

$$= \$9706.67$$

4.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$10,500 \left(1 + \frac{0.0575}{2} \right)^{(2)(6)}$$

$$= \$10,500(1.02875)^{12}$$

$$= \$14,753.92$$

5.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$15,000 \left(1 + \frac{0.055}{2} \right)^{(2)(8)}$$

$$= \$15,000(1.0275)^{16}$$

$$= \$23,152.64$$

6.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = \$6000 \left(1 + \frac{0.075}{4} \right)^{(4)(5)}$$

$$= \$6000(1.01875)^{20}$$

$$= \$8699.69$$

7.

$$P = \$150,000$$

$$i = 0.065/12$$

$$n = 30 \times 12 = 360$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$150,000 \left(\frac{\left(\frac{0.065}{12} \right) \left(1 + \frac{0.065}{12} \right)^{360}}{\left(1 + \frac{0.065}{12} \right)^{360} - 1} \right)$$

$$= \$948.10$$

8.

$$P = \$75,000$$

$$i = 0.0625/12$$

$$n = 15 \times 12 = 180$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$75,000 \left(\frac{\left(\frac{0.0625}{12} \right) \left(1 + \frac{0.0625}{12} \right)^{180}}{\left(1 + \frac{0.0625}{12} \right)^{180} - 1} \right)$$

$$= \$643.07$$

9.

$$\text{Price} = 275 \text{ acres} \times \$4100/\text{acre}$$

$$= \$1,127,500$$

$$P = \$1,127,500 \times 0.75 = \$845,625$$

$$i = 0.0675$$

$$n = 20$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$845,625 \left(\frac{0.0675(1+0.0675)^{20}}{(1+0.0675)^{20} - 1} \right)$$

$$= \$78,276.71$$

The annual payment is $\$6429.83 \times 12$

$$= \$77,157.96.$$

11. a.

$$P = \$24,000$$

$$i = 0.0075/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$24,000 \left(\frac{\left(\frac{0.0075}{12} \right) \left(1 + \frac{0.0075}{12} \right)^{36}}{\left(1 + \frac{0.0075}{12} \right)^{36} - 1} \right)$$

$$= \$674.40$$

$$\text{Total payment} = \$674.40 \times 36 = \$24,278.40$$

10.

$$P = ([\$45,500 - \$4500]) \times 0.80 = \$32,800$$

$$i = 0.0725/12$$

$$n = 5 \times 12 = 60$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$32,800 \left(\frac{\left(\frac{0.0725}{12} \right) \left(1 + \frac{0.0725}{12} \right)^{60}}{\left(1 + \frac{0.0725}{12} \right)^{60} - 1} \right)$$

$$= \$653.36$$

11. (continued)

b.

$$P = \$24,000 - \$1500 = \$22,500$$

$$i = 0.085/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$22,500 \left(\frac{\left(\frac{0.085}{12} \right) \left(1 + \frac{0.085}{12} \right)^{36}}{\left(1 + \frac{0.085}{12} \right)^{36} - 1} \right)$$

$$= \$710.27$$

$$\text{Total payment} = \$710.27 \times 36 = \$25,569.71$$

Choice a costs $\$25,569.71 - \$24,278.51 = \$1291.20$ less.

12. a.

$$P = \$19,500$$

$$i = 0.0175/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$19,500 \left(\frac{\left(\frac{0.0175}{12} \right) \left(1 + \frac{0.0175}{12} \right)^{36}}{\left(1 + \frac{0.0175}{12} \right)^{36} - 1} \right)$$

$$= \$556.40$$

$$\text{Total payment} = \$556.40 \times 36 = \$20,030.40$$

b.

$$P = \$19,500 - \$2500 = \$17,000$$

$$i = 0.065/12$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$17,000 \left(\frac{\left(\frac{0.065}{12} \right) \left(1 + \frac{0.065}{12} \right)^{36}}{\left(1 + \frac{0.065}{12} \right)^{36} - 1} \right)$$

$$= \$521.03$$

$$\text{Total payment} = \$521.03 \times 36 = \$18,757.08$$

Choice b costs $\$20,030.57 - \$18,757.19 = \$1273.38$ less.

