

Solutions to Odd-Numbered Problems

CHAPTER 1

ARITHMETIC OF WHOLE NUMBERS

Preview 1

1. (a) Two hundred fifty thousand, three hundred seventy-four
 (b) 1,065,008
3. (a) $67 + 58 = 125$ (b) $7009 + 1598 = 8607$
5. (a)
$$\begin{array}{r} 64 \\ \times 37 \\ \hline 448 \\ 192 \\ \hline 2368 \end{array}$$
 (b)
$$\begin{array}{r} 305 \\ \times 243 \\ \hline 915 \\ 1220 \\ \hline 610 \\ 74115 \text{ or } 74,115 \end{array}$$
 (c)
$$\begin{array}{r} 908 \\ \times 705 \\ \hline 4540 \\ 63560 \\ \hline 640140 \text{ or } 640,010 \end{array}$$
7. $680 - 235 = 455$ lb finished weight
9. (a) $6 + 9 \times 3 = 6 + 27 = 33$
 (b) $35 - 14 \div 7 = 35 - 2 = 33$
 (c) $56 \div 4 \times 2 + 9 - 4 = 14 \times 2 + 9 - 4 = 28 + 9 - 4 = 33$
 (d) $(23 - 7) \times 24 \div (12 - 4) = 16 \times 24 \div 8 = 384 \div 8 = 48$

Exercises 1-1 Reading, Writing, Rounding, and Adding Whole Numbers.

A.

1. Three hundred fifty-seven 3. Seventeen thousand, ninety-two
5. Two million, thirty-four
7. Seven hundred forty thousand, one hundred six
9. One hundred eighteen million, one hundred eighty thousand, eighteen
11. 3006 13. 11,100 15. 4,040,006
17. 360 19. 4000 21. 230,000

B.

1. 70 3. 80 5. 123 7. 132 9. 393
11. 1390 13. 1009 15. 861 17. 9461 19. 11,428
21. 25,717 23. 11,071 25. 175,728 27. 663,264

C.

1. 1042 3. 2442 5. 7083 7. 6352
 9. 6514 11. 64 13. 55 15. 357
 17. 1,166,040

D.

- | | | |
|---|---|---|
| <p>1. 387 ft
 913
 76
 2640
 + 845
 <u> </u>
 4861 ft</p> | <p>3. 346
 275
 84
 128
 325
 98
 260
 + 120
 <u> </u>
 1636 screws</p> | <p>5. 78
 428
 143
 96
 + 384
 <u> </u>
 1129 minutes</p> |
| <p>7. (a) 420
 260
 875
 340
 558
 564
 280
 + 310
 <u> </u>
 3607 watts</p> | <p>(b) 875
 564
 + 558
 <u> </u>
 1997 watts</p> | <p>(c) 260
 280
 + 310
 <u> </u>
 850 watts</p> |
| <p>9. 1205
 865
 742
 + 257
 <u> </u>
 3114 bricks</p> | <p>11. \$ 499
 249
 369
 + 79
 <u> </u>
 \$1196</p> | <p>13. 520
 1160
 49
 + 1200
 <u> </u>
 2929 ohms</p> |
| <p>15. 485
 74
 251
 + 146
 <u> </u>
 756 grams</p> | <p>17. 1400
 1800
 600
 + 100
 <u> </u>
 3900 W</p> | |
| <p>19. (a) 1172
 1054
 915
 + 1123
 <u> </u>
 4264 points</p> | <p>(b) 1264
 776
 + 987
 <u> </u>
 3027 points</p> | <p>(c) 4264
 3027
 + 3027
 <u> </u>
 7291 points</p> |

E.

1.
$$\begin{array}{r} 35244 \\ + 61775 \\ \hline \end{array}$$
 97001 kHz or 97,001 kHz
3. (a) \$307,225 (b) \$732,813 (c) \$2,298,502 (d) \$7156
5. (a) Total feet of each kind
 11,453 ft of #12 BHD
 258 ft of #TX
 12,715 ft of 410 AAC
 8792 ft of 110 ACSR
 7425 ft of 6B
- (b) Total feet installed at each location
 3530 ft at A3
 8412 ft at A4
 4294 ft at B1
 5482 ft at B5
 5073 ft at B6
 6073 ft at C4
 7779 ft at C5

Exercises 1-2 Subtraction of Whole Numbers**A.**

1. 6 3. 2 5. 4 7. 3 9. 3 11. 8
13. 9 15. 9 17. 3 19. 8 21. 7 23. 7
25. 0 27. 8 29. 6 31. 6 33. 5 35. 4

B.

1. 13 3. 12 5. 15 7. 38 9. 46
11. 25 13. 189 15. 281 17. 408 19. 273
21. 574 23. 2809 25. 12,518 27. 4741 29. 47,593

C.

1.
$$\begin{array}{r} \$ 486 \\ - 27 \\ \hline \end{array}$$
 \$ 459
3.
$$\begin{array}{r} 3540 \text{ ft} \\ - 1782 \\ \hline \end{array}$$
 1758 ft
5.
$$\begin{array}{r} \$ 1206512 \\ - 875977 \\ \hline \end{array}$$
 \$ 330535 or \$330,535
7. The 4 drums contain $72 + 45 + 39 + 86 = 242$ liters
 3 drums contain $97 + 115 + 74 = 286$ liters
 The total volume of the 3 drums is greater by $(286 - 242) = 44$ liters.
9.
$$\begin{array}{r} 238 \\ - 64 \\ \hline \end{array}$$
 174 gal
11.
$$\begin{array}{r} 22000 \\ - 14250 \\ \hline \end{array}$$
 7750 impressions
13.
$$\begin{array}{r} 20000 \\ - 6500 \\ \hline \end{array}$$
 13500 ohms or 13,500 ohms
15.
$$\begin{array}{r} 1350000 \\ - 850000 \\ \hline \end{array}$$
 500000 Hertz or 500,000 Hertz

17.
$$\begin{array}{r} 8823 \\ - 8701 \\ \hline 122 \text{ HCF} \end{array}$$

19. Hyundai Sonata:

$$\begin{array}{r} \$ 23219 \\ + 8410 \\ \hline \$ 31629 \\ - 8629 \\ \hline \$ 23000 \text{ or } 23,000 \end{array}$$

Sonata Hybrid:

$$\begin{array}{r} \$ 25784 \\ + 6426 \\ \hline \$ 32210 \\ - 9053 \\ \hline \$ 23157 \text{ or } \$23,157 \end{array}$$

Therefore, the Sonata costs less than the Sonata Hybrid by \$157.

D.

1. Total mileage of each
- # 1 $60,027 - 58,352 = 1675$
 - # 2 $43,302 - 42,135 = 1167$
 - # 3 $78,007 - 76,270 = 1737$
 - # 4 $41,322 - 40,006 = 1316$
 - # 5 $10,002 - 08,642 = 1360$
 - # 6 $35,700 - 35,401 = 299$
 - # 7 $80,101 - 79,002 = 1099$
 - # 8 $40,122 - 39,987 = 135$
 - # 9 $11,671 - 10,210 = 1461$
 - #10 $73,121 - 71,040 = 2081$
- Total mileage of all = 12330 or 12,330

3.
$$\begin{array}{r} \$28245 \\ - 3814 \\ \hline \$24431 \text{ or } 24,431 \end{array}$$

5. (a) Balance A = \$2065

(b)
$$\begin{array}{r} \$ 6375 \\ 6375 - 379 = 5996 \\ 5996 + 1683 = 7679 \\ 7679 + 474 = 8153 \\ 8153 + 487 = 8640 \\ 8640 - 2373 = 6267 \\ 6267 - 1990 = 4277 \\ 4277 - 308 = 3969 \\ 3969 - 1090 = 2879 \\ 2879 - 814 = 2065 \end{array}$$

Exercises 1-3 Multiplication of Whole Numbers

A.

