

# SOLUTIONS MANUAL



## BUSINESS MATH

*Brief Edition*

NINTH EDITION

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## Chapter 2 Review of Fractions

### Section Exercises

#### 2-1, p. 49

- |           |             |             |           |           |             |
|-----------|-------------|-------------|-----------|-----------|-------------|
| 1. proper | 2. improper | 3. improper | 4. proper | 5. proper | 6. improper |
|-----------|-------------|-------------|-----------|-----------|-------------|
7. 
$$\begin{array}{r} 1\overline{)12} \\ \underline{7} \\ 5 \end{array}$$
  8. 
$$\begin{array}{r} 1\overline{)21} \\ \underline{20} \\ 1 \end{array}$$
  9. 
$$\begin{array}{r} 1\overline{)18} \\ \underline{18} \end{array}$$
  10. 
$$\begin{array}{r} 2\overline{)17} \\ \underline{14} \\ 3 \end{array}$$
  11. 
$$\begin{array}{r} 2\overline{)16} \\ \underline{16} \end{array}$$
  12. 
$$\begin{array}{r} 24\overline{)387} \\ \underline{32} \\ 67 \\ \underline{64} \\ 3 \end{array}$$
13.  $\frac{1,300}{1,000} = \frac{13}{10} = 1\frac{3}{10}$  phones per person
  14.  $\frac{1,500}{1,000} = \frac{3}{2} = 1\frac{1}{2}$  phones per person
  15.  $(4 \times 6) + 1 = 25; \frac{25}{4}$
  16.  $(5 \times 27) + 2 = (135) + 2 = 137; \frac{137}{5}$
  17.  $(3 \times 2) + 1 = 7; \frac{7}{3}$
  18.  $(5 \times 3) + 4 = 19; \frac{19}{5}$
  19.  $(8 \times 1) + 5 = 13; \frac{13}{8}$
  20.  $(3 \times 6) + 2 = 20; \frac{20}{3}$
  21.  $\frac{12 \div 3}{15 \div 3} = \frac{4}{5}$
  22.  $\frac{12 \div 4}{20 \div 4} = \frac{3}{5}$
  23.  $\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$
  24.  $\frac{18 \div 18}{36 \div 18} = \frac{1}{2}$
  25.  $\frac{24 \div 12}{36 \div 12} = \frac{2}{3}$
  26.  $\frac{13 \div 13}{39 \div 13} = \frac{1}{3}$
  27.  $\frac{400 \text{ million}}{9,000 \text{ million}} = \frac{2}{45}$
  28.  $\frac{4,000 \text{ million}}{24,000 \text{ million}} = \frac{1}{6}$
  29. 
$$\begin{array}{r} 2\overline{)16} \\ \underline{3 \times 2} \\ 8 \times 2 = 16 \end{array}$$
  30. 
$$\begin{array}{r} 4\overline{)20} \\ \underline{4 \times 4} \\ 5 \times 4 = 20 \end{array}$$
  31. 
$$\begin{array}{r} 4\overline{)32} \\ \underline{3 \times 4} \\ 8 \times 4 = 32 \end{array}$$
  32. 
$$\begin{array}{r} 3\overline{)27} \\ \underline{5 \times 3} \\ 9 \times 3 = 27 \end{array}$$
  33. 
$$\begin{array}{r} 5\overline{)15} \\ \underline{1 \times 5} \\ 3 \times 5 = 15 \end{array}$$
  34. 
$$\begin{array}{r} 3\overline{)15} \\ \underline{3 \times 3} \\ 5 \times 3 = 15 \end{array}$$

#### 2-2, p. 56

1. 
$$\begin{array}{r} \frac{1}{9} \\ \frac{2}{9} \\ \underline{+ \frac{5}{9}} \\ \frac{8}{9} \end{array}$$
2. 
$$\begin{array}{r} \frac{7}{8} \\ + \frac{5}{8} \\ \hline \frac{12}{8} = 1\frac{4}{8} = 1\frac{1}{2} \end{array}$$
3. 
$$\begin{array}{r} \frac{5}{6} = \frac{25}{30} \\ + \frac{7}{15} = + \frac{14}{30} \\ \hline \frac{39}{30} = 1\frac{9}{30} = 1\frac{3}{10} \end{array}$$

$$\begin{array}{r} 4. \quad \frac{5}{8} = \frac{15}{24} \\ + \frac{7}{12} = + \frac{14}{24} \\ \hline \frac{29}{24} = 1\frac{5}{24} \end{array}$$