13.

$$P = \$220,500 - \$4500 - \$9500 - \$8000 = \$198,500$$

$$i = 0.08$$

$$n = 4$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$\begin{aligned} A &= \$198,500 \left(\frac{(0.08)(1+0.08)^4}{(1+0.08)^4 - 1} \right) \\ &= \$59,931.28 \end{aligned}$$

14.

$$\text{Dealer price} = \$150,500 \times (1 + 0.035 + 0.0095) = \$157,197.25$$

$$P = \$157,197.25 - \$7500 - \$10,000 = \$139,697.25$$

$$i = 0.0725$$

$$n = 5$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$\begin{aligned} A &= \$139,697.25 \left(\frac{(0.0725)(1+0.0725)^5}{(1+0.0725)^5 - 1} \right) \\ &= \$34,299.23 \end{aligned}$$

15.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{1} \right)^{(1)(3)} \\ &= \$30,000(1.05)^3 \\ &= \$34,728.75 \end{aligned}$$

16.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{12} \right)^{(12)(3)} \\ &= \$34,844.17 \end{aligned}$$

17.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{365} \right)^{(365)(3)} \\ &= \$34,854.67 \end{aligned}$$

18.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$30,000 \left(1 + \frac{0.05}{52} \right)^{(52)(3)} \\ &= \$34,852.52 \end{aligned}$$

19.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$8400 \left(1 + \frac{0.035}{12} \right)^{(12)(5)} \\ &= \$10,003.92 \end{aligned}$$

20.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$\begin{aligned} A &= \$4000 \left(1 + \frac{0.055}{52} \right)^{(52)(4)} \\ &= \$4983.73 \end{aligned}$$

21.

$$P = \$37,500 - \$37,500 \times 0.10 + \$37,500 \times 0.06$$

$$= \$36,000$$

$$i = 0.042/12 = 0.0035$$

$$n = 3 \times 12 = 36$$

$$A = P \left(\frac{i(1+i)^n}{(1+i)^n - 1} \right)$$

$$A = \$36,000 \left(\frac{0.0035(1+0.0035)^{36}}{(1+0.0035)^{36} - 1} \right)$$

$$= \$1066.07$$

22.

$$\text{Discount amount} = (0.02)(\$12,000) = \$240$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$12,000 - \$240} \times \frac{365}{20} = 37.2\%$$

23.

$$\text{Discount amount} = (0.03)(\$15,870) = \$476.10$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$476.10}{\$15,870 - \$476.10} \times \frac{365}{20} = 56.4\%$$

24.

$$\text{Discount amount} = (0.02)(\$3000) = \$60$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$60}{\$3000 - \$60} \times \frac{365}{18} = 41.4\%$$

25.

$$\text{Discount amount} = (0.025)(\$129,115.23) = \$3227.88$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$3227.88}{\$129,115.23 - \$3227.88} \times \frac{365}{20} = 46.8\%$$

26.

$$\text{Discount amount} = (0.02)(\$22,000) = \$440$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$440}{\$22,000 - \$440} \times \frac{365}{30} = 24.8\%$$

27.

$$\text{Discount amount} = (0.01)(\$21,500) = \$215$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$215}{\$21,500 - \$215} \times \frac{365}{10} = 36.9\%$$

28.

$$\text{Discount amount} = (0.015)(\$16,000) = \$240$$

$$\text{Interest} = \frac{\text{Discount amount}}{\text{Invoice amount} - \text{Discount amount}} \times \frac{\text{Number of days per year}}{\text{Number of days paid early}}$$

$$\text{Interest} = \frac{\$240}{\$16,000 - \$240} \times \frac{365}{20} = 27.8\%$$

Unit 1C Review

1. 1.625

2. $\frac{45}{100} = \frac{9}{20}$

3. 10.129

4. 116.935

5. 5.854

6. $55.6 \text{ ft} - 15.0 \text{ ft} - 15.0 \text{ ft} = 25.6 \text{ ft}$

7.

55.6 ft

15.0 ft

15.0 ft

9.5 ft

25.6 ft

9.5 ft

15.0 ft

15.0 ft

160.2 ft

8. a. 45.1

b. 45.06

9. a. 45.1

b. 45.06

10. 0.11515

11. 18.85

12. $18.5 \text{ in.} \div 2.75 \text{ in.} = 6 \text{ r } 2$. Six cables could be cut and there would be 2 in. remaining.