- | | | | | | |
|---------|---------|----------|----------|----------|----------|
| 1. 42 | 3. 48 | 5. 63 | 7. 54 | 9. 45 | 11. 296 |
| 13. 576 | 15. 320 | 17. 290 | 19. 416 | 21. 792 | 23. 1404 |
| 25. 282 | 27. 720 | 29. 5040 | 31. 1938 | 33. 4484 | 35. 3822 |

B.

$$\begin{array}{r} 1. \quad 305 \\ \times 123 \\ \hline 915 \\ 610 \\ \underline{305} \\ 37515 \\ \text{or } 37,515 \end{array}$$

$$\begin{array}{r} 3. \quad 8043 \\ \times 37 \\ \hline 56301 \\ \underline{24129} \\ 297591 \\ \text{or } 297,591 \end{array}$$

$$\begin{array}{r} 5. \quad 3706 \\ \times 102 \\ \hline 7412 \\ \underline{37060} \\ 378012 \\ \text{or } 378,012 \end{array}$$

$$\begin{array}{r} 7. \quad 684 \\ \times 45 \\ \hline 3420 \\ \underline{2736} \\ 30780 \\ \text{or } 30,780 \end{array}$$

$$\begin{array}{r} 9. \quad 2008 \\ \times 198 \\ \hline 16064 \\ 18072 \\ \underline{2008} \\ 397584 \\ \text{or } 397,584 \end{array}$$

$$\begin{array}{r} 11. \quad 809 \\ \times 9 \\ \hline 7281 \\ \text{or } 25,000 \end{array}$$

$$\begin{array}{r} 13. \quad 500 \\ \times 50 \\ \hline 25000 \\ \text{or } 25,000 \end{array}$$

$$\begin{array}{r} 15. \quad 7009 \\ \times 504 \\ \hline 28036 \\ \underline{350450} \\ 3532536 \\ \text{or } 3,532,536 \end{array}$$

$$\begin{array}{r} 17. \quad 316 \\ \times 32 \\ \hline 632 \\ \underline{948} \\ 10112 \\ \text{or } 10,112 \end{array}$$

$$\begin{array}{r} 19. \quad 807 \\ \times 111 \\ \hline 807 \\ 807 \\ \underline{807} \\ 89577 \\ \text{or } 89,577 \end{array}$$

C.

$$\begin{array}{r} 1. \quad \$ 75 \\ \times 40 \\ \hline \$ 3000 \end{array}$$

$$\begin{array}{r} 3. \quad 65 \\ \times 20 \\ \hline 1300 \text{ ft} \end{array}$$

$$\begin{array}{r} 5. \quad 50 \\ \times 18 \\ \hline 400 \\ \underline{50} \\ 900 \end{array}$$

$$\begin{array}{r} 100 \\ \times 16 \\ \hline 1600 \end{array}$$

$$\begin{array}{r} 500 \\ \times 11 \\ \hline 500 \\ \underline{500} \\ 5500 \end{array}$$

$$\begin{array}{r} 900 \\ 1600 \\ + 5500 \\ \hline 8000 = \text{total envelopes} \end{array}$$

$$\begin{array}{r} 7. \quad 27 \\ \times 2 \\ \hline 54 \\ \underline{\times 45} \\ 270 \\ \underline{216} \\ 2430 \text{ parts} \end{array}$$

$$\begin{array}{r} 9. \quad 60 \\ \times 4 \\ \hline 240 \\ \underline{\times 5} \\ 1200 \text{ bolts} \end{array}$$

$$\begin{array}{r} 11. \quad 850 \\ \times 9 \\ \hline 7650 \text{ cards} \end{array}$$

$$\begin{array}{r} 13. \quad 60 \\ \times 24 \\ \hline 240 \\ \underline{120} \\ 1440 \text{ min} \end{array}$$

$$\begin{array}{r} 1440 \\ \times 16 \\ \hline 8640 \\ \underline{1440} \\ 23040 \text{ screws or } 23,040 \text{ screws} \end{array}$$

$$\begin{array}{r} 15. \quad 23 \\ \times 5 \\ \hline 115 \text{ in. (or } 9 \text{ ft } 7 \text{ in.)} \end{array}$$

$$\begin{array}{r} 17. \quad 850 \\ \times 25 \\ \hline 4250 \\ \underline{1700} \\ 21250 \text{ ohms or } 21,250 \text{ ohms,} \\ \text{No} \end{array}$$

$$\begin{array}{r} 19. \quad 170 \\ \times 220 \\ \hline 000 \\ 340 \\ \underline{340} \\ 37400 \text{ bu or } 37,400 \text{ bu} \end{array}$$

$$\begin{array}{r} 21. \quad 96 \\ \times 5 \\ \hline 480 \text{ A} \end{array}$$

$$\begin{array}{r}
 23. \quad 176 \\
 \times 500 \\
 \hline
 000 \\
 000 \\
 \hline
 880 \\
 \hline
 88000 \text{ mL or } 88,000 \text{ mL}
 \end{array}$$

$$\begin{array}{r}
 25. \quad \$ 16 \\
 \times 40 \\
 \hline
 00 \\
 64 \\
 \hline
 \$ 640
 \end{array}$$

$$\begin{array}{r}
 \$ 640 \\
 \times 52 \\
 \hline
 1280 \\
 3200 \\
 \hline
 \$ 33280 \text{ or } \$33,280
 \end{array}$$

$$\begin{array}{r}
 27. \quad 250 \\
 \times 60 \\
 \hline
 000 \\
 1500 \\
 \hline
 15000 \text{ gal/hr or } 15,000 \text{ gal/hr}
 \end{array}$$

$$\begin{array}{r}
 15000 \\
 \times 2 \\
 \hline
 30000 \text{ gal or } 30,000 \text{ gal}
 \end{array}$$

D.

1. $\$873 \times 365 = \$318,645$
 $\$1,000,000 - 318,645 = \$681,355$

3. (a)
$$\begin{array}{r}
 111,111,111 \\
 222,222,222 \\
 333,333,333
 \end{array}$$

(b)
$$\begin{array}{r}
 111,111 \\
 222,222 \\
 333,333
 \end{array}$$

(c)
$$\begin{array}{r}
 1 \\
 121 \\
 12,321 \\
 1,234,321 \\
 123,454,321
 \end{array}$$

(d)
$$\begin{array}{r}
 42 \\
 4422 \\
 444,222 \\
 44,442,222 \\
 4,444,422,222
 \end{array}$$

5. $8 \text{ hours/day} \times 5 \text{ days/week} = 40 \text{ hours/week}$

Alpha $117 \times \$6 \times 40 = \$28,080$

Beta $67 \times \$17 \times 40 = \$45,560$

Gamma $29 \times \$32 \times 40 = \$37,120$

Delta $37 \times \$49 \times 40 = \$72,520$

Tau $18 \times \$78 \times 40 = \$56,160$

Exercises 1-4 Division of Whole Numbers**A.**

1.
$$\begin{array}{r}
 9 \\
 7 \overline{)63} \\
 \underline{63} \\
 0
 \end{array}$$

3. Not defined

5.
$$\begin{array}{r}
 10 \text{ r}1 \\
 7 \overline{)71} \\
 \underline{7} \\
 01 \\
 \underline{0} \\
 1
 \end{array}$$

7.
$$\begin{array}{r}
 8 \\
 4 \overline{)32} \\
 \underline{32} \\
 0
 \end{array}$$

$$9. \quad 9 \overline{)54} \begin{array}{r} 6 \\ \underline{54} \end{array}$$

$$11. \quad 7 \overline{)167} \begin{array}{r} 23 \text{ r}6 \\ \underline{14} \\ 27 \\ \underline{21} \\ 6 \end{array}$$

$$13. \quad 6 \overline{)310} \begin{array}{r} 51 \text{ r}4 \\ \underline{30} \\ 10 \\ \underline{6} \\ 4 \end{array}$$

$$15. \quad 7 \overline{)147} \begin{array}{r} 21 \\ \underline{14} \\ 07 \\ \underline{7} \end{array}$$

$$17. \quad 6 \overline{)222} \begin{array}{r} 37 \\ \underline{18} \\ 42 \\ \underline{42} \end{array}$$

$$19. \quad 14 \overline{)322} \begin{array}{r} 23 \\ \underline{28} \\ 42 \\ \underline{42} \end{array}$$

$$21. \quad 24 \overline{)936} \begin{array}{r} 39 \\ \underline{72} \\ 216 \\ \underline{216} \end{array}$$

$$23. \quad 81 \overline{)730} \begin{array}{r} 9 \text{ r}1 \\ \underline{729} \\ 1 \end{array}$$

$$25. \quad 31 \overline{)682} \begin{array}{r} 22 \\ \underline{62} \\ 62 \\ \underline{62} \end{array}$$

$$27. \quad 42 \overline{)371} \begin{array}{r} 8 \text{ r}35 \\ \underline{336} \\ 35 \end{array}$$

B.

