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

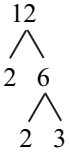
3. (a) $67 + 58 = 125$ (b) $7009 + 1598 = 8607$

5. (a)
$$\begin{array}{r} 64 \\ \times\, 37 \\ \hline 448 \\ 192 \\ \hline 2368 \end{array}$$

(b)
$$\begin{array}{r} 305 \\ \times\, 243 \\ \hline 915 \\ 1220 \\ 610 \\ \hline 74115 \text{ or } 74{,}115 \end{array}$$

(c)
$$\begin{array}{r} 908 \\ \times\, 705 \\ \hline 4540 \\ 63560 \\ \hline 640140 \text{ or } 640{,}010 \end{array}$$

7. (a) 1, 2, 3, 4, 6 and 12

(b)


$12 = 2 \times 2 \times 3$

9. $680 - 235 = 455$ lb finished weight

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. 69 **3.** 80 **5.** 123 **7.** 132 **9.** 806

11. 1390 **13.** 1009 **15.** 861 **17.** 5461 **19.** 11,428

21. 11,071 **23.** 25,717 **25.** 175,728 **27.** 6095 **29.** 663,264

C.

1.	1042	**3.**	6352	**5.**	6514	**7.**	2442
9.	7083	**11.**	4114	**13.**	64	**15.**	55
17.	55	**19.**	1,166,040				

D.

1.
387
913
76
2640
+ 845
4861 ft

3.
346
275
84
128
325
98
260
+ 120
1636 screws

5.
78
428
143
96
+ 384
1129 minutes

7. (a)
420
260
875
340
558
564
280
+ 310
3607 watts

(b)
875
564
+ 558
1997 watts

(c)
260
280
+ 310
850 watts

9.
1205
865
742
+ 257
3114 bricks

11.
$ 599
309
369
+ 280
$ 1557

13.
520
1160
49
+ 1200
2929 ohms

15.
485
74
251
+ 146
756 grams

17.
1400
1800
600
+ 100
3900 W

19. (a)
1172
1054
915
+ 1123
4264 points

(b)
1264
776
+ 987
3027 points

(c)
4264
+ 3027
7291 points

E.

1.
$$\begin{array}{r} 35{,}244 \\ +\ 61{,}775 \\ \hline 97{,}001 \text{ kHz} \end{array}$$

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.	35	**3.**	25	**5.**	33	**7.**	62	**9.**	13
11.	12	**13.**	15	**15.**	38	**17.**	46	**19.**	25
21.	189	**23.**	281	**25.**	408	**27.**	273	**29.**	574
31.	2809	**33.**	12,518	**35.**	4741	**37.**	47,593		

B.

1.
$$\begin{array}{r} \$\ 486 \\ -\ 27 \\ \hline \$\ 459 \end{array}$$

3.
$$\begin{array}{r} 3540 \\ -\ 1782 \\ \hline 1758 \text{ ft} \end{array}$$

5.
$$\begin{array}{r} \$\ 1206512 \\ -\ 875977 \\ \hline \$\ 330535 \text{ or } \$330{,}535 \end{array}$$

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.
$$\begin{array}{r} 238 \\ -\ 64 \\ \hline 174 \text{ gal} \end{array}$$

11.
$$\begin{array}{r} 22{,}000 \\ -\ 14{,}250 \\ \hline 7{,}750 \text{ impressions} \end{array}$$

13.
$$\begin{array}{r} 20000 \\ -\ 6500 \\ \hline 13500 \text{ ohms or } 13{,}500 \text{ ohms} \end{array}$$

15.
$$\begin{array}{r} 1350000 \\ -\ 850000 \\ \hline 500000 \text{ Hertz or } 500{,}000 \text{ Hertz} \end{array}$$

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

19. Hyundai Sonata:

$ 28185
5444
8166
+ 4716
$ 46511
– 9419
$ 37092 or $37,092

Sonata Hybrid:

$ 30935
3953
9101
+ 4168
$ 48157
– 9107
$ 39050 or $39,050

Therefore, the Sonata costs less than the Sonata Hybrid by $1958.

C.

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.
$ 28245
– 3814
$24431 or 24,431

5. (a) Balance A = $2065

(b)

		$ 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

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.**	282	**21.**	416	**23.**	792
25.	1404	**27.**	720	**29.**	5040	**31.**	1938	**33.**	4484	**35.**	3822

B.