13. 0.25

14. 72.4

15.

$P = BR$

$$P = (420)(0.165)$$

$$= 69.3$$

16.

$B = \frac{P}{R}$

$$B = \frac{240}{0.12}$$

$$= 2000$$

17.

$R = \frac{P}{B}$

$$R = \frac{96 \text{ yd}}{240 \text{ yd}}$$

$$= 40.0\%$$

18.

$P = BR$

$$P = (\$16.50)(0.06)$$

$$= \$0.99$$

Her new salary is

$$\$16.50 + \$0.99 = \$17.49/\text{h}$$

19. 2110

20. 9.40

Chapter 1 Review

1. 8243

2. 55,197

3. 9,178,000

4. 226 r 240

$$\begin{aligned}
 5. \quad & 12 - 3(5 - 2) \\
 & = 12 - 3(3) \\
 & = 12 - 9 \\
 & = 3
 \end{aligned}$$

$$\begin{aligned}
 6. \quad & (6 + 4)8 \div 2 + 3 \\
 & = (10)8 \div 2 + 3 \\
 & = 80 \div 2 + 3 \\
 & = 40 + 3 \\
 & = 43
 \end{aligned}$$

$$\begin{aligned}
 9. \quad & \text{Area of upper rectangle: } 12 \text{ cm} \times 5 \text{ cm} = 60 \text{ cm}^2 \\
 & \text{Area of lower rectangle: } 10 \text{ cm} \times 28 \text{ cm} = \underline{280 \text{ cm}^2} \\
 & \text{Total area: } \quad \quad \quad = 340 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 10. \quad & \text{Volume of left box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^3 \\
 & \text{Volume of middle box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ cm}^3 \\
 & \text{Volume of right box: } 10 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = \underline{10 \text{ cm}^3} \\
 & \text{Total Volume: } \quad \quad \quad = 30 \text{ cm}^3
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & C = \frac{5}{9}(F - 32) \\
 & C = \frac{5}{9}(50 - 32) \\
 & = \frac{5}{9}(18) \\
 & = 10
 \end{aligned}$$

13. $4 + 6 + 0 = 10$ is not divisible by 3, so 28 is not divisible by 3.

14. $54 = 2 \cdot 3 \cdot 3 \cdot 3$

15. $330 = 2 \cdot 3 \cdot 5 \cdot 11$

16. $\frac{36}{56} = \frac{9 \cdot 4}{14 \cdot 4} = \frac{9}{14}$

17. $\frac{180}{216} = \frac{5 \cdot 36}{6 \cdot 36} = \frac{5}{6}$

18. $4\frac{1}{6}$

$$\begin{aligned}
 7. \quad & 18 \div 2 \times 5 \div 3 - 6 + 4 \times 7 \\
 & = 9 \times 5 \div 3 - 6 + 28 \\
 & = 45 \div 3 - 6 + 28 \\
 & = 15 - 6 + 28 \\
 & = 37
 \end{aligned}$$

$$\begin{aligned}
 8. \quad & 18 / (5 - 3) + (6 - 2) \times 8 - 10 \\
 & = 18 / 2 + 4 \times 8 - 10 \\
 & = 9 + 32 - 10 \\
 & = 31
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & P = \frac{Fs}{t} \\
 & P = \frac{(600)(50)}{10} \\
 & = \frac{30,000}{10} \\
 & = 3000
 \end{aligned}$$

19. $3\frac{18}{5} = 3 + \frac{18}{5} = 3 + 3\frac{3}{5} = 6\frac{3}{5}$

20. $2\frac{5}{8} = \frac{(2 \times 8) + 5}{8} = \frac{21}{8}$

21. $3\frac{7}{16} = \frac{(3 \times 16) + 7}{16} = \frac{55}{16}$

22. $\frac{16}{8} = 2$

23.

$$\begin{aligned} & \frac{1}{4} + \frac{5}{12} + \frac{5}{6} \\ &= \frac{3}{12} + \frac{5}{12} + \frac{10}{12} \\ &= \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2} \end{aligned}$$

24.

$$\begin{aligned} & \frac{29}{36} - \frac{7}{30} \\ &= \frac{145}{180} - \frac{42}{180} \\ &= \frac{103}{180} \end{aligned}$$