$$1. \quad 61 \overline{)7320} \begin{array}{r} 120 \\ \underline{61} \\ 122 \\ \underline{122} \end{array}$$

$$3. \quad 16 \overline{)904} \begin{array}{r} 56 \text{ r}8 \\ \underline{80} \\ 104 \\ \underline{96} \\ 8 \end{array}$$

$$5. \quad 21 \overline{)2016} \begin{array}{r} 96 \\ \underline{189} \\ 126 \\ \underline{126} \end{array}$$

$$7. \quad 9 \overline{)2000} \begin{array}{r} 222 \text{ r}2 \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

$$9. \quad 14 \overline{)4275} \begin{array}{r} 305 \text{ r}5 \\ \underline{42} \\ 075 \\ \underline{70} \\ 5 \end{array}$$

$$11. \quad 53 \overline{)6307} \begin{array}{r} 119 \\ \underline{53} \\ 100 \\ \underline{53} \\ 477 \\ \underline{477} \end{array}$$

$$13. \quad 7 \overline{)3507} \begin{array}{r} 501 \\ \underline{35} \\ 007 \\ \underline{7} \end{array}$$

$$15. \quad 6 \overline{)3624} \begin{array}{r} 604 \\ \underline{36} \\ 024 \\ \underline{24} \end{array}$$

$$17. \quad 15 \overline{)3000} \begin{array}{r} 200 \\ \underline{30} \\ 000 \end{array}$$

$$19. \quad 24 \overline{)2596} \begin{array}{r} 108 \text{ r}4 \\ \underline{24} \\ 196 \\ \underline{192} \\ 4 \end{array}$$

$$21. \quad 38 \overline{)22800} \begin{array}{r} 600 \\ \underline{228} \\ 000 \end{array}$$

$$23. \quad 411 \overline{)42020} \begin{array}{r} 102 \text{ r}98 \\ \underline{411} \\ 920 \\ \underline{822} \\ 98 \end{array}$$

$$25. \quad 111 \overline{)11111} \begin{array}{r} 100 \text{ r}11 \\ \underline{111} \\ 011 \\ \underline{0} \\ 11 \end{array}$$

$$27. \quad 405 \overline{)7008} \begin{array}{r} 17 \text{ r}123 \\ \underline{405} \\ 2958 \\ \underline{2835} \\ 123 \end{array}$$

C.

- | | | |
|----|-------------------------------|---|
| 1. | (a) 1, 2, 3, 6 | (b) $6 = 2 \times 3$ |
| 3. | (a) 1, 19 | (b) prime |
| 5. | (a) 1, 2, 4, 5, 8, 10, 20, 40 | (b) $40 = 2 \times 2 \times 2 \times 5$ |

D.

1.
$$\begin{array}{r} \frac{27}{9} \text{ in.} \\ 9 \overline{)243} \\ \underline{18} \\ 63 \\ \underline{63} \\ 0 \end{array}$$

3.
$$\begin{array}{r} \frac{13}{85} \text{ hr} \\ 85 \overline{)1105} \\ \underline{85} \\ 255 \\ \underline{255} \\ 0 \end{array}$$

5.
$$\begin{array}{r} \frac{27}{16} + 1 = 28 \text{ joists} \\ 16 \overline{)432} \\ \underline{32} \\ 112 \\ \underline{112} \\ 0 \end{array}$$

7.
$$\begin{array}{r} \frac{7}{18} \text{ in.} \\ 18 \overline{)126} \\ \underline{126} \\ 0 \end{array}$$

9.
$$\begin{array}{r} \$ 4696 \\ - 3400 \\ \hline \$ 1296 \end{array}$$

$$\begin{array}{r} \frac{\$72}{18} \text{ per hour} \\ 18 \overline{)1296} \\ \underline{126} \\ 36 \\ \underline{36} \\ 0 \end{array}$$

11.
$$\begin{array}{r} \frac{48}{10} \text{ boxes} \\ 10 \overline{)480} \\ \underline{40} \\ 80 \\ \underline{80} \\ 0 \end{array}$$

13.
$$\begin{array}{r} \frac{27}{500} \text{ reams} \\ 500 \overline{)13500} \\ \underline{1000} \\ 3500 \\ \underline{3500} \\ 0 \end{array}$$

15.
$$\begin{array}{r} \frac{6}{3} \text{ loops} \\ 3 \overline{)18} \\ \underline{18} \\ 0 \end{array}$$

17.
$$\begin{array}{r} \frac{230}{30} \text{ months} \\ 30 \overline{)6900} \\ \underline{60} \\ 90 \\ \underline{90} \\ 0 \\ 0 \end{array}$$

$$\begin{array}{r} \frac{19}{12} \\ 12 \overline{)230} \\ \underline{12} \\ 110 \\ \underline{108} \\ 2 \end{array}$$

19 years, 2 months

19.
$$\begin{array}{r} \frac{250}{200} \text{ minutes} \\ 200 \overline{)50000} \\ \underline{400} \\ 1000 \\ \underline{1000} \\ 0 \\ 0 \end{array}$$

$$\begin{array}{r} \frac{4}{60} \\ 60 \overline{)250} \\ \underline{240} \\ 10 \end{array}$$

4 hr, 10 min

E.

1. (a) $1347 \times 46819 \div 3 = 21,021,731$
 (b) $(76459 + 93008 + 255) \div 378 = 449$
 (c) $(4008 + 408 + 48) \div 48 = 93$
 (d) $9909 \times 9090 \div 3303 = 27,270$
3. $6587 \div 344 = 19.148\dots$ or 20 rivets to be sure
5. $297600 \div 96 = 3100$ min
 $3100 \div 60 = 51.666\dots$ or 51 hr 40 min

7.
$$\begin{array}{r} 42 \text{ hours} \\ 115 \overline{)4830} \\ \underline{460} \\ 230 \\ \underline{230} \\ 0 \end{array}$$

Exercises 1-5 Order of Operations**A.**

1. $2 + 8 \times 6 = 2 + 48 = 50$ 3. $40 - 20 \div 5 = 40 - 4 = 36$
5. $16 \times 3 + 9 = 48 + 9 = 57$ 7. $48 \div 8 - 2 = 6 - 2 = 4$
9. $(5 + 9) \times 3 = 14 \times 3 = 42$ 11. $24 \div (6 - 2) = 24 \div 4 = 6$
13. $16 + 5 \times (3 + 6) = 16 + 5 \times 9 = 16 + 45 = 61$
15. $(23 + 5) \times (12 - 8) = 28 \times 4 = 112$
17. $6 + 4 \times 7 - 3 = 6 + 28 - 3 = 34 - 3 = 31$
19. $5 \times 8 + 6 \div 6 - 12 \times 2 = 40 + 1 - 24 = 41 - 24 = 17$
21. $2 \times (6 + 4 \times 9) = 2 \times (6 + 36) = 2 \times 42 = 84$
23. $(4 \times 3 + 8) \div 5 = (12 + 8) \div 5 = 20 \div 5 = 4$
25. $8 - 4 + 2 = 4 + 2 = 6$ 27. $18 \times 10 \div 5 = 180 \div 5 = 36$
29. $12 - 7 - 3 = 5 - 3 = 2$ 31. $12 - (7 - 3) = 12 - 4 = 8$
33. $\frac{36}{9} + \frac{27}{3} = 4 + 9 = 13$ 35. $\frac{44 + 12}{11 - 3} = \frac{56}{8} = 7$
37. $\frac{6 + 12 \times 4}{15 - 3 \times 2} = \frac{6 + 48}{15 - 6} = \frac{54}{9} = 6$

$$39. \quad \frac{12+6}{3+6} + \frac{24}{6} - 6 \div 6 = \frac{18}{9} + 4 - 1 = 2 + 4 - 1 = 6 - 1 = 5$$

B.

$$1. \quad 3 \times \$34 + 5 \times \$39 = \$102 + \$195 = \$297$$

$$3. \quad 12 \times \$25 - 3 \times \$6 = \$300 - \$18 = \$282$$

$$5. \quad \begin{aligned} \text{Cost} &= 2 \times \$12 \times 40 + 3 \times \$20 \times 40 + \$3240 + \$500 \\ &= \$960 + \$2400 + \$3240 + \$500 \\ &= \$7100 \end{aligned}$$

$$7. \quad 33 \times \$80 + 12 \times \$40 + 45 \times \$18 = \$2640 + \$480 + \$810 = \$3930$$

$$9. \quad \begin{aligned} \text{China: } &51 \times 5 + 21 \times 3 + 28 \times 1 = 255 + 63 - 28 = 346 \text{ points} \\ \text{U.S.: } &36 \times 5 + 38 \times 3 + 36 \times 1 = 180 + 114 + 36 = 330 \text{ points} \\ &\text{China "won."} \end{aligned}$$

$$11. \quad \begin{array}{r} 8 \text{ gal} \\ 22 \overline{)176} \\ \underline{176} \\ 0 \end{array}$$

$$\begin{array}{r} 6 \text{ gal} \\ 30 \overline{)180} \\ \underline{180} \\ 0 \end{array}$$

$$8 \text{ gal} + 6 \text{ gal} = 14 \text{ gal}$$

C.