$$\begin{array}{r} 7. \quad 51\frac{5}{18} = 51\frac{20}{72} \\ + 86\frac{9}{24} = + 86\frac{27}{72} \\ \hline 137\frac{47}{72} \end{array}$$

$$\begin{array}{r} 10. \quad 3\frac{5}{9} = 3\frac{20}{36} \\ 5\frac{1}{12} = 5\frac{3}{36} \\ + 2\frac{2}{3} = + 2\frac{24}{36} \\ \hline 10\frac{47}{36} = 11\frac{11}{36} \end{array}$$

$$\begin{array}{r} 13. \quad \frac{3}{4} = \frac{21}{28} \\ - \frac{5}{7} = - \frac{20}{28} \\ \hline \frac{1}{28} \end{array}$$

$$\begin{array}{r} 16. \quad 21\frac{3}{5} = 21\frac{6}{10} = 20\frac{16}{10} \\ - 12\frac{7}{10} = - 12\frac{7}{10} = - 12\frac{7}{10} \\ \hline 8\frac{9}{10} \end{array}$$

$$\begin{array}{r} 19. \quad 8\frac{1}{3} \\ - 5 \\ \hline 3\frac{1}{3} \end{array}$$

$$\begin{array}{r} 22. \quad 42\frac{3}{8} + 37\frac{5}{8} + 12\frac{3}{8} + 23\frac{3}{4} = \\ 42\frac{3}{8} + 37\frac{5}{8} + 12\frac{3}{8} + 23\frac{6}{8} = \\ 114\frac{17}{8} = 116\frac{1}{8} \text{ feet} \end{array}$$

$$\begin{array}{r} 5. \quad 4\frac{5}{6} = 4\frac{10}{12} \\ + 7\frac{1}{2} = + 7\frac{6}{12} \\ \hline 11\frac{16}{12} = 12\frac{4}{12} = 12\frac{1}{3} \end{array}$$

$$\begin{array}{r} 8. \quad 5\frac{7}{12} = 5\frac{7}{12} \\ 3\frac{1}{4} = 3\frac{3}{12} \\ + 2\frac{2}{3} = + 2\frac{8}{12} \\ \hline 10\frac{18}{12} = 11\frac{6}{12} = 11\frac{1}{2} \end{array}$$

$$\begin{array}{r} 11. \quad \frac{7}{8} \\ - \frac{3}{8} \\ \hline \frac{4}{8} = \frac{1}{2} \end{array}$$

$$\begin{array}{r} 14. \quad 9\frac{2}{3} = 9\frac{4}{6} \\ - 6\frac{1}{2} = - 6\frac{3}{6} \\ \hline 3\frac{1}{6} \end{array}$$

$$\begin{array}{r} 17. \quad 15\frac{8}{15} = 15\frac{32}{60} \\ - 7\frac{5}{12} = - 7\frac{25}{60} \\ \hline 8\frac{7}{60} \end{array}$$

$$\begin{array}{r} 20. \quad 12\frac{1}{5} = 11\frac{6}{5} \\ - 7\frac{4}{5} = - 7\frac{4}{5} \\ \hline 4\frac{2}{5} \end{array}$$

$$\begin{array}{r} 23. \quad 10\frac{3}{4} + 10\frac{3}{4} + 12\frac{5}{8} + 12\frac{5}{8} + 12\frac{5}{8} \\ + 12\frac{5}{8} + 8\frac{1}{2} + 8\frac{1}{2} = \\ 10\frac{6}{8} + 10\frac{6}{8} + 12\frac{5}{8} + 12\frac{5}{8} + 12\frac{5}{8} \\ + 12\frac{5}{8} + 8\frac{4}{8} + 8\frac{4}{8} = 84\frac{40}{8} = 89 \text{ feet} \end{array}$$

$$\begin{array}{r} 6. \quad 23\frac{5}{12} = 23\frac{20}{48} \\ + 48\frac{7}{16} = + 48\frac{21}{48} \\ \hline 71\frac{41}{48} \end{array}$$

$$\begin{array}{r} 9. \quad \frac{7}{8} = \frac{21}{24} \\ 2\frac{3}{24} = 2\frac{3}{24} \\ + 6\frac{1}{6} = + 6\frac{4}{24} \\ \hline 8\frac{28}{24} = 9\frac{4}{24} = 9\frac{1}{6} \end{array}$$

$$\begin{array}{r} 12. \quad \frac{8}{9} \\ - \frac{2}{9} \\ \hline \frac{6}{9} = \frac{2}{3} \end{array}$$