25.

$$\begin{aligned} & 5\frac{3}{16} + 9\frac{5}{12} \\ &= 5\frac{9}{48} + 9\frac{20}{48} \\ &= 14\frac{29}{48} \end{aligned}$$

26.

$$\begin{aligned} & 6\frac{3}{8} - 4\frac{7}{12} \\ &= 6\frac{9}{24} - 4\frac{14}{24} \\ &= 5\frac{33}{24} - 4\frac{14}{24} \\ &= 1\frac{19}{24} \end{aligned}$$

27.

$$\begin{aligned} & 18 - 6\frac{2}{5} \\ &= 17\frac{5}{5} - 6\frac{2}{5} \\ &= 11\frac{3}{5} \end{aligned}$$

28.

$$\begin{aligned} & 16\frac{2}{3} + 1\frac{1}{4} - 12\frac{11}{12} \\ &= 16\frac{8}{12} + 1\frac{3}{12} - 12\frac{11}{12} \\ &= 17\frac{11}{12} - 12\frac{11}{12} \\ &= 5 \end{aligned}$$

29. $\frac{1}{4}$

30.

$$\begin{aligned} & 3\frac{6}{7} \times 4\frac{2}{3} \\ &= \frac{27}{7} \times \frac{14}{3} \\ &= 18 \end{aligned}$$

31.

$$\begin{aligned} & \frac{3}{8} \div 6 \\ &= \frac{3}{8} \times \frac{1}{6} \\ &= \frac{1}{16} \end{aligned}$$

32.

$$\begin{aligned} & \frac{2}{3} \div 1\frac{7}{9} \\ &= \frac{2}{3} \div \frac{16}{9} \\ &= \frac{2}{3} \times \frac{9}{16} \\ &= \frac{3}{8} \end{aligned}$$

33.

$$\begin{aligned} & 1\frac{4}{5} \div 1\frac{9}{16} \times 11\frac{2}{3} \\ &= \frac{9}{5} \div \frac{25}{16} \times \frac{35}{3} \\ &= \frac{9}{5} \times \frac{16}{25} \times \frac{35}{3} \\ &= \frac{144}{125} \times \frac{35}{3} \\ &= \frac{336}{25} = 13\frac{11}{25} \end{aligned}$$

34.

$$\begin{aligned}
 A &= 12\frac{5}{16} \text{ in.} - 4\frac{3}{8} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 4\frac{6}{16} \text{ in.} - 4\frac{9}{16} \text{ in.} \\
 &= 12\frac{5}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 11\frac{21}{16} \text{ in.} - 8\frac{15}{16} \text{ in.} \\
 &= 3\frac{6}{16} \text{ in.} = 3\frac{3}{8} \text{ in.} \\
 B &= 9\frac{3}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} + 2\frac{1}{2} \text{ in.} \\
 &= 9\frac{3}{32} \text{ in.} + 2\frac{16}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 11\frac{19}{32} \text{ in.} - 6\frac{5}{32} \text{ in.} \\
 &= 5\frac{14}{32} \text{ in.} = 5\frac{7}{16} \text{ in.}
 \end{aligned}$$

$$35. \quad 6 \text{ lb } 9 \text{ oz} = \left(6 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}}\right) + 9 \text{ oz} = 105 \text{ oz}$$

$$36. \quad 168 \text{ ft} \times \frac{12 \text{ in.}}{1 \text{ ft}} = 2016 \text{ in.}$$

$$37. \quad 72 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 24 \text{ yd}$$

$$38. \quad 36 \text{ mi} \times \frac{1760 \text{ yd}}{3 \text{ mi}} = 63,360 \text{ yd}$$

$$39. \quad 0.5625$$

$$40. \quad 0.416$$

$$41. \quad \frac{45}{100} = \frac{9}{20}$$

$$42. \quad 19\frac{625}{1000} = 19\frac{5}{8}$$

$$43. \quad 168.278$$

$$44. \quad 17.25$$

$$45. \quad 68.665$$

$$46. \quad 33.72$$

$$47. \quad 3206.5$$

$$48. \quad 1.9133$$

$$49. \quad 3.18$$

$$50. \quad 20.6$$

51. a. 200

b. 248.2

c. 250

52. a. 5.6

b. 5.65

c. 5.6491

$$53. \quad 15\% = \frac{15}{100} = 0.15$$

$$54. \quad 8\frac{1}{4}\% = 8.25\% = 0.0825$$

55. 6.5%

56. 120%

57.

$$P = BR$$

$$P = (\$12,000)(0.0875)$$

$$= \$1050$$

58.