$$1. \quad 462 + 83 \times 95 = 462 + 7885 = 8347$$

$$3. \quad 7482 - 1152 \div 12 = 7482 - 96 = 7386$$

$$5. \quad (268 + 527) \div 159 = 795 \div 159 = 5$$

$$7. \quad 612 + 86 \times 9 - 1026 \div 38 = 612 + 774 - 27 = 1359$$

$$9. \quad 3579 - 16 \times (72 + 46) = 3579 - 16 \times 118 = 3579 - 1888 = 1691$$

$$11. \quad 864 \div 16 \times 27 = 54 \times 27 = 1458$$

$$13. \quad (296 + 18 \times 48) \times 12 = (296 + 864) \times 12 = 1160 \times 12 = 13,920$$

$$15. \quad (3297 + 1858 - 493) \div (48 \times 16 - 694) = 63$$

Problem Set 1**A.**

1. Five hundred ninety-three
3. Forty-five thousand, two hundred six
5. Two million, four hundred three thousand, five hundred sixty
7. Ten thousand twenty
9. 408 11. 230,056 13. 64,700
15. 690 17. 18,000 19. 700,000

B.

1.
$$\begin{array}{r} 24 \\ + 69 \\ \hline 93 \end{array}$$
3.
$$\begin{array}{r} 456 \\ + 72 \\ \hline 528 \end{array}$$
5.
$$\begin{array}{r} 396 \\ + 538 \\ \hline 934 \end{array}$$
7.
$$\begin{array}{r} 43 \\ - 28 \\ \hline 15 \end{array}$$
9.
$$\begin{array}{r} 734 \\ - 85 \\ \hline 649 \end{array}$$
11.
$$\begin{array}{r} 543 \\ - 348 \\ \hline 195 \end{array}$$
13.
$$\begin{array}{r} 376 \\ \times 4 \\ \hline 1504 \end{array}$$
15.
$$\begin{array}{r} 67 \\ \times 21 \\ \hline 67 \\ 134 \\ \hline 1407 \end{array}$$
17.
$$\begin{array}{r} 207 \\ \times 63 \\ \hline 621 \\ 1242 \\ \hline 13041 \text{ or } 13,041 \end{array}$$
19.
$$\begin{array}{r} 5,236 \\ \times 44 \\ \hline 20944 \\ 20944 \\ \hline 230384 \text{ or } 230,384 \end{array}$$
21.
$$\begin{array}{r} 37 \\ 7 \overline{)259} \\ \underline{21} \\ 49 \\ \underline{49} \\ 0 \end{array}$$
23.
$$\begin{array}{r} 57 \\ 42 \overline{)2394} \\ \underline{210} \\ 294 \\ \underline{294} \\ 0 \end{array}$$
25.
$$\begin{array}{r} 9 \\ 160 \overline{)1440} \\ \underline{1440} \\ 0 \end{array}$$
27.
$$\begin{array}{r} 18 \\ 73 \overline{)1314} \\ \underline{73} \\ 584 \\ \underline{584} \\ 0 \end{array}$$
29.
$$\frac{36 \times 91}{13 \times 42} = \frac{3276}{546}$$

$$= 546 \overline{)3276}$$

$\begin{array}{r} 36 \\ \times 91 \\ \hline 36 \\ 324 \\ \hline 3276 \end{array}$	$\begin{array}{r} 42 \\ \times 13 \\ \hline 126 \\ 42 \\ \hline 546 \end{array}$
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31. $120 - 40 \div 8 = 120 - 5 = 115$
33. $3 \times 4 - 15 \div 3 = 12 - 5 = 7$
35.
$$\begin{array}{r} 308 \\ 793 \\ \hline 144 \\ \hline 1245 \end{array}$$

C.

1. (a) 1, 2, 4, 8, (b) $8 = 2 \times 2 \times 2$
 3. (a) 1, 31 (b) prime
 5. (a) 1, 2, 3, 4, 6, 9, 12, 18, 36 (b) $36 = 2 \times 2 \times 3 \times 3$

D.

1. $6 \text{ ft} + 8 \text{ ft} + 20 \text{ ft} + 9 \text{ ft} = 43 \text{ ft}$
 3. $346 + 210 + 4 \times 164 + 2 \times 96 + 208 + 280 = 1892 \text{ sq ft}$

5.
$$\begin{array}{r} 6 \\ 35 \overline{)210} \\ \underline{210} \end{array}$$

7.
$$\begin{array}{r} 210 \\ 215 \\ 245 \\ 217 \\ 220 \\ 227 \\ \underline{115} \\ 1449 \end{array}$$

$$\begin{array}{r} 207 \text{ lb average} \\ 7 \overline{)1449} \\ \underline{14} \\ 049 \\ \underline{49} \end{array}$$

9. $\$500 + 12 \times \$110 = \$500 + \$1320 = \boxed{\$1820}$

$$\begin{array}{r} \$110 \\ \times 12 \\ \hline 220 \\ \underline{110} \\ \$1320 \end{array}$$

11.
$$\begin{array}{r} 136 \\ - 107 \\ \hline 29 \text{ psi, Yes} \end{array}$$

13.
$$\begin{array}{r} 39000 \text{ gal per hour} \\ 4 \overline{)156000} \\ \underline{12} \\ 36 \\ \underline{36} \end{array}$$

$$\begin{array}{r} 650 \text{ gal per min} \\ 60 \overline{)39000} \\ \underline{360} \\ 300 \\ \underline{300} \end{array}$$

15. $167 \times 17 = 2839 \text{ lb}$

17. $\frac{3}{4} \times 32 = 24 \text{ hours}$
 Note: $45 \text{ min} = \frac{3}{4} \text{ hr}$

19.
$$\begin{array}{r} 380 \\ \times 231 \\ \hline 380 \\ 1140 \\ \underline{760} \\ 87780 \text{ or } 87,780 \text{ cu in.} \end{array}$$

21.
$$\begin{array}{r} 506409 \\ - 460089 \\ \hline 46320 \text{ or } 46,320 \text{ in } 4 \text{ hr} \end{array}$$

$$\begin{array}{r} 11580 \text{ rph} \\ 4 \overline{)46320} \end{array}$$

$$\begin{array}{r} 193 \text{ rpm} \\ 60 \overline{)11580} \\ \underline{60} \\ 558 \\ \underline{540} \\ 180 \\ \underline{180} \end{array}$$

23.
$$\begin{array}{r} 18 \\ - 6 \\ \hline 12 \end{array}$$
 $12 \div 2 = 6$ ft from each wall

25. $\$85 \times 36 + \$350 = \$3060 + \$350 = \$3410$
 $\$3410 - \$3300 = \$110$

27. Cost = $\$20 \times \$3 + 30 \times \$4 + (87 - 50) \times \5
 $= 20 \times \$3 + 30 \times \$4 + 37 \times \$5$
 $= \$60 + \$120 + \$185$
 $= \$365$

29. (a) $95 \div 19 + 300 \div 25 = 5 + 12 = 17$ gal
 (b) $17 \times \$4 = \68

31.
$$\begin{array}{r} 220 \\ \times 13 \\ \hline 660 \\ \underline{220} \\ 2860 \text{ calories} \end{array}$$

33. Hybrid

$$\begin{array}{r} \$ 26915 \\ + 3876 \\ \hline \$ 30791 \\ - 17718 \\ \hline \$ 13073 \text{ or } \$13,073 \end{array}$$

Non-Hybrid

$$\begin{array}{r} \$ 24718 \\ + 4291 \\ \hline \$ 29639 \\ - 15214 \\ \hline \$ 14425 \text{ or } \$14,425 \end{array}$$

$\$ 14425$
 $\underline{-13073}$
 $\$ 1352$

The 3-year cost of the hybrid is lower by \$1352

35.
$$\begin{array}{r} 24 \text{ bushels} \\ 32 \overline{)768} \\ \underline{64} \\ 128 \\ \underline{128} \\ 0 \end{array}$$

CHAPTER 2 FRACTIONS

Preview 2

1. (a) $\frac{31}{4} = 4\frac{7}{4} = 7\frac{3}{4}$ (b) $3\frac{7}{8} = \frac{8 \times 3 + 7}{8} = \frac{24 + 7}{8} = \frac{31}{8}$
- (c) $\frac{5}{16} \times \frac{4}{4} = \frac{20}{64}$ (d) $1\frac{3}{4} = \frac{7}{4}, \frac{7}{4} \times \frac{8}{8} = \frac{56}{32}$
- (e) $\frac{10}{64} = \frac{5}{32}$ (f) $1\frac{7}{8} = \frac{15}{8} = \frac{45}{24}, \frac{5}{3} = \frac{40}{24}; 1\frac{7}{8}$ is larger
3. (a) $\frac{7}{16} + \frac{3}{16} = \frac{10}{16} = \frac{5}{8}$ (b) $1\frac{3}{16} + \frac{3}{4} = \frac{19}{16} + \frac{12}{16} = \frac{31}{16} = 1\frac{15}{16}$
- (c) $\frac{3}{4} - \frac{1}{5} = \frac{15}{20} - \frac{4}{20} = \frac{11}{20}$ (d) $4 - 1\frac{5}{16} = \frac{64}{16} - \frac{21}{16} = \frac{43}{16} = 2\frac{11}{16}$

Exercises 2-1 Working with Fractions

A.

