

Chapter 2: Ratios and Percents

Review Set 2-1 (page 50)

1. $3:150 = \frac{3}{150} = \frac{1}{50}$

2. $6:10 = \frac{6}{10} = \frac{3}{5}$

3. $0.05:0.15 = \frac{0.05}{0.15} = \frac{1}{3}$

4. $20:40 = \frac{20}{40} = \frac{1}{2} = 0.5$

5. $\frac{1}{1000} : \frac{1}{150} = \frac{\frac{1}{1000}}{\frac{1}{150}} = \frac{1}{1000} \div \frac{1}{150} = \frac{1}{1000} \times \frac{150}{1} = \frac{3}{20} = 0.15$

$$\begin{array}{r} 0.15 \\ 20 \overline{) 3.00} \\ \underline{20} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

6. $0.3:4.5 = \frac{0.3}{4.5} = 0.07$

$$\begin{array}{r} 0.066 \\ 4.5 \overline{) 0.3000} \\ \underline{270} \\ 300 \\ \underline{270} \\ 30 \end{array}$$

7. $1\frac{1}{2}:6\frac{2}{9} = \frac{1\frac{1}{2}}{6\frac{2}{9}} = 1\frac{1}{2} \div 6\frac{2}{9} = \frac{3}{2} \div \frac{56}{9} = \frac{3}{2} \times \frac{9}{56} = \frac{27}{112} = 0.24$

$$\begin{array}{r} 0.241 \\ 112 \overline{) 27.000} \\ \underline{224} \\ 460 \\ \underline{448} \\ 120 \\ \underline{112} \\ 8 \end{array}$$

8. $12:48 = \frac{12}{48} = \frac{1}{4} = 0.25 = 25\%$

9. $0.08:0.64 = \frac{0.08}{0.64} = 0.125 = \mathbf{12.5\%}$

$$\begin{array}{r} 0.125 \\ 0.64 \overline{)0.08.000} \\ \underline{64} \\ 160 \\ \underline{128} \\ 320 \\ \underline{320} \\ 0 \end{array}$$

10. $7:10 = \frac{7}{10} = 0.7 = \mathbf{70\%}$

11. $50:100 = \frac{50}{100} = \mathbf{50\%}$

12. $45\% = \frac{45}{100} = \frac{9}{20}$

13. $0.5\% = 0.005 = \frac{5}{1000} = \frac{1}{200}$

14. $1\% = 0.01 = \frac{1}{100}$

15. $66\frac{2}{3}\% = \frac{200}{3}\% = \frac{200}{3} \div 100 = \frac{200}{3} \times \frac{1}{100} = \frac{2}{3}$

16. $2.94\% = 2.94 \div 100 = 0.0294 = \mathbf{0.03}$

17. $33\% = 33 \div 100 = \mathbf{0.33}$

18. $0.9\% = 0.9 \div 100 = 0.009 = \mathbf{0.01}$

19. $16\% = \frac{16}{100} = \frac{4}{25} = \mathbf{4:25}$

20. $25\% = \frac{25}{100} = \frac{1}{4} = \mathbf{1:4}$

21. $50\% = \frac{50}{100} = \frac{1}{2} = \mathbf{1:2}$

22. $0.9\% = 0.9 \div 100 = 0.009$
 $0.9 = \mathbf{0.900}$ is largest
 $1:9 = \frac{1}{9} = 1 \div 9 = 0.110$
 $\frac{1}{90} = 1 \div 90 = 0.011$

23. $0.05 = 0.050$
 $\frac{200}{400} = 200 \div 400 = 0.5 = \mathbf{0.500}$ is largest
 $0.025 = 0.025$
 $1:25 = \frac{1}{25} = 0.04 = 0.040 = 0.040$

$$\begin{array}{r} 0.5 \\ 400 \overline{)200} \\ \underline{200} \\ 0 \end{array}$$

$$\begin{array}{r} 0.04 \\ 25 \overline{)1.00} \\ \underline{100} \\ 0 \end{array}$$

24. $0.0125\% \div 100 = 0.000125$
 $0.25\% = 0.25 \div 100 = \mathbf{0.002500}$ is largest
 $0.1\% = 0.1 \div 100 = 0.001000$
 $0.02\% = 0.02 \div 100 = 0.002000$

25. $\frac{1}{150} = 0.007$

$\frac{1}{300} = 0.003$

$0.5 = \mathbf{0.500}$ is largest

$\frac{2}{3}\% = 0.067$

$$\begin{array}{r} 0.0066 \\ 150 \overline{)1.0000} \\ \underline{900} \\ 1000 \\ \underline{900} \\ 100 \end{array}$$

$$\begin{array}{r} 0.0033 \\ 300 \overline{)1.0000} \\ \underline{900} \\ 1000 \\ \underline{900} \\ 100 \end{array}$$

$\frac{2}{3}\% = \frac{2}{3} \div 100 = \frac{2}{3} \times \frac{1}{100} = \frac{2}{300}$

$$\begin{array}{r} 0.0066 \\ 300 \overline{)2.0000} \\ \underline{1800} \\ 2000 \\ \underline{1800} \\ 200 \end{array}$$

Review Set 2-2 (page 52)