Fraction	Decimal	Percent
$\frac{1}{4}$	0.25	25%
$\frac{3}{8}$	0.375	$37\frac{1}{2}\%$
$\frac{5}{6}$	$0.83\frac{1}{3}$	$83\frac{1}{3}\%$
$8\frac{3}{4}$	8.75	875%
$2\frac{2}{5}$	2.4	240%
$\frac{3}{2000}$	0.0015	0.15%

59.

$$R = \frac{P}{B}$$

$$R = \frac{\$32,000}{\$84,000}$$

$$= 38.1\%$$

60.

$$R = \frac{P}{B}$$

$$R = \frac{\frac{11}{64}}{\frac{13}{32}} = \frac{11}{64} \times \frac{32}{13}$$

$$= 42.3\%$$

61. $60 \text{ tons} \times 0.80 = 48 \text{ tons}$

62.

$$\begin{aligned} & 6 \times \left(3\frac{1}{16} \text{ in.} \right) + 5 \times \left(\frac{1}{4} \text{ in.} \right) + 2 \times \left(1\frac{1}{8} \text{ in.} \right) \\ &= 6 \times \left(\frac{49}{16} \text{ in.} \right) + 5 \times \left(\frac{1}{4} \text{ in.} \right) + 2 \times \left(\frac{9}{8} \text{ in.} \right) \\ &= \frac{147}{8} \text{ in.} + \frac{5}{4} \text{ in.} + \frac{9}{4} \text{ in.} \\ &= \frac{147}{8} \text{ in.} + \frac{10}{8} \text{ in.} + \frac{18}{8} \text{ in.} \\ &= 21\frac{7}{8} \text{ in.} \end{aligned}$$

63. $\frac{7}{8} \text{ in.} - \frac{9}{16} \text{ in.} = \frac{14}{16} \text{ in.} - \frac{9}{16} \text{ in.} = \frac{5}{16} \text{ in.}$

64.

Height = $20 \text{ in.} + 2 \times 5 \text{ in.} = 30 \text{ in.}$

Length = $4 \times 10 \text{ in.} + 1 \text{ in.} = 41 \text{ in.}$

The sheet of cardboard would have to be $30 \text{ in.} \times 41 \text{ in.}$

65. 4020

66. 139

Chapter 1 Test

1. 5729

2. 3516

5.

$$\begin{aligned} & 8 + 2(5 \times 6 + 8) \\ &= 8 + 2(30 + 8) \\ &= 8 + 2(38) \\ &= 8 + 76 = 84 \end{aligned}$$

7.

Area of upper rectangle: $10 \text{ m} \times 40 \text{ m} = 400 \text{ m}^2$

Area of middle rectangle: $10 \text{ m} \times 15 \text{ m} = 150 \text{ m}^2$

Area of lower rectangle: $10 \text{ m} \times 20 \text{ m} = \underline{200 \text{ m}^2}$

Total area: $\quad\quad\quad = 750 \text{ m}^2$

8.

Volume of outer box: $10 \text{ in.} \times 12 \text{ in.} \times 20 \text{ in.} = 2400 \text{ in}^3$

Volume of missing corner: $3 \text{ in.} \times 4 \text{ in.} \times 20 \text{ in.} = \underline{240 \text{ in}^3}$

Total Volume: $\quad\quad\quad = 2160 \text{ in}^3$

9. $\frac{120 \text{ V}}{40 \Omega} = 3 \text{ A}$

10.

$$\begin{aligned} P &= 2l + 2w \\ P &= 2(20) + 2(15) \\ &= 40 + 30 \\ &= 70 \end{aligned}$$

3. 2,584.450

4. 1600

6.

$$\begin{aligned} & 15 - 9 \div 3 + 3 \times 4 \\ &= 15 - 3 + 12 = 24 \end{aligned}$$

11.

$$t = \frac{d}{r}$$

$$\begin{aligned} t &= \frac{1050}{21} \\ &= 50 \end{aligned}$$

12.