1. $2\frac{1}{3} = \frac{7}{3}$ 3. $8\frac{3}{8} = \frac{67}{8}$ 5. $2\frac{7}{8} = \frac{23}{8}$
7. $2\frac{2}{3} = \frac{8}{3}$ 9. $4\frac{5}{6} = \frac{29}{6}$

B.

1. $\frac{17}{2} = 8\frac{1}{2}$ 3. $\frac{11}{8} = 1\frac{3}{8}$ 5. $\frac{3}{2} = 1\frac{1}{2}$
7. $\frac{100}{6} = 16\frac{4}{6} = 16\frac{2}{3}$ 9. $\frac{80}{32} = 2\frac{16}{32} = 2\frac{1}{2}$

C.

1. $\frac{12}{16} = \frac{3}{4}$ 3. $\frac{6}{16} = \frac{3}{8}$ 5. $\frac{4}{10} = \frac{2}{5}$ 7. $\frac{24}{30} = \frac{4}{5}$

9. $4\frac{3}{12} = 4\frac{1}{4}$

11. $\frac{42}{64} = \frac{21}{32}$

13. $\frac{15}{36} = \frac{5}{12}$

15. $\frac{38}{24} = \frac{19}{12}$

D.

1. $\frac{7}{8} = \frac{14}{16}$

3. $\frac{1}{8} = \frac{8}{64}$

5. $1\frac{1}{4} = \frac{5}{4} = \frac{20}{16}$

7. $3\frac{3}{5} = \frac{18}{5} = \frac{36}{10}$

9. $1\frac{40}{60} = 1\frac{2}{3} = \frac{5}{3}$

11. $2\frac{5}{8} = \frac{21}{8} = \frac{42}{16}$

E.

1. $\frac{3}{5} = \frac{21}{35}$, $\frac{4}{7} = \frac{20}{35}$; $\frac{3}{5}$ is larger

3. $1\frac{1}{2} = 1\frac{7}{14}$, $1\frac{3}{7} = 1\frac{6}{14}$; $1\frac{1}{2}$ is larger

5. $\frac{7}{8} = \frac{21}{24}$, $\frac{5}{6} = \frac{20}{24}$; $\frac{7}{8}$ is larger

7. $1\frac{2}{5} = \frac{7}{5} = \frac{28}{20}$, $\frac{6}{4} = \frac{30}{20}$; $\frac{6}{4}$ is larger

9. $\frac{13}{5} = \frac{26}{10}$, $\frac{5}{2} = \frac{25}{10}$; $\frac{13}{5}$ is larger

11. $\frac{3}{8} = \frac{9}{24}$, $\frac{5}{12} = \frac{10}{24}$; $\frac{5}{12}$ is larger

F.

1. $15\frac{6}{8} = 15\frac{3}{4}$ in.

3. $\frac{22}{7} = \frac{34,320}{10,920}$, $\frac{19}{6} = \frac{34,580}{10,920}$, $\frac{47}{15} = \frac{34,216}{10,920}$, $\frac{25}{8} = \frac{34,125}{10,920}$
 $\frac{41}{13} = \frac{34,440}{10,920}$; $\frac{19}{6}$ is largest approximation; $\frac{25}{8}$ is smallest approximation.

5. $\frac{7}{8}$ in. = $\frac{28}{32}$ in.; it is not possible to have an inner diameter of $\frac{29}{32}$ in.

7. $15 - 6 = 9$, $\frac{9}{15} = \frac{3}{5}$ will remain

9. $\frac{12}{60} = \frac{1}{5}$ fertilizer in final mixture

11. $\frac{3}{4} = \frac{24}{32}$ $\frac{11}{16} = \frac{22}{32}$

Try $\frac{23}{32}$ in.

Exercises 2-2 Multiplication of Fractions

A.

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

3. $\frac{\cancel{4}}{5} \times \frac{1}{\cancel{5}} = \frac{2}{15}$

5. $\frac{8}{\cancel{3}} \times \frac{1}{\cancel{3}} = \frac{8}{3} = 2\frac{2}{3}$

7. $\frac{\cancel{8}}{3} \times \frac{5}{\cancel{12}} = \frac{10}{9} = 1\frac{1}{9}$

9. $\frac{\cancel{12}}{8} \times \frac{15}{\cancel{9}} = \frac{5}{2} = 2\frac{1}{2}$

11. $4\frac{1}{2} \times \frac{2}{3} = \frac{\cancel{9}}{2} \times \frac{\cancel{2}}{\cancel{3}} = 3$

13. $2\frac{1}{6} \times 1\frac{1}{2} = \frac{13}{\cancel{6}} \times \frac{\cancel{2}}{2} = \frac{13}{4} = 3\frac{1}{4}$

15. $4\frac{3}{5} \times 15 = \frac{23}{\cancel{5}} \times \frac{3}{\cancel{15}} = 69$

17. $34 \times 2\frac{3}{17} = \frac{34}{1} \times \frac{37}{\cancel{17}} = 74$

19. $11\frac{6}{7} \times \frac{7}{8} = \frac{83}{\cancel{7}} \times \frac{\cancel{7}}{8} = \frac{83}{8} = 10\frac{3}{8}$

21. $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

23. $\frac{1}{\cancel{4}} \times \frac{\cancel{2}}{3} \times \frac{\cancel{2}}{5} = \frac{1}{15}$

25. $\frac{\cancel{2}}{\cancel{2}} \times \frac{\cancel{2}}{\cancel{2}} \times 2 = 2$

B.

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

3. $\frac{\cancel{2}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{4}} = \frac{1}{2}$

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

7. $\frac{5}{8} \times 2\frac{1}{10} = \frac{5}{8} \times \frac{21}{10} = \frac{21}{16} = 1\frac{5}{16}$

9. $\frac{\cancel{4}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{4}} = 1$

11. $\frac{7}{8} \times 1\frac{1}{5} = \frac{7}{8} \times \frac{6}{5} = \frac{21}{20} = 1\frac{1}{20}$

13. $\frac{7}{16} \times \frac{3}{8} = \frac{21}{128} = 2\frac{5}{8}$

15. $\frac{3}{8} \times 2\frac{2}{3} = \frac{3}{8} \times \frac{8}{3} = 1$

C.

1. $38 \times 3\frac{5}{8} = \frac{19}{\cancel{4}} \times \frac{29}{\cancel{8}} = \frac{551}{4} = 137\frac{3}{4}$ in.

3. $\frac{5}{12} \times 2\frac{7}{8} = \frac{35}{3} = 11\frac{2}{3}$ ft

5. $28\frac{1}{4} \times 6 = \frac{113}{\cancel{4}} \times \frac{3}{\cancel{2}} = \frac{339}{2} = 169\frac{1}{2}$ in., or 14 ft $1\frac{1}{2}$ in.

7. $22\frac{3}{4} \times 14 = \frac{91}{\cancel{4}} \times \frac{14}{1} = \frac{637}{2} = 318\frac{1}{2}$ mi

9. $46\frac{1}{2} \times 7\frac{2}{3} = \frac{93}{2} \times \frac{23}{\cancel{3}} = \frac{713}{2} = 356\frac{1}{2}$ lb

11. $18 \times \frac{1}{20} = \frac{9}{10}$ in.