$$\begin{array}{r} 15. \quad 15 = 14\frac{9}{9} \\ - 12\frac{7}{9} = - 12\frac{7}{9} \\ \hline 2\frac{2}{9} \end{array}$$

$$\begin{array}{r} 18. \quad 23\frac{1}{8} = 23\frac{3}{24} = 22\frac{27}{24} \\ - \frac{7}{12} = - \frac{14}{24} = - \frac{14}{24} \\ \hline 22\frac{13}{24} \end{array}$$

$$\begin{array}{r} 21. \quad 11\frac{3}{4} + 11\frac{3}{4} + 18\frac{5}{8} = \\ 11\frac{6}{8} + 11\frac{6}{8} + 18\frac{5}{8} = 40\frac{17}{8} = \\ 42\frac{1}{8} \text{ yards} \end{array}$$

$$24. 4\frac{4}{5} + 4\frac{4}{5} + 4\frac{4}{5} + 7\frac{3}{8} + 7\frac{3}{8} =$$

$$4\frac{32}{40} + 4\frac{32}{40} + 4\frac{32}{40} + 7\frac{15}{40} + 7\frac{15}{40} =$$

$$26\frac{126}{40} = 29\frac{3}{20} \text{ inches}$$

$$26. 12 - 10\frac{3}{4} = 11\frac{4}{4} - 10\frac{3}{4} = 1\frac{1}{4} \text{ feet}$$

$$28. 8\frac{3}{4} + 8\frac{3}{4} = 16\frac{6}{4} = 17\frac{2}{4} = 17\frac{1}{2}$$

$$36 - 17\frac{1}{2} = 35\frac{2}{2} - 17\frac{1}{2}$$

$$= 18\frac{1}{2} \text{ inches}$$

$$25. 45 - 42\frac{1}{8} = 44\frac{8}{8} - 42\frac{1}{8} =$$

$$2\frac{7}{8} \text{ yards; she can use the fabric.}$$

$$27. 13\frac{15}{16} - 12\frac{5}{8} = 13\frac{15}{16} - 12\frac{10}{16} = 1\frac{5}{16} \text{ feet}$$

$$14\frac{1}{8} - 12\frac{5}{8} = 13\frac{9}{8} - 12\frac{5}{8} = 1\frac{4}{8} = 1\frac{1}{2} \text{ feet}$$

$$14 - 12\frac{5}{8} = 13\frac{8}{8} - 12\frac{5}{8} = 1\frac{3}{8} \text{ feet}$$

$$13\frac{13}{16} - 12\frac{5}{8} = 13\frac{13}{16} - 12\frac{10}{16} = 1\frac{3}{16} \text{ feet}$$

## 2-3, p. 63

$$1. \frac{3}{8} \times \frac{4}{5} = \frac{3}{10}$$

$$2. \frac{5}{7} \times \frac{1}{6} = \frac{5}{42}$$

$$3. \frac{23}{4} \times \frac{35}{9} = \frac{805}{36} = 22\frac{13}{36}$$

$$4. \frac{3}{8} \times \frac{24}{1} = 9$$

$$5. \frac{12}{7}$$

$$6. \frac{5}{3}$$

$$7. \frac{1}{9}$$

$$8. \frac{1}{12}$$

$$9. 5\frac{4}{7} = \frac{39}{7}; \frac{7}{39}$$

$$10. 3\frac{3}{8} = \frac{27}{8}; \frac{8}{27}$$

$$11. \frac{5}{8} \div \frac{3}{4} = \frac{5}{8} \times \frac{4}{3} = \frac{5}{6}$$

$$12. \frac{3}{5} \div \frac{9}{10} = \frac{3}{5} \times \frac{10}{9} = \frac{2}{3}$$

$$13. 2\frac{2}{5} \div 1\frac{1}{7} = \frac{12}{5} \div \frac{8}{7} = \frac{12}{5} \times \frac{7}{8} = \frac{21}{10} = 2\frac{1}{10}$$

$$14. 5\frac{1}{4} \div 2\frac{2}{3} = \frac{21}{4} \div \frac{8}{3} = \frac{21}{4} \times \frac{3}{8} = \frac{63}{32} = 1\frac{31}{32}$$

$$15. \frac{3}{4} \div 5 = \frac{3}{4} \div \frac{5}{1} = \frac{3}{4} \times \frac{1}{5} = \frac{3}{20}$$

$$16. 75 \div 1\frac{1}{8} = \frac{75}{1} \div \frac{9}{8} = \frac{75}{1} \times \frac{8}{9}$$

$$= \frac{200}{3} = 66\frac{2}{3}, \text{ or } 67 \text{ sheets}$$

$$17. 200 \div 9\frac{3}{4} = 200 \div \frac{39}{4} = \frac{200}{1} \times \frac{4}{39} = \frac{800}{39} = 20\frac{20}{39} \text{ rooms}$$

$$18. 40 \div 8\frac{3}{4} = 40 \div \frac{35}{4} = \frac{40}{1} \times \frac{4}{35} = \frac{32}{7} = 4\frac{4}{7}; 4 \text{ boxes}$$

$$19. 21 \div 3\frac{1}{2} = \frac{21}{1} \div \frac{7}{2} = \frac{21}{1} \times \frac{2}{7} = 6$$