$P = 2a + b$

$$\begin{aligned} P &= 2(36) + 15 \\ &= 72 + 15 \\ &= 87 \end{aligned}$$

13. $90 = 2 \cdot 3 \cdot 3 \cdot 5$

14. $220 = 2 \cdot 2 \cdot 5 \cdot 11$

15. $\frac{30}{64} = \frac{15 \cdot 2}{32 \cdot 2} = \frac{15}{32}$

16. $\frac{28}{42} = \frac{2 \cdot 14}{3 \cdot 14} = \frac{2}{3}$

17. $\frac{23}{6} = 3 \text{ r } 5 = 3\frac{5}{6}$

18. $3\frac{1}{4} = \frac{3 \times 4 + 1}{4} = \frac{13}{4}$

19. $\frac{3}{8} + \frac{1}{4} = \frac{3}{8} + \frac{2}{8} = \frac{5}{8}$

20. $\frac{5}{16} - \frac{5}{32} = \frac{10}{32} - \frac{5}{32} = \frac{5}{32}$

21.

$3\frac{1}{8} = 3\frac{1}{8}$

$2\frac{1}{2} = 2\frac{4}{8}$

$4\frac{3}{4} = 4\frac{6}{8}$

$9\frac{11}{8} = 10\frac{3}{8}$

22.

$10\frac{1}{8} - 3\frac{5}{16}$

$= 10\frac{2}{16} - 3\frac{5}{16}$

$= 9\frac{18}{16} - 3\frac{5}{16}$

$= 6\frac{13}{16}$

23.

$3\frac{5}{8} + 2\frac{3}{16} - 1\frac{1}{4}$

$= 3\frac{10}{16} + 2\frac{3}{16} - 1\frac{4}{16}$

$= 5\frac{13}{16} - 1\frac{4}{16}$

$= 4\frac{9}{16}$

24. $\frac{3}{8} \times \frac{16}{27} = \frac{3}{8} \times \frac{8 \cdot 2}{9 \cdot 3} = \frac{2}{9}$

25.

$\frac{3}{8} \div 3\frac{5}{16} = \frac{3}{8} \div \frac{53}{16}$

$= \frac{3}{8} \times \frac{16}{53}$

$= \frac{6}{53}$

26. $\frac{3}{40}$

27.

$3\frac{5}{8} + 1\frac{3}{4} \times 6\frac{1}{5} = \frac{29}{8} + \frac{7}{4} \times \frac{31}{5}$

$= \frac{29}{8} + \frac{217}{20}$

$= \frac{145}{40} + \frac{434}{40}$

$= \frac{579}{40} = 14\frac{19}{40}$

28.

$P = 2l + 2w$

$P = 2\left(4\frac{3}{4}\right) + 2\left(2\frac{1}{2}\right)$

$= 2\left(\frac{19}{4}\right) + 2\left(\frac{5}{2}\right)$

$= \frac{19}{2} + \frac{10}{2}$

$= \frac{29}{2} = 14\frac{1}{2}$

29.

$3\frac{5}{8} \text{ A} + 2\frac{3}{4} \text{ A} + 4\frac{5}{16} \text{ A}$

$= 3\frac{10}{16} \text{ A} + 2\frac{12}{16} \text{ A} + 4\frac{5}{16} \text{ A}$

$= 9\frac{27}{16} \text{ A} = 10\frac{11}{16} \text{ A}$

30.

$120 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} = 40 \text{ yd}$

31. $3 \text{ lb } 5 \text{ oz} = \left(3 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}}\right) + 5 \text{ oz} = 53 \text{ oz}$

32. $\frac{5}{8} = 0.625$

33. $2.12 = 2\frac{12}{100} = 2\frac{3}{25}$

34. 65.024

35. 397.19

36. a. 27.3

b. 27.28

37. 8.0784

38. 0.05

39.

$$B = \frac{P}{R}$$

$$B = \frac{59.45}{0.41}$$
$$= 145$$

40.

$$R = \frac{P}{B}$$

$$R = \frac{88}{284}$$
$$= 31.0\%$$

41.

$$P = BR$$

$$P = (\$612)(0.067)$$
$$= \$41$$

Her new salary is $\$612 + \$41 = \$653$.

42. 0.0552

43. 6.73