13. $\frac{3}{\cancel{8}} \times 2\frac{13}{6} = \frac{39}{4} = 9\frac{3}{4}$ in.

$$15. \quad 45 \times 6 \frac{3}{4} = 45 \times \frac{27}{4} = \frac{1,215}{4} = 303 \frac{3}{4} + 45 = 348 \frac{3}{4} \text{ min}$$

$$17. \quad \frac{1}{\cancel{6}} \times \frac{32}{\cancel{64}} = \frac{32}{3} = 10 \frac{2}{3} \text{ hr}$$

$$19. \quad 6 \frac{3}{4} \times \frac{4}{5} = \frac{27}{\cancel{4}} \times \frac{\cancel{4}}{5} = \frac{27}{5} = 5 \frac{2}{5} \text{ in.}$$

$$21. \quad 6 \times 3 \frac{3}{4} = \cancel{6} \times \frac{15}{\cancel{2}} = \frac{45}{2} = 22 \frac{1}{2} \text{ picas}$$

$$23. \quad 12 \times 2 \frac{1}{4} + 11 \times \frac{3}{8} = \cancel{12} \times \frac{9}{\cancel{4}} + \frac{33}{8} = 27 + 4 \frac{1}{8} = 31 \frac{1}{8} \text{ in.}$$

$$25. \quad \frac{13}{\cancel{26}} \times \frac{1}{\cancel{8}} = \frac{13}{4} = 3 \frac{1}{4} \text{ in.}$$

$$27. \quad 2 \frac{1}{2} \times \frac{3}{16} = \frac{5}{2} \times \frac{3}{16} = \frac{15}{32} \text{ in.}$$

$$29. \quad 4 \frac{5}{8} \times 2 = \frac{37}{\cancel{8}} \times \frac{\cancel{2}}{1} = \frac{37}{4} = 9 \frac{1}{4} \text{ pounds}$$

$$31. \quad 15 \frac{1}{2} \times \frac{1}{4} = \frac{31}{2} \times \frac{1}{4} = \frac{31}{8} = 3 \frac{7}{8} \text{ in.}$$

$$33. \quad 6 \frac{1}{6} \times 12 = \frac{37}{\cancel{6}} \times \frac{\cancel{12}}{1} = 74 \text{ pairs}$$

Exercises 2-3 Division of Fractions

A.

$$1. \quad \frac{5}{6} \div \frac{1}{2} = \frac{5}{\cancel{6}} \times \frac{\cancel{2}}{1} = \frac{5}{3} = 1 \frac{2}{3}$$

$$3. \quad \frac{5}{12} \div \frac{4}{3} = \frac{5}{\cancel{12}} \times \frac{\cancel{3}}{4} = \frac{5}{16}$$

$$5. \quad \frac{6}{16} \div \frac{3}{4} = \frac{\cancel{6}}{\cancel{16}} \times \frac{\cancel{4}}{\cancel{3}} = \frac{1}{2}$$

$$7. \quad \frac{3}{16} \div \frac{6}{8} = \frac{\cancel{3}}{\cancel{16}} \times \frac{\cancel{8}}{\cancel{6}} = \frac{1}{4}$$

$$9. \quad 1\frac{1}{2} \div \frac{1}{6} = \frac{3}{2} \div \frac{1}{6} = \frac{3}{\cancel{2}} \times \frac{\cancel{6}}{1} = 9$$

$$11. \quad 3\frac{1}{7} \div 2\frac{5}{14} = \frac{22}{7} \div \frac{33}{14} = \frac{\cancel{22}}{7} \times \frac{\cancel{14}}{\cancel{33}} = \frac{4}{3} = 1\frac{1}{3}$$

$$13. \quad 6\frac{2}{5} \div 5\frac{1}{3} = \frac{32}{5} \div \frac{16}{3} = \frac{\cancel{32}}{5} \times \frac{3}{\cancel{16}} = \frac{6}{5} = 1\frac{1}{5}$$

$$15. \quad 8 \div \frac{1}{2} = 8 \times \frac{2}{1} = 16$$

$$17. \quad 12 \div \frac{2}{3} = \cancel{12} \times \frac{3}{\cancel{2}} = 18$$

$$19. \quad 5 \div \frac{2}{3} = 5 \times \frac{3}{2} = \frac{15}{2} = 7\frac{1}{2}$$

$$21. \quad \frac{5}{16} \div \frac{3}{8} = \frac{5}{\cancel{16}} \times \frac{\cancel{8}}{3} = \frac{5}{6}$$

$$23. \quad \frac{7}{23} \div 1\frac{3}{4} = \frac{7}{32} \div \frac{7}{4} = \frac{\cancel{7}}{\cancel{32}} \times \frac{\cancel{4}}{\cancel{7}} = \frac{1}{8}$$

B.

$$1. \quad 4 \div \frac{1}{2} = 4 \times \frac{2}{1} = 8 \text{ ft}$$

$$3. \quad 222 \div 4\frac{5}{8} = 222 \div \frac{37}{8} = \frac{\cancel{222}}{\cancel{37}} \times \frac{8}{1} = 48 \text{ boards}$$

$$5. \quad 4 \div \frac{1}{2} = 4 \times \frac{2}{1} = 8 \text{ pieces}$$

$$7. \quad 47\frac{1}{4} \div 2\frac{5}{8} = \frac{189}{4} \div \frac{21}{8} = \frac{\cancel{189}}{\cancel{21}} \times \frac{\cancel{8}}{\cancel{21}} = 18 \text{ courses of brick}$$

$$9. \quad 40 \div 6\frac{1}{4} = 40 \div \frac{25}{4} = \cancel{40} \times \frac{4}{\cancel{25}} = \frac{32}{5} = 6\frac{2}{5} = 6 \times 35 = 210 \text{ pieces}$$

$$11. \quad 24\frac{3}{4} \div 3\frac{1}{2} = \frac{99}{4} \div \frac{7}{2} = \frac{\cancel{99}}{\cancel{7}} \times \frac{\cancel{2}}{\cancel{14}} = \frac{99}{14} = 7\frac{1}{14}; \text{ 7 full sheets can be cut}$$

$$13. \quad 2\frac{1}{2} \div \frac{1}{18} = \frac{5}{2} \times \frac{18}{1} = 45 \text{ threads}$$

$$15. \quad 106\frac{1}{2} \text{ sq ft} \div \frac{3}{8} = \frac{213}{2} \times \frac{8}{3} \text{ sq ft} = 284 \text{ sq ft}$$

$$17. \quad \frac{7}{16} \div 3\frac{1}{2} = \frac{7}{16} \div \frac{7}{2} = \frac{7}{16} \times \frac{2}{7} = \frac{1}{8} \text{ in. per year}$$

$$19. \quad 1\frac{1}{8} \div \frac{3}{16} = \frac{9}{8} \times \frac{16}{3} = 6 \text{ washers}$$

Exercises 2-4 Addition and Subtraction of Fractions

A.

$$1. \quad \frac{1}{16} + \frac{3}{16} = \frac{4}{16} = \frac{1}{4}$$

$$3. \quad \frac{5}{16} + \frac{7}{16} = \frac{12}{16} = \frac{3}{4}$$

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

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

$$9. \quad \frac{5}{16} + \frac{3}{16} + \frac{7}{16} = \frac{15}{16}$$

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

$$13. \quad \frac{1}{4} + \frac{1}{2} = \frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

$$15. \quad \frac{5}{8} + \frac{1}{12} = \frac{15}{24} + \frac{2}{24} = \frac{17}{24}$$

$$17. \quad \frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8} = \frac{1}{8}$$

$$19. \quad \frac{15}{16} - \frac{1}{2} = \frac{15}{16} - \frac{8}{16} = \frac{7}{16}$$

$$21. \quad \frac{3}{5} + \frac{1}{8} = \frac{24}{40} + \frac{5}{40} = \frac{29}{40}$$

$$23. \quad \frac{7}{8} - \frac{2}{5} = \frac{35}{40} - \frac{16}{40} = \frac{19}{40}$$

$$25. \quad \frac{1}{2} + \frac{1}{4} - \frac{1}{8} = \frac{4}{8} + \frac{2}{8} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$$

$$27. \quad 1\frac{1}{2} + \frac{1}{4} = \frac{3}{2} + \frac{1}{4} = \frac{6}{4} + \frac{1}{4} = \frac{7}{4} = 1\frac{3}{4}$$

$$29. \quad 2\frac{1}{2} + 1\frac{5}{8} = \frac{5}{2} + \frac{13}{8} = \frac{20}{8} + \frac{13}{8} = \frac{33}{8} = 4\frac{1}{8}$$

$$31. \quad 2\frac{1}{3} + \frac{1}{5} = \frac{7}{3} + \frac{6}{5} = \frac{35}{15} + \frac{18}{15} = \frac{53}{15} = 3\frac{8}{15}$$

$$33. \quad 4\frac{1}{8} - 1\frac{3}{4} = \frac{33}{8} - \frac{7}{4} = \frac{33}{8} - \frac{14}{8} = \frac{19}{8} = 2\frac{3}{8}$$

$$35. \quad 3\frac{1}{5} - 2\frac{1}{12} = \frac{16}{5} - \frac{25}{12} = \frac{192}{60} - \frac{125}{60} = \frac{67}{60} = 1\frac{7}{60}$$