Theoretically, 6 cabinets will exactly fit on the wall.

$$20. 4 \times 18\frac{5}{8} = \frac{4}{1} \times \frac{149}{8} = \frac{149}{2} = 74\frac{1}{2} \text{ feet}$$

$$21. 4 \times 4\frac{1}{8} = \frac{4}{1} \times \frac{33}{8} = \frac{33}{2} = 16\frac{1}{2} \text{ feet}$$

Yes, if no more than a total of  $\frac{1}{8}$  inch is needed for spacing between the desks.

$$22. 3\frac{1}{4} \times 2 = \frac{13}{4} \times \frac{2}{1} = \frac{13}{2} = 6\frac{1}{2} \text{ inches long}$$

$$28 \div 2 = 14 \text{ inches wide}$$

$$6\frac{1}{2} \text{ inches long} \times 14 \text{ inches wide}$$

## Exercises Set A, p. 69

1. Examples will vary.  $\frac{3}{5}, \frac{7}{9}, \frac{5}{8}, \frac{100}{301}, \frac{41}{53}$ ; proper fractions
2. Examples will vary.  $\frac{4}{4}, \frac{8}{5}, \frac{12}{4}, \frac{132}{89}, \frac{7}{1}$ ; improper fractions
3.  $20\frac{2}{3}$
4. 7
5.  $8\frac{1}{2}$
6.  $\frac{(6 \times 5) + 5}{6} = \frac{35}{6}$
7.  $\frac{(3 \times 4) + 1}{3} = \frac{13}{3}$
8.  $\frac{(3 \times 33) + 1}{3} = \frac{100}{3}$
9.  $\frac{15 \div 3}{18 \div 3} = \frac{5}{6}$
10.  $\frac{20 \div 10}{30 \div 10} = \frac{2}{3}$
11.  $\frac{30 \div 6}{48 \div 6} = \frac{5}{8}$
12.  $\frac{5 \times 2}{6 \times 2} = \frac{10}{12}$
13.  $\frac{5 \times 4}{8 \times 4} = \frac{20}{32}$
14.  $\frac{9 \times 13}{11 \times 13} = \frac{117}{143}$
15.  $\frac{15}{105} = \frac{3}{21} = \frac{1}{7}$  of the employees
16. 
$$\begin{array}{r} 2 \overline{)4 \ 12 \ 16} \\ \underline{2 \ 2 \ 6 \ 8} \\ 2 \ 1 \ 3 \ 4 \\ \underline{2 \ 1 \ 3 \ 2} \\ 3 \ 1 \ 3 \ 1 \\ \underline{3 \ 1 \ 1 \ 1} \\ 2 \times 2 \times 2 \times 2 \times 3 = 48 \end{array}$$
17. 
$$\begin{array}{r} 2 \overline{)56 \ 24 \ 12 \ 42} \\ \underline{2 \ 28 \ 12 \ 6 \ 21} \\ 2 \ 14 \ 6 \ 3 \ 21 \\ \underline{2 \ 7 \ 3 \ 3 \ 21} \\ 7 \ 7 \ 1 \ 1 \ 7 \\ \underline{7 \ 1 \ 1 \ 1 \ 1} \\ 2 \times 2 \times 2 \times 3 \times 7 = 168 \end{array}$$
18. 
$$\begin{array}{r} 2 \overline{)1 \ 5 \ 10 \ 6} \\ \underline{3 \ 1 \ 5 \ 5 \ 3} \\ 5 \ 1 \ 5 \ 5 \ 1 \\ \underline{1 \ 1 \ 1 \ 1} \\ 2 \times 3 \times 5 = 30 \end{array}$$
19.  $\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$
20.  $\frac{2}{5} + \frac{2}{3} = \frac{6}{15} + \frac{10}{15} = \frac{16}{15} = 1\frac{1}{15}$
21.  $7\frac{1}{2} + 4\frac{3}{8} = 7\frac{4}{8} + 4\frac{3}{8} = 11\frac{7}{8}$
22.  $11\frac{5}{6} + 8\frac{2}{3} = 11\frac{5}{6} + 8\frac{4}{6} = 19\frac{9}{6} = 20\frac{3}{6} = 20\frac{1}{2}$
23.  $12\frac{3}{8} + 16\frac{5}{8} = 28\frac{8}{8} = 29$  yards
24.  $\frac{5}{12} - \frac{3}{12} = \frac{2}{12} = \frac{1}{6}$
25. 
$$\begin{array}{r} 7\frac{4}{5} = 7\frac{8}{10} \\ -4\frac{1}{2} = -4\frac{5}{10} \\ \hline 3\frac{3}{10} \end{array}$$
26. 
$$\begin{array}{r} 5 = 4\frac{5}{5} \\ -3\frac{2}{5} = -3\frac{2}{5} \\ \hline 1\frac{3}{5} \end{array}$$
27. 
$$\begin{array}{r} 4\frac{5}{6} = 4\frac{5}{6} \\ -3\frac{1}{3} = -3\frac{2}{6} \\ \hline 1\frac{3}{6} = 1\frac{1}{2} \end{array}$$
28. 
$$\begin{array}{r} 6 = 5\frac{8}{8} \\ -3\frac{5}{8} = -3\frac{5}{8} \\ \hline 2\frac{3}{8} \text{ feet} \end{array}$$
29.  $\frac{5}{18}$
30.  $\frac{5}{1} \times \frac{2}{3} = \frac{10}{3} = 3\frac{1}{3}$
31.  $6\frac{2}{9} \times 4\frac{1}{2}$
32.  $\frac{8}{5}$
33. 4
- $$\frac{\overset{28}{\cancel{56}}}{\underset{1}{9}} \times \frac{\overset{1}{\cancel{9}}}{\underset{1}{2}} = 28$$
34.  $3\frac{1}{4} = \frac{13}{4}; \frac{4}{13}$
35.  $\frac{3}{4} \div \frac{1}{4} = \frac{3}{\cancel{4}} \times \frac{\cancel{4}}{1} = 3$