1.
$$\begin{array}{r} 809 \\ \times\ 9 \\ \hline 7281 \end{array}$$

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

5.
$$\begin{array}{r} 500 \\ \times\ 50 \\ \hline 25000 \end{array}$$
or 25,000

7.
$$\begin{array}{r} 316 \\ \times\ 32 \\ \hline 632 \\ 948\ \ \\ \hline 10112 \end{array}$$
or 10,112

9.
$$\begin{array}{r} 684 \\ \times\ 45 \\ \hline 3420 \\ 2736\ \ \\ \hline 30780 \end{array}$$
or 30,780

11.
$$\begin{array}{r} 305 \\ \times\ 123 \\ \hline 915 \\ 610\ \ \\ 305\ \ \ \\ \hline 37515 \end{array}$$
or 37,515

13.
$$\begin{array}{r} 807 \\ \times\ 111 \\ \hline 807 \\ 807\ \ \\ 807\ \ \ \\ \hline 89577 \end{array}$$
or 89,577

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

17.
$$\begin{array}{r} 3706 \\ \times\ 102 \\ \hline 7412 \\ 37060\ \ \\ \hline 378012 \end{array}$$
or 378,012

19.
$$\begin{array}{r} 2008 \\ \times\ 198 \\ \hline 16064 \\ 18072\ \ \\ 2008\ \ \ \\ \hline 397584 \end{array}$$
or 397,584

C.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

29.
$$\begin{array}{r} 800 \\ \times\ 170 \\ \hline 000 \\ 5600 \\ \underline{800\ } \\ 136000 \end{array}$$ or 136,000 lb

D.

1. $873 × 365 = $318,645
$1,000,000 – 318,645 = $681,355

3. (a)
111,111,111
222,222,222
333,333,333

(b)
111,111
222,222
333,333

(c)
1
121
12,321
1,234,321
123,454,321

(d)
42
4422
444,222
44,442,222
4,444,422,222

5. 8 hours/day × 5 days/week = 40 hours/week

Alpha	117 × $ 6 × 40 = $ 28,080
Beta	67 × $17 × 40 = $ 45,560
Gamma	29 × $32 × 40 = $ 37,120
Delta	37 × $49 × 40 = $ 72,520
Tau	18 × $78 × 40 = $ 56,160

Exercises 1-4 Division of Whole Numbers

A.

1. $7\overline{)63}$ → 9, 63

3. $4\overline{)32}$ → 8, 32

5. $9\overline{)54}$ → 6, 54

7. $5\overline{)72}$ → 14 r2, 5, 22, 20, 2

9.
$$\begin{array}{r} 10 \text{ r1} \\ 7\overline{)71} \\ \underline{7} \\ 01 \\ \underline{0} \\ 1 \end{array}$$

11.
$$\begin{array}{r} 23 \text{ r6} \\ 7\overline{)167} \\ \underline{14} \\ 27 \\ \underline{21} \\ 6 \end{array}$$

13.
$$\begin{array}{r} 51 \text{ r4} \\ 6\overline{)310} \\ \underline{30} \\ 10 \\ \underline{6} \\ 4 \end{array}$$

15.
$$\begin{array}{r} 210 \text{ r6} \\ 9\overline{)1476} \\ \underline{14} \\ 07 \\ \underline{7} \\ 06 \\ \underline{0} \\ 6 \end{array}$$

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

19.
$$\begin{array}{r} 222 \text{ r2} \\ 9\overline{)2000} \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

21.
$$\begin{array}{r} 501 \\ 7\overline{)3507} \\ \underline{35} \\ 007 \\ \underline{7} \end{array}$$

23.
$$\begin{array}{r} 604 \\ 6\overline{)3624} \\ \underline{36} \\ 024 \\ \underline{24} \end{array}$$

B.

1.
$$\begin{array}{r} 23 \\ 14\overline{)322} \\ \underline{28} \\ 42 \\ \underline{42} \end{array}$$

3.
$$\begin{array}{r} 39 \\ 24\overline{)936} \\ \underline{72} \\ 216 \\ \underline{216} \end{array}$$

5.
$$\begin{array}{r} 9 \text{ r1} \\ 81\overline{)730} \\ \underline{729} \\ 1 \end{array}$$

7.
$$\begin{array}{r} 22 \\ 31\overline{)682} \\ \underline{62} \\ 62 \\ \underline{62} \end{array}$$