B.

$$1. \quad \frac{8}{1} - 2\frac{7}{8} = \frac{64}{8} - \frac{23}{8} = \frac{41}{8} = 5\frac{1}{8}$$

$$3. \quad 3\frac{5}{8} - \frac{13}{16} = \frac{29}{8} - \frac{13}{16} = \frac{58}{16} - \frac{13}{16} = \frac{45}{16} = 2\frac{13}{16}$$

$$5. \quad \frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{4}{8} + \frac{2}{8} + \frac{1}{8} = \frac{7}{8}$$

$$7. \quad \frac{7}{8} + \frac{5}{2} - \frac{5}{4} = \frac{7}{8} + \frac{20}{8} - \frac{10}{8} = \frac{27}{8} - \frac{10}{8} = \frac{17}{8} = 2\frac{1}{8}$$

$$9. \quad 4\frac{7}{8} - 2\frac{3}{16} = \frac{39}{8} - \frac{35}{16} = \frac{78}{16} - \frac{35}{16} = \frac{43}{16} = 2\frac{11}{16}$$

$$11. \quad 6\frac{1}{2} - 2\frac{3}{5} = \frac{13}{2} - \frac{13}{5} = \frac{65}{10} - \frac{26}{10} = \frac{39}{10} = 3\frac{9}{10}$$

C.

$$1. \quad \frac{1}{4} + \frac{5}{8} + 5\frac{3}{4} + \frac{1}{2} + 1\frac{1}{4} + \frac{5}{8} \text{ in.} = \frac{2}{8} + \frac{5}{8} + \frac{46}{8} + \frac{4}{8} + \frac{10}{8} + \frac{5}{8} \text{ in.} = \frac{72}{8} \text{ in.} = 9 \text{ in.}$$

$$3. \quad 46\frac{3}{8} - 34\frac{3}{4} \text{ in.} = 45\frac{11}{8} - 34\frac{6}{8} \text{ in.} = 11\frac{5}{8} \text{ in.}$$

$$5. \quad 1\frac{5}{16} + \frac{2}{8} = \frac{21}{16} + \frac{4}{16} = \frac{25}{16} = 1\frac{9}{16} \text{ in.}$$

$$7. \quad 6\frac{1}{2} + 5\frac{3}{4} + 3\frac{1}{4} + 4\frac{3}{4} + 5 = 6\frac{2}{4} + 5\frac{3}{4} + 3\frac{1}{4} + 4\frac{3}{4} + 5 = 23 + \frac{9}{4} = 25\frac{1}{4} \text{ c.i.}$$

$$9. \quad 1\frac{1}{2} - \frac{6}{16} = \frac{3}{2} - \frac{6}{16} = \frac{24}{16} - \frac{6}{16} = \frac{18}{16} = 1\frac{2}{16} = 1\frac{1}{8} \text{ in.}$$

11. $5\frac{3}{8} + 8\frac{1}{4} + 6\frac{9}{16} + 2\frac{5}{8} + \frac{1}{2} = 5\frac{6}{16} + 8\frac{4}{16} + 6\frac{9}{16} + 2\frac{10}{16} + \frac{8}{16} = 21\frac{37}{16} = 21 + 2\frac{5}{16} = 23\frac{5}{16}$ in.
13. $18\frac{5}{8} - \left(9\frac{1}{4} + 6\frac{7}{16} + \frac{2}{16}\right) = 18\frac{10}{16} - \left(9\frac{4}{16} + 6\frac{7}{16} + \frac{2}{16}\right) = 18\frac{10}{16} - 15\frac{13}{16} = \frac{298}{16} - \frac{253}{16} = \frac{45}{16}$ in. remain
15. $101\frac{1}{4} - 100\frac{7}{8}$ in. $= \frac{405}{4}$ in. $- \frac{807}{8}$ in. $= \frac{810}{8}$ in. $- \frac{807}{8}$ in. $= \frac{3}{8}$ in.
17. $8\frac{1}{4} - \frac{1}{2} = \frac{33}{4} - \frac{2}{4} = \frac{31}{4} = 7\frac{3}{4}$ in.; $6\frac{3}{4} - \frac{1}{4} = 6\frac{1}{2}$ in.
Finished size is $7\frac{3}{4}$ in. \times $6\frac{1}{2}$ in.
19. $2\frac{15}{16} - 2\frac{3}{8} = 2\frac{15}{16} - 2\frac{6}{16} = \frac{9}{16}$ in.
21. $4\frac{5}{8}$ in. $- \frac{7}{64}$ in. $= 4\frac{40}{64}$ in. $- \frac{7}{64}$ in. $= 4\frac{33}{64}$ in.
23. $5\frac{1}{4}$ qt $- 4\frac{1}{2}$ qt $= \frac{21}{4} - \frac{9}{2} = \frac{21}{4} - \frac{18}{4} = \frac{3}{4}$ qt
25. $9 - 4\frac{1}{3} = \frac{27}{3} - \frac{13}{3} = \frac{14}{3} = 4\frac{2}{3}$ cu yd remaining in the truck

Problem Set 2

A.

- | | | | | | |
|-----|---|-----|--|-----|--|
| 1. | $1\frac{1}{8} = \frac{9}{8}$ | 3. | $1\frac{2}{3} = \frac{5}{3}$ | 5. | $3\frac{3}{32} = \frac{99}{32}$ |
| 7. | $1\frac{5}{8} = \frac{13}{8}$ | 9. | $\frac{10}{4} = 2\frac{2}{4} = 2\frac{1}{2}$ | 11. | $\frac{25}{3} = 8\frac{1}{3}$ |
| 13. | $\frac{25}{16} = 1\frac{9}{16}$ | 15. | $\frac{35}{4} = 8\frac{3}{4}$ | 17. | $\frac{\cancel{3}}{\cancel{3}\cancel{2}} = \frac{3}{16}$
16 |
| 19. | $\frac{\cancel{12}}{\cancel{3}\cancel{2}} = \frac{3}{8}$
8 | 21. | $\frac{\cancel{5}}{\cancel{3}\cancel{0}} = \frac{1}{6}$
6 | 23. | $1\frac{16}{20} = 1\frac{4}{5}$ |
| 25. | $\frac{3}{4} = \frac{9}{12}$ | 27. | $2\frac{3}{4} = \frac{11}{4} = \frac{44}{16}$ | 29. | $5\frac{2}{3} = \frac{17}{3} = \frac{68}{12}$ |

31. $1\frac{1}{4} = \frac{5}{4} = \frac{15}{12}$

33. $\frac{7}{16} = \frac{105}{240}, \frac{2}{15} = \frac{32}{240}; \frac{7}{16}$ is larger

35. $\frac{13}{16}, \frac{7}{8} = \frac{14}{16}; \frac{7}{8}$ is larger

37. $\frac{13}{32} = \frac{65}{160}, \frac{3}{5} = \frac{96}{160}; \frac{3}{5}$ is larger

39. $1\frac{7}{16}, 1\frac{3}{4} = 1\frac{12}{16}; \frac{7}{16}$ is larger

B.

1. $\frac{1}{2} \times \frac{3}{16} = \frac{3}{32}$

3. $\frac{7}{16} \times \frac{1}{3} = \frac{7}{48}$

5. $1\frac{1}{2} \times \frac{5}{6} = \frac{2}{2} \times \frac{5}{6} = \frac{5}{3} = 1\frac{2}{3}$

7. $\frac{5}{16} \times \frac{5}{4} = \frac{25}{64}$

9. $\frac{3}{2} \times \frac{5}{2} = \frac{15}{2} = 7\frac{1}{2}$

11. $18 \times 1\frac{1}{2} = 18 \times \frac{3}{2} = 27$

13. $2\frac{2}{3} \times 4\frac{3}{8} = \frac{8}{3} \times \frac{35}{8} = \frac{35}{3} = 11\frac{2}{3}$

15. $\frac{1}{2} \div \frac{1}{4} = \frac{1}{2} \times \frac{4}{1} = 2$

17. $4 \div \frac{1}{8} = \frac{4}{1} \times \frac{8}{1} = 32$

19. $\frac{2}{3} \div 4 = \frac{2}{3} \times \frac{1}{4} = \frac{1}{6}$

21. $3\frac{1}{2} \div 5 = \frac{7}{2} \times \frac{1}{5} = \frac{7}{10}$

23. $2\frac{3}{4} \div 1\frac{1}{8} = \frac{11}{4} \div \frac{9}{8} = \frac{11}{4} \times \frac{8}{9} = \frac{22}{9} = 2\frac{4}{9}$

C.