1. $X = 0.25\% \times 520$
 $X = 0.0025 \times 520$
 $X = \mathbf{1.3}$

2. $X = 5\% \times 95$
 $X = 0.05 \times 95$
 $X = \mathbf{4.75}$

3. $X = 40\% \times 140$
 $X = 0.4 \times 140$
 $X = \mathbf{56}$

4. $X = 0.7\% \times 62$
 $X = 0.007 \times 62$
 $X = 0.434 = \mathbf{0.43}$

5. $X = 3\% \times 889$
 $X = 0.03 \times 889$
 $X = \mathbf{26.67}$

6. $X = 20\% \times 75$
 $X = 0.2 \times 75$
 $X = \mathbf{15}$

7. $X = 4\% \times 20$
 $X = 0.04 \times 20$
 $X = \mathbf{0.8}$

8. $X = 7\% \times 34$
 $X = 0.07 \times 34$
 $X = \mathbf{2.38}$

9. $X = 15\% \times 250$
 $X = 0.15 \times 250$
 $X = \mathbf{37.5}$

10. $X = 75\% \times 150$
 $X = 0.75 \times 150$
 $X = \mathbf{112.5}$

11. $X = 40\% \times 20$
 $X = 0.4 \times 20$
 $X = \mathbf{8 \text{ tablets}}$

12. $X = 60\% \times 1200$
 $X = 0.60 \times 1200$
 $X = \mathbf{720 \text{ mL}}$

13. $X = 80\% \text{ of } \$17\,651.07$
 $X = 0.8 \times \$17\,651.07$
 $X = \$14\,120.86$

$\$ 17\,651.07$	total bill
$- 14\,120.86$	paid by insurance company
$\$ \mathbf{3530.21}$	paid by patient

14. $X = 40\% \times 750$
 $X = 0.4 \times 750$
 $X = \mathbf{300 \text{ g}}$

15. $X = 20\% \times 3500$
 $X = 0.2 \times 3500$
 $X = \mathbf{700 \text{ calories}}$

Practice Problems—Chapter 2 (pages 52–54)

1. $0.4, 40\%, 2:5$ $\frac{2}{5} = \frac{0.4}{1}$ $0.4 \xrightarrow{\curvearrowright} 0.40 = 40\%$
 $ \phantom{\frac{2}{5} = \frac{0.4}{1}} \phantom{0.4 \xrightarrow{\curvearrowright} 0.40 = 40\%}$

$$\begin{array}{r} 5 \overline{) 2.0} \\ \underline{20} \\ 0 \end{array}$$

2. $\frac{1}{20}, 5\%, 1:20$ $0.5 = \frac{5}{100} = \frac{1}{20}$ $0.05 \xrightarrow{\curvearrowright} 0.05 = 5\%$

3. $0.17, \frac{17}{100}, 17:100$ $17\% = \frac{17}{100} = 0.17$

4. $0.25, \frac{1}{4}, 25\%$ $1:4 = \frac{1}{4} = \frac{0.25}{1}$ $0.25 \xrightarrow{\curvearrowright} 0.25 = 25\%$
 $ \phantom{0.25, \frac{1}{4}, 25\%} \phantom{1:4 = \frac{1}{4} = \frac{0.25}{1}} \phantom{0.25 \xrightarrow{\curvearrowright} 0.25 = 25\%}$

$$\begin{array}{r} 4 \overline{) 1.00} \end{array}$$

5. **0.06, $\frac{3}{50}$, 3:50** $6\% = \frac{6}{100} = \frac{3}{50}$ $6\% \overset{06\%}{\curvearrowright} = 0.06$
6. **0.17, 17%, 1:6** $\frac{1}{6} = \frac{0.166}{6 \overline{)1.000}}$ $0.166 = 0.17 \quad 0.17 = 17\% \overset{\curvearrowright}{}$
- $\begin{array}{r} \underline{6} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 4 \end{array}$
7. **0.5, $\frac{1}{2}$, 1:2** $50\% = \frac{50}{100} = \frac{1}{2} = 1:2$
 $50\% = 0.5$
8. **0.01, $\frac{1}{100}$, 1%** $1:100 = \frac{1}{100}$
 $1\% = 01\% = 0.01$
9. **$\frac{9}{100}$, 9%, 9:100** $0.09 = \frac{9}{100}$
 $0.09 \overset{0.09}{\curvearrowright} = 9\%$
10. **0.38, 38%, 3:8** $\frac{3}{8} = \frac{0.375}{8 \overline{)3.000}}$ $0.375 = 0.38 \quad 0.38 = 38\% \overset{\curvearrowright}{}$
- $\begin{array}{r} \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{36} \\ 4 \end{array}$
11. **0.67, $\frac{2}{3}$, 67%** $2:3 = \frac{2}{3} = \frac{0.666}{3 \overline{)2.000}}$ $0.666 = 0.67 \quad 0.67 = 67\% \overset{\curvearrowright}{}$
- $\begin{array}{r} \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$
12. **0.33, 33%, 1:3** $\frac{1}{3} = \frac{0.333}{3 \overline{)1.000}}$ $0.333 = 0.33 \quad 0.33 = 33\% \overset{\curvearrowright}{}$
- $\begin{array}{r} \underline{9} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 1 \end{array}$

13. $\frac{13}{25}$, **52%**, **13:25** $0.52 = \frac{52}{100} = \frac{13}{25}$
 $0.52 \xrightarrow{\curvearrowright} 0.52 = 52\%$
14. **0.45**, $\frac{9}{20}$, **45%** $9:20 = \frac{9}{20} = \frac{0.45}{1}$ $0.45 \xrightarrow{\curvearrowright} 0.45 = 45\%$

$$\begin{array}{r} 20 \overline{) 9.00} \\ \underline{80} \\ 100 \\ \underline{100} \\ 0 \end{array}$$
15. **0.86**, **86%**, **6:7** $\frac{6}{7} = \frac{0.857}{1}$ $0.86 \xrightarrow{\curvearrowright} 0.86 = 86\%$

$$\begin{array}{r} 7 \overline{) 6.000} \\ \underline{56} \\ 40 \\ \underline{35} \\ 50 \\ \underline{49} \\ 1 \