9.
$$\begin{array}{r} 8 \text{ r35} \\ 42\overline{)371} \\ \underline{336} \\ 35 \end{array}$$

11.
$$\begin{array}{r} 120 \\ 61\overline{)7320} \\ \underline{61} \\ 122 \\ \underline{122} \end{array}$$

13.
$$\begin{array}{r} 56 \text{ r8} \\ 16\overline{)904} \\ \underline{80} \\ 104 \\ \underline{96} \\ 8 \end{array}$$

15.
$$\begin{array}{r} 305 \text{ r5} \\ 14\overline{)4275} \\ \underline{42} \\ 075 \\ \underline{70} \\ 5 \end{array}$$

17.
$$\begin{array}{r} 119 \\ 53\overline{)6307} \\ \underline{53} \\ 100 \\ \underline{53} \\ 477 \\ \underline{477} \end{array}$$

19.
$$\begin{array}{r} 96 \\ 21\overline{)2016} \\ \underline{189} \\ 126 \\ \underline{126} \end{array}$$

21.
$$\begin{array}{r} 200 \\ 15\overline{)3000} \\ \underline{30} \\ 000 \end{array}$$

23.
$$\begin{array}{r} 108 \text{ r4} \\ 24\overline{)2596} \\ \underline{24} \\ 196 \\ \underline{192} \\ 4 \end{array}$$

25.
$$\begin{array}{r} 600 \\ 38\overline{)22800} \\ \underline{228} \\ 000 \end{array}$$

27.
$$\begin{array}{r} 102 \text{ r98} \\ 411\overline{)42020} \\ \underline{411} \\ 920 \\ \underline{822} \\ 98 \end{array}$$

29.
$$\begin{array}{r} 17 \text{ r123} \\ 405\overline{)7008} \\ \underline{405} \\ 2958 \\ \underline{2835} \\ 123 \end{array}$$

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.
$$9\overline{)243}\ \text{in.}$$
$$\begin{array}{r} 27 \\ 18 \\ \hline 63 \\ 63 \\ \hline \end{array}$$

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

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

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

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

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

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

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

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

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

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

19 years, 2 months

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

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

4 hr, 10 min

21.
$$8\overline{)168}\ \text{eight-foot lengths}$$
$$\begin{array}{r} 21 \\ 16 \\ \hline 8 \\ 8 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \\ \times\ \$\ \ 22 \\ \hline 42 \\ 42 \\ \hline \$\ 462 \end{array}$$

E.

1. (a) $4464 \div 48 = 93$

(b) $169{,}722 \div 378 = 449$

3. $6587 \div 344 = 19.148...$ or 20 rivets to be sure

5. $297{,}600 \div 96 = 3100$ min
$3100 \div 60 = 51.666...$ or 51 hr 40 min

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

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. $\dfrac{36}{9} + \dfrac{27}{3} = 4 + 9 = 13$

35. $\dfrac{44 + 12}{11 - 3} = \dfrac{56}{8} = 7$

37. $\dfrac{6 + 12 \times 4}{15 - 3 \times 2} = \dfrac{6 + 48}{15 - 6} = \dfrac{54}{9} = 6$

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

B.

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

3. $12 \times \$30 - 3 \times \$6 = \$360 - \$18 = \$342$

5. Cost $= 2 \times \$12 \times 40 + 3 \times \$20 \times 40 + \$3240 + \$500$
$= \$960 + \$2400 + \$3240 + \$500$
$= \$7100$

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

9. China: $51 \times 5 + 21 \times 3 + 28 \times 1 = 255 + 63 - 28 = 346$ points
U.S.: $36 \times 5 + 38 \times 3 + 36 \times 1 = 180 + 114 + 36 = 330$ points
China "won."

11.
$$22\overline{)176} = 8 \text{ gal} \qquad 30\overline{)180} = 6 \text{ gal} \qquad 8 \text{ gal} + 6 \text{ gal} = 14 \text{ gal}$$
$$\underline{176} \qquad\qquad \underline{180}$$
$$0 \qquad\qquad 0$$

C.

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

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

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

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

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

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

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

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

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. Twelve billion, six hundred four million, seven hundred thousand, two hundred fifty

11. 230,056 **13.** 64,700 **15.** 6,047,920,000

17. 5500 **19.** 94,700 **21.** 710,000

B.