1. $\frac{3}{8} + \frac{7}{8} = \frac{10}{8} = 1\frac{2}{8} = 1\frac{1}{4}$

3. $\frac{3}{32} + \frac{1}{8} = \frac{3}{32} + \frac{4}{32} = \frac{7}{32}$

5. $\frac{3}{5} + \frac{5}{6} = \frac{18}{30} + \frac{25}{30} = \frac{43}{30} = 1\frac{13}{30}$

7. $\frac{9}{16} - \frac{3}{16} = \frac{6}{16} = \frac{3}{8}$

9. $\frac{11}{16} - \frac{1}{4} = \frac{11}{16} - \frac{4}{16} = \frac{7}{16}$

11. $\frac{7}{8} - \frac{3}{10} = \frac{35}{40} - \frac{12}{40} = \frac{23}{40}$

13. $2\frac{1}{8} + 1\frac{1}{4} = \frac{17}{8} + \frac{5}{8} = \frac{17}{8} + \frac{10}{8} = \frac{27}{8} = 3\frac{3}{8}$

15. $6 - 1\frac{1}{2} = \frac{6}{1} - \frac{3}{2} = \frac{12}{2} - \frac{3}{2} = \frac{9}{2} = 4\frac{1}{2}$

17. $3\frac{2}{3} - 1\frac{7}{8} = \frac{11}{3} - \frac{15}{8} = \frac{88}{24} - \frac{45}{24} = \frac{43}{24} = 1\frac{19}{24}$

19. $\frac{1}{2} + \frac{1}{3} + \frac{1}{5} = \frac{15}{30} + \frac{10}{30} + \frac{6}{30} = \frac{31}{30} = 1\frac{1}{30}$

21. $3\frac{1}{2} - 2\frac{1}{3} = \frac{7}{2} - \frac{7}{3} = \frac{21}{6} - \frac{14}{6} = \frac{7}{6} = 1\frac{1}{6}$

23. $2 - 1\frac{3}{5} = 2 - \frac{8}{5} = \frac{10}{5} - \frac{8}{5} = \frac{2}{5}$

D.

1. $5\frac{7}{8} + 8\frac{1}{2} + 22\frac{3}{4} = \frac{47}{8} + \frac{17}{2} + \frac{91}{4} = \frac{47}{8} + \frac{68}{8} + \frac{182}{8} = \frac{297}{8} = 37\frac{1}{8}$ in.

3. Shortest: $22\frac{3}{8} - \frac{1}{16}$ in. $= 22\frac{6}{16} - \frac{1}{16} = 22\frac{5}{16}$ in.

Longest: $22\frac{3}{8} + \frac{1}{16}$ in. $= 22\frac{6}{16} + \frac{1}{16}$ in. $= 22\frac{7}{16}$ in.

5. $1\frac{7}{8} - 1\frac{3}{32} = 1\frac{28}{32} - 1\frac{3}{32} = \frac{25}{32}$ in. difference

7. $34\frac{1}{2} \div 7\frac{1}{2} = \frac{69}{2} \div \frac{15}{2} = \frac{69}{2} \times \frac{2}{15} = \frac{69}{15} = 4\frac{9}{15} = 4\frac{3}{5}$ cu ft

9. $8\frac{1}{4} + 17\frac{3}{8} + 9\frac{13}{16} + 25\frac{1}{2} + 31\frac{7}{8} = 8\frac{4}{16} + 17\frac{6}{16} + 9\frac{13}{16} + 25\frac{8}{16} + 31\frac{14}{16}$
 $= 90\frac{45}{16} = 90 + 2\frac{13}{16} = 92\frac{13}{16}$ in.

$$11. \quad \frac{3}{4} + \frac{3}{16} = \frac{12}{16} + \frac{3}{16} = \frac{15}{16} \text{ in.}$$

$$13. \quad \text{Radius \#1} = \frac{1}{2} \times 2 \frac{3}{16} = \frac{1}{2} \times \frac{35}{16} = \frac{35}{32}$$

$$\text{Radius \#2} = \frac{1}{2} \times 1 \frac{1}{8} = \frac{1}{2} \times \frac{9}{8} = \frac{9}{16} = \frac{18}{32}$$

$$\frac{23}{4} - \frac{18}{32} - \frac{35}{32} = \frac{184}{32} - \frac{53}{32} = \frac{131}{32} = 4 \frac{3}{32} \text{ in.}$$

$$15. \quad 28 \times 8 \frac{1}{4} + 27 \times \frac{1}{2} = \cancel{28} \times \frac{33}{4} + 13 \frac{1}{2} = 231 + 13 \frac{1}{2} = 244 \frac{1}{2} \text{ in.}$$

1

$$17. \quad 4 \frac{1}{4} - 2 \frac{1}{8} = 4 \frac{2}{8} - 2 \frac{1}{8} = 2 \frac{1}{8} \div 2 = \frac{17}{8} \times \frac{1}{2} = \frac{17}{16}$$

$$= 1 \frac{1}{16} \text{ in. margin on each side width-wise}$$

$$5 \frac{1}{2} - 4 \frac{1}{8} = 5 \frac{4}{8} - 4 \frac{1}{8} = 1 \frac{3}{8} \div 2 = \frac{11}{8} \times \frac{1}{2}$$

$$= \frac{11}{16} \text{ in. margin on each side length-wise}$$

$$19. \quad 46 - 2 \times 2 \frac{1}{4} = 46 - 4 \frac{1}{2} = 41 \frac{1}{2} \text{ in. } \div 8 = \frac{83}{2} \times \frac{1}{8} = \frac{83}{16} = 5 \frac{3}{16} \text{ in.}$$

$$21. \quad 7 \frac{1}{2} \text{ in. } \div \left(18 \frac{\text{rev}}{\text{min}} \times \frac{1}{16} \frac{\text{in.}}{\text{rev}} \right)$$

$$= \frac{15}{2} \text{ in. } \div \left(\frac{9 \text{ in.}}{8 \text{ min}} \right) = \frac{15}{2} \text{ in. } \times \frac{8 \text{ min}}{9 \text{ in.}} = \frac{60}{9} \text{ min} = 6 \frac{2}{3} \text{ min}$$

$$23. \quad 4 \times \frac{5}{8} \text{ in.} = \frac{5}{2} \text{ in.} = 2 \frac{1}{2} \text{ in.}$$

$$25. \quad 1 \frac{1}{2} \times \frac{3}{16} \text{ in.} = \frac{3}{2} \times \frac{3}{16} = \frac{9}{32} \text{ in.}$$

$$27. \quad 60 \times 3 \frac{3}{4} = 60 \times \frac{15}{4} = 225 \text{ tablets}$$

$$29. \quad \frac{3}{8} + \frac{3}{4} = \frac{3}{8} + \frac{6}{8} = \frac{9}{8} = 1 \frac{1}{8} \text{ in.}$$

The 1-in. screw is the longest one less than this.

$$\begin{aligned}
 31. \quad (a) \quad & 10\frac{1}{4} + 8\frac{1}{2} + 22\frac{2}{3} + 2\left(15\frac{1}{3}\right) \\
 & = 10\frac{3}{12} + 8\frac{6}{12} + 22\frac{8}{12} + \frac{2}{1} \times \frac{46}{3} \\
 & = \frac{123}{12} + \frac{102}{12} + \frac{272}{12} + \frac{92}{3} \\
 & = \frac{123}{12} + \frac{102}{12} + \frac{272}{12} + \frac{368}{12} \\
 & = \frac{865}{12} = 72\frac{1}{12} \text{ ft}
 \end{aligned}$$

$$(b) \quad \frac{12}{1} \times \frac{865}{12} = 865 \text{ sq ft}$$

$$(c) \quad 865 \times \$6 = \$5190$$

$$33. \quad 8\frac{3}{4} \times 12 = \frac{35}{\cancel{4}} \times \frac{\cancel{12}^3}{1} = 105 \text{ pairs of shorts}$$