$$36. 7\frac{1}{2} \div 2 = \frac{15}{2} \div \frac{2}{1} = \frac{15}{2} \times \frac{1}{2} = \frac{15}{4} = 3\frac{3}{4}$$

$$38. 244 \div 7\frac{5}{8} = \frac{244}{1} \div \frac{61}{8} = \frac{244}{1} \times \frac{8}{61} = 32 \text{ pieces}$$

$$40. \frac{2}{3} \times \frac{18}{1} = 12 \text{ hours}$$

$$37. 3\frac{1}{7} \div 5\frac{1}{2} = \frac{22}{7} \div \frac{11}{2} = \frac{22}{7} \times \frac{2}{11} = \frac{4}{7}$$

$$39. \frac{5}{8} + \frac{3}{4} - \frac{1}{8} = \frac{5}{8} + \frac{6}{8} - \frac{1}{8} = \frac{10}{8} = \frac{5}{4} = 1\frac{1}{4} \text{ inches}$$

$$41. 1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3}; \frac{2}{3} \times \frac{\$288}{1} = \$192$$

## Exercises Set B, p. 71

$$1. 15 \overline{)52} \begin{array}{r} 3\frac{7}{15} \\ \underline{45} \\ 7 \end{array}$$

$$2. 4 \overline{)83} \begin{array}{r} 20\frac{3}{4} \\ \underline{8} \\ 3 \\ \underline{0} \\ 3 \end{array}$$

$$3. 11 \overline{)77} \begin{array}{r} 7 \\ \underline{77} \end{array}$$

$$4. 10 \overline{)19} \begin{array}{r} 1\frac{9}{10} \\ \underline{10} \\ 9 \end{array}$$

$$5. \frac{(8 \times 7) + 3}{8} = \frac{59}{8}$$

$$6. \frac{(5 \times 10) + 1}{5} = \frac{51}{5}$$

$$7. \frac{18 \div 2}{20 \div 2} = \frac{9}{10}$$

$$8. \frac{27 \div 9}{36 \div 9} = \frac{3}{4}$$

$$9. \frac{18 \div 9}{63 \div 9} = \frac{2}{7}$$

$$10. \frac{78 \div 6}{96 \div 6} = \frac{13}{16}$$

$$11. \frac{7 \times 9}{9 \times 9} = \frac{63}{81}$$

$$12. \frac{4 \times 7}{7 \times 7} = \frac{28}{49}$$

$$13. \frac{8}{30} = \frac{4}{15} \text{ of the class}$$

$$14. \begin{array}{r} 2 \overline{)82016} \\ \underline{2} \ 4 \ 10 \ 8 \\ \underline{2} \ 2 \ 5 \ 4 \\ \underline{2} \ 1 \ 5 \ 2 \\ \underline{5} \ 1 \ 5 \ 1 \\ \underline{1} \ 1 \ 1 \end{array}$$