1.
$$\begin{array}{r} 87 \\ +\ 9 \\ \hline 96 \end{array}$$

3.
$$\begin{array}{r} 63 \\ -\ 8 \\ \hline 55 \end{array}$$

5.
$$\begin{array}{r} 24 \\ +\ 69 \\ \hline 93 \end{array}$$

7.
$$\begin{array}{r} 456 \\ +\ 72 \\ \hline 528 \end{array}$$

9.
$$\begin{array}{r} 396 \\ +\ 538 \\ \hline 934 \end{array}$$

11.
$$\begin{array}{r} 43 \\ -\ 28 \\ \hline 15 \end{array}$$

13.
$$\begin{array}{r} 734 \\ -\ 85 \\ \hline 649 \end{array}$$

15.
$$\begin{array}{r} 543 \\ -\ 348 \\ \hline 195 \end{array}$$

17.
$$\begin{array}{r} 376 \\ \times\ 4 \\ \hline 1504 \end{array}$$

19.
$$\begin{array}{r} 67 \\ \times\ 21 \\ \hline 67 \\ 134 \\ \hline 1407 \end{array}$$

21.
$$\begin{array}{r} 207 \\ \times\ 63 \\ \hline 621 \\ 1242 \\ \hline 13041 \end{array}$$ or 13,041

23.
$$\begin{array}{r} 5236 \\ \times\ 44 \\ \hline 20944 \\ 20944 \\ \hline 230384 \end{array}$$ or 230,384

25.
$$\begin{array}{r} 37 \\ 7\overline{)259} \\ 21 \\ \hline 49 \\ 49 \end{array}$$

27.
$$\begin{array}{r} 57 \\ 42\overline{)2394} \\ 210 \\ \hline 294 \\ 294 \end{array}$$

29.
$$\begin{array}{r} 9 \\ 160\overline{)1440} \\ 1440 \end{array}$$

31.
$$\begin{array}{r} 18 \\ 73\overline{)1314} \\ 73 \\ \hline 584 \\ 584 \end{array}$$

33. $\dfrac{36\times 91}{13\times 42} = \dfrac{3276}{546}$

$$= 546\overline{)3276}\ 6$$
$$3276$$

$$\begin{array}{r} 36 \\ \times\ 91 \\ \hline 36 \\ 324 \\ \hline 3276 \end{array} \qquad \begin{array}{r} 42 \\ \times\ 13 \\ \hline 126 \\ 42 \\ \hline 546 \end{array}$$

35. $120 - 40 \div 8 = 120 - 5 = 115$

37. $3 \times 4 - 15 \div 3 = 12 - 5 = 7$

39.
$$\begin{array}{r} 308 \\ 793 \\ 144 \\ \hline 1245 \end{array}$$

41.
$$\begin{array}{r} 256 \\ 965 \\ 89 \\ 42 \\ \hline 1352 \end{array}$$

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 ft + 8 ft + 20 ft + 9 ft = 43 ft

3. (a) $x = 40 - 26 = 14$ ft; $y = 15 + 12 = 27$ ft

(b) $x = 54 - 22 - 14 = 18$ ft; $y = 31 + 19 = 50$ ft

5.
$$35\overline{)210}\quad 6,\ \underline{210}$$

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

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

9. \$400 + 12 × \$110 = \$400 + \$1320 = \boxed{\$1720}

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

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

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

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

15. $167 \times 17 = 2839$ lb

17. $\frac{3}{4} \times 32 = 24$ hours

Note: 45 min $= \frac{3}{4}$ hr

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

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

$$4\overline{)46320}\quad 11580 \text{ rph}$$

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

23.
$$\begin{array}{r} 18 \\ -\ \underline{6} \\ 12 \end{array}$$
$12 \div 2 = 6$ 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) For City Driving:
125 mi ÷ 25 mi/gal = 5 gal

For Highway Driving:
480 mi ÷ 32 mi/gal = 15 gal

Total = 5 gal + 15 gal = 20 gal

(b) 20 gal × \$2 per gal = \$40

31.
220
× 13
660
220
2860 calories

33.

ES 350	ES 300h	
\$ 38950	\$ 41870	\$ 50088
7859	6509	− 48513
9768	9599	\$ 1575
+ 5775	+ 5836	
\$ 62352	\$ 63814	
− 13839	− 13726	The ES 350 is lower by \$1575.
\$ 48513 or \$48,513	\$ 50088 or \$50,088	

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

37.

Exposed Walls	Glass	Cold Ceiling	Cold Floor
1344	220	1664	1664
× 6	× 40	× 5	× 7
8064 Btu	8800 Btu	8320 Btu	11648 Btu

Total Heat Loss = 8064 + 8800 + 8320 + 11,648 = 36,832 Btu/hr

CHAPTER 2
FRACTIONS

Preview 2

1. (a) $\frac{31}{4} = 4\overline{)31}\ \begin{matrix}7\\ \underline{28}\\ 3\end{matrix} = 7\frac{3}{4}$

(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) $\frac{\cancel{10}^{\,5}}{\cancel{64}_{\,32}} = \frac{5}{32}$

(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. $\frac{17}{4} = 4\frac{1}{4}$

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. $\frac{80}{32} = 2\frac{16}{32} = 2\frac{1}{2}$

B.

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. $4\frac{5}{6} = \frac{29}{6}$

C.

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

D.

1. $\frac{4}{16}=\frac{1}{4}$ **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.** $\frac{38}{24}=\frac{19}{12}$

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.

13. (a) $\frac{4}{16}$ or $\frac{1}{4}$ (b) $\frac{10}{16}$ or $\frac{5}{8}$ (c) $\frac{15}{16}$ (d) $1\frac{6}{16}$ or $1\frac{3}{8}$

(e) $1\frac{8}{16}$ or $1\frac{1}{2}$ (f) $1\frac{12}{16}$ or $1\frac{3}{4}$ (g) $2\frac{5}{16}$ (h) $2\frac{14}{16}$ or $2\frac{7}{8}$

Exercises 2-2 Multiplication of Fractions

A.

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

3. $\frac{\overset{2}{\cancel{4}}}{5}\times\frac{1}{\underset{3}{\cancel{6}}}=\frac{2}{15}$

5. $\frac{\overset{3}{\cancel{9}}}{\underset{3}{\cancel{9}}}\times\frac{\overset{1}{\cancel{3}}}{\cancel{3}}=\frac{8}{3}=2\frac{2}{3}$

7. $\frac{\overset{2}{\cancel{8}}}{3}\times\frac{5}{\underset{3}{\cancel{12}}}=\frac{10}{9}=1\frac{1}{9}$

9. $\frac{\overset{1}{\cancel{4}}}{\underset{2}{\cancel{8}}}\times\frac{\overset{5}{\cancel{15}}}{\underset{3}{\cancel{9}}}=\frac{5}{2}=2\frac{1}{2}$

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

13. $2\frac{1}{6}\times1\frac{1}{2}=\frac{13}{\cancel{6}}\times\frac{\overset{1}{\cancel{3}}}{2}=\frac{13}{4}=3\frac{1}{4}$

15. $4\frac{3}{5}\times15=\frac{23}{\cancel{5}}\times\frac{\overset{3}{\cancel{15}}}{1}=69$

17. $34\times2\frac{3}{17}=\frac{\overset{2}{\cancel{34}}}{1}\times\frac{37}{\cancel{17}}=74$

19. $11\frac{6}{7}\times\frac{7}{8}=\frac{83}{\cancel{7}}\times\frac{\overset{1}{\cancel{7}}}{8}=\frac{83}{8}=10\frac{3}{8}$

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

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

25. $\frac{\overset{1}{\cancel{2}}}{\cancel{3}}\times\frac{\overset{1}{\cancel{3}}}{\cancel{2}}\times2=2$

B.

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

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

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

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

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

11. $\frac{7}{8}\times 1\frac{1}{5}=\frac{7}{\underset{4}{\cancel{8}}}\times\frac{\overset{3}{\cancel{6}}}{5}=\frac{21}{20}=1\frac{1}{20}$

13. $\frac{7}{\underset{8}{\cancel{16}}}\times\frac{\overset{3}{\cancel{6}}}{}=\frac{21}{8}=2\frac{5}{8}$

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

C.

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

3. $\frac{5}{\underset{3}{\cancel{12}}}\times\overset{7}{\cancel{28}}=\frac{35}{3}=11\frac{2}{3}$ ft

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

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

9. $46\frac{1}{2}\times 7\frac{2}{3}=\frac{\overset{31}{\cancel{93}}}{2}\times\frac{23}{\underset{1}{\cancel{3}}}=\frac{713}{2}=356\frac{1}{2}$ lb

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

13. $\frac{3}{\underset{4}{\cancel{8}}}\times\overset{13}{\cancel{26}}=\frac{39}{4}=9\frac{3}{4}$ in.

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