$$15. \begin{array}{r} 2 \overline{)891224} \\ \underline{2} \ 4 \ 9 \ 6 \ 12 \\ \underline{2} \ 2 \ 9 \ 3 \ 6 \\ \underline{3} \ 1 \ 9 \ 3 \ 3 \\ \underline{3} \ 1 \ 3 \ 1 \ 1 \\ \underline{1} \ 1 \ 1 \ 1 \end{array}$$

$$2 \times 2 \times 2 \times 2 \times 5 = 80$$

$$2 \times 2 \times 2 \times 3 \times 3 = 72$$

$$16. \begin{array}{r} 2 \overline{)1215} \\ \underline{2} \ 6 \ 15 \\ \underline{3} \ 3 \ 15 \\ \underline{5} \ 1 \ 5 \\ \underline{1} \ 1 \end{array}$$

$$17. \frac{7}{8} + \frac{1}{8} = \frac{8}{8} = 1$$

$$18. \frac{1}{4} + \frac{11}{12} + \frac{7}{16} =$$

$$\frac{12}{48} + \frac{44}{48} + \frac{21}{48} = \frac{77}{48} = 1\frac{29}{48}$$

$$2 \times 2 \times 3 \times 5 = 60$$

$$19. 3\frac{1}{4} + 2\frac{1}{3} + 3\frac{5}{6} =$$

$$3\frac{3}{12} + 2\frac{4}{12} + 3\frac{10}{12} =$$

$$8\frac{17}{12} = 9\frac{5}{12}$$

$$20. 5\frac{3}{8} + 7\frac{1}{2} + 9\frac{3}{4} = 5\frac{3}{8} + 7\frac{4}{8} + 9\frac{6}{8}$$

$$= 21\frac{13}{8} = 22\frac{5}{8}$$

$$21. \frac{6}{7} - \frac{5}{14} = \frac{12}{14} - \frac{5}{14} =$$

$$\frac{7}{14} = \frac{1}{2}$$

$$22. 4\frac{1}{2} = 4\frac{7}{14} = 3\frac{21}{14}$$

$$\underline{-3\frac{6}{7}} = \underline{-3\frac{12}{14}} = \underline{-3\frac{12}{14}}$$

$$\frac{9}{14}$$



$$10. \begin{array}{r} 4\frac{4}{13} \\ 13 \overline{)56} \\ \underline{52} \\ 4 \end{array}$$

$$11. \frac{5}{6} - \frac{4}{6} = \frac{1}{6}$$

$$12. \frac{5}{8} + \frac{9}{10} = \frac{25}{40} + \frac{36}{40} = \frac{61}{40} = 1\frac{21}{40}$$

$$13. \frac{5}{8} \times \frac{7}{10} = \frac{35}{80} = \frac{7}{16}$$

$$14. \frac{5}{6} \div \frac{3}{4} = \frac{5}{6} \times \frac{4}{3} = \frac{10}{9} = 1\frac{1}{9}$$

$$15. 10\frac{1}{2} \div 5\frac{3}{4} = \frac{21}{2} \div \frac{23}{4} = \frac{21}{2} \times \frac{4}{23} = \frac{42}{23} = 1\frac{19}{23}$$

$$16. 56 \times 32\frac{6}{7} = \frac{56}{1} \times \frac{230}{7} = 1,840$$

$$17. 2\frac{1}{2} + 3\frac{1}{3} = 2\frac{3}{6} + 3\frac{2}{6} = 5\frac{5}{6}$$

$$18. 137 - 89\frac{4}{5} = 136\frac{5}{5} - 89\frac{4}{5} = 47\frac{1}{5}$$

$$19. \frac{3}{3} = \text{entire load}$$

$$\frac{3}{3} - \frac{1}{3} = \frac{2}{3} \text{ Part of the } \frac{3}{4} \text{ truckload to be unloaded}$$

$$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12} \text{ of the truckload remains to be unloaded}$$

$$20. \frac{87}{580} = \frac{3}{20}$$

$$21. 62\frac{1}{2} \div \frac{5}{8} = \frac{125}{2} \div \frac{5}{8} = \frac{125}{2} \times \frac{8}{5} = 100 \text{ sheets}$$

$$22. 5\frac{1}{2}\% + 2\frac{1}{4}\% = 5\frac{2}{4}\% + 2\frac{1}{4}\% = 7\frac{3}{4}\%$$

## Critical Thinking, p. 75

- The two operations that require a common denominator are addition and subtraction.
- The number 1 can be written as any fraction that has a denominator and numerator that are the same.  $\frac{21}{21} = 1$
- The product of any number and its reciprocal is 1.  
Examples will vary.  $\frac{3}{5} \times \frac{5}{3} = 1$
- Division requires the use of the reciprocal of a fraction.  
Answers will vary. One example is:  $\frac{3}{7} \div \frac{8}{15} = \frac{3}{7} \times \frac{15}{8} = \frac{45}{56}$
- To find the reciprocal of a mixed number, first change the mixed number to an improper fraction by multiplying the denominator by the whole number and adding the numerator to get the numerator of the improper fraction. The denominator of the mixed number is the denominator of the improper fraction. Then, interchange the numerator and denominator of the improper fraction to make its reciprocal.  
 $3\frac{1}{3} = \frac{10}{3}$ ; reciprocal =  $\frac{3}{10}$



7. Two fractions are equal if the lowest terms of both fractions are the same.

$$\frac{3}{7} \times \frac{2}{2} = \frac{6}{14}$$

$$\frac{3}{7} \times \frac{3}{3} = \frac{9}{21}; \frac{6}{14} = \frac{9}{21}$$

9. A whole number, like 5, divided by a proper fraction, like  $\frac{1}{2}$ , means the wholes are being broken up into halves, so you have more parts (pieces) than you started with.  
 $5 \div \frac{1}{2} = \frac{5}{1} \times \frac{2}{1} = 10$ .

8. Answers will vary.

$$12 \div \frac{1}{2} = 12 \times 2 = 24$$

$$12 \div \frac{3}{4} = \frac{12}{1} \times \frac{4}{3} = \frac{48}{3} = 16$$

$$15 \div \frac{2}{3} = \frac{15}{1} \times \frac{3}{2} = \frac{45}{2} = 22\frac{1}{2}$$

10. A proper fraction has a value that is less than 1 and an improper fraction has a value that is greater than or equal to 1.

## Challenge Problem, p. 75

$$25\frac{1}{2} \times 32\frac{3}{4} = \frac{51}{2} \times \frac{131}{4}$$

$$= \frac{6,681}{8} = 835\frac{1}{8} \text{ square feet}$$

$$\frac{6,681}{8} \div 9 = \frac{6,681}{8} \times \frac{1}{9} = \frac{6,681}{72} \text{ square yards}$$

$$\frac{6,681}{72} = 92\frac{19}{24}$$

Because a portion of the 93rd square yard is needed, we will buy 93 yards and 4 additional yards for matching.

$$93 + 4 = 97$$

$$97 \times 12 = \$1,164$$

## Case Studies

### 2-1, p. 76

1.  $2\frac{1}{2} = \frac{5}{2}$

$$\frac{5}{2} \left(\frac{4}{1}\right) = \frac{20}{2} = 10 \text{ cups apples}$$

$$\frac{5}{2} \left(\frac{1}{2}\right) \text{ cup} = \frac{5}{4} = 1\frac{1}{4} \text{ cups brown sugar}$$

$$\frac{5}{2} \left(\frac{1}{2}\right) \text{ tsp} = \frac{5}{4} = 1\frac{1}{4} \text{ tsp cinnamon}$$

$$\frac{5}{2} \left(\frac{1}{4}\right) \text{ tsp} = \frac{5}{8} \text{ tsp each nutmeg/cloves}$$

$$\frac{5}{2} \left(\frac{2}{1}\right) \text{ tsp} = \frac{10}{2} = 5 \text{ tsp lemon juice}$$

$$\frac{5}{2} \left(\frac{2}{3}\right) \text{ cup} = \frac{10}{6} = 1\frac{2}{3} \text{ cups sugar}$$

$$\frac{5}{2} \left(\frac{1}{8}\right) \text{ tsp} = \frac{5}{16} \text{ tsp salt}$$

$$\frac{5}{2} \left(\frac{3}{4}\right) \text{ cup} = \frac{15}{8} = 1\frac{7}{8} \text{ cups flour}$$

$$\frac{5}{2} \left(\frac{1}{3}\right) \text{ cup} = \frac{5}{6} \text{ cup butter}$$

$$\frac{5}{2} \left(\frac{1}{4}\right) \text{ cup} = \frac{5}{8} \text{ cup walnuts}$$

2.  $4 \text{ cups} + 4 \text{ cups} = 8 \text{ cups apples}$

$$\frac{1}{2} \text{ cup} + \frac{1}{2} \text{ cup} = 1 \text{ cup brown sugar}$$

$$\frac{1}{2} \text{ tsp} + \frac{1}{2} \text{ tsp} = 1 \text{ tsp cinnamon}$$

$$\frac{1}{4} \text{ tsp} + \frac{1}{4} \text{ tsp} = \frac{1}{2} \text{ tsp each nutmeg/cloves}$$

$$2 \text{ tsp} + 2 \text{ tsp} = 4 \text{ tsp lemon juice}$$

$$\frac{2}{3} \text{ cup} + \frac{2}{3} \text{ cup} = 1\frac{1}{3} \text{ cup sugar}$$

$$\frac{1}{8} \text{ tsp} + \frac{1}{8} \text{ tsp} = \frac{2}{8} = \frac{1}{4} \text{ tsp salt}$$

$$\frac{3}{4} \text{ cup} + \frac{3}{4} \text{ cup} = \frac{6}{4} = 1\frac{1}{2} \text{ cups flour}$$

$$\frac{1}{3} \text{ cup} + \frac{1}{3} \text{ cup} = \frac{2}{3} \text{ cup butter}$$

$$\frac{1}{4} \text{ cup} + \frac{1}{4} \text{ cup} = \frac{2}{4} = \frac{1}{2} \text{ cup walnuts}$$

3.  $\frac{1}{2} \text{ cup} \left(\frac{1}{2}\right) = \frac{1}{4} \text{ cup brown sugar}; \frac{1}{4} \left(\frac{3}{1}\right) = \frac{3}{4} \text{ cup for all 3 batches}$

$$\frac{2}{3} \text{ cup} \left(\frac{1}{2}\right) = \frac{2}{6} = \frac{1}{3} \text{ cup granulated sugar}; \frac{1}{3} \left(\frac{3}{1}\right) = 1 \text{ cup for 3 batches}$$

### 2-2, p. 77

1.  $\frac{(3+2+12+15)}{64} = \frac{32}{64} = \frac{1}{2}$  of the pieces are chocolate

$$\frac{4 \text{ green} + 9 \text{ orange}}{64} = \frac{13}{64} \text{ Less than } \frac{1}{4} \text{ of the pieces are green and orange because 16 pieces would be } \frac{1}{4}.$$

2.  $\frac{(32 \text{ chocolate} + 6 \text{ peppermint} + 6 \text{ licorice})}{64} = \frac{44}{64} = \frac{11}{16}$

Close to  $\frac{3}{4}$  of the pieces are the five most popular flavors.

The Atlantic Candy Company does a good job of creating an assortment that matches the market research.

3. If a 1-lb box has 64 regular-size pieces, then a  $\frac{1}{2}$ -lb box would have 32 regular-size pieces ( $\frac{64}{2} = 32$ ).  
If we want the pieces to be double size and there are 32 regular-size pieces in a  $\frac{1}{2}$ -lb box, there will be 16 double-size pieces in each special holiday gift box. ( $\frac{32}{2} = 16$ ).
4.  $\frac{16 \text{ pieces}}{3 \text{ flavors}} = 5\frac{1}{3}$  pieces of each flavor (which is impossible).  
There would be 5 pieces of two of the flavors and 6 pieces of one of the flavors.

### 2-3, p. 77

1.  $\$240,000 \times \frac{1}{2} = \frac{\$240,000}{1} \times \frac{1}{2} = \frac{\$240,000}{2} = \$120,000$  materials  
 $\$240,000 \times \frac{1}{3} = \frac{\$240,000}{1} \times \frac{1}{3} = \frac{\$240,000}{3} = \$80,000$  labor  
 $\$240,000 - (\$120,000 + \$80,000) = \$40,000$  profit or  $\frac{40,000}{240,000} = \frac{1}{6}$  fraction of cost
2.  $400 \text{ ft} \times 400 \text{ ft} = 160,000$  square feet.  
 $\frac{40,000}{160,000} = \frac{1}{4} \cdot \frac{5,000}{160,000} = \frac{1}{32} \cdot \frac{10,000}{160,000} = \frac{1}{16} \cdot \frac{80,000}{160,000} = \frac{1}{2}$
3.  $160,000 - (40,000 + 5,000 + 10,000 + 80,000) = 25,000$  square feet  
 $\frac{25,000}{160,000} = \frac{5}{32}$  is the portion that remains for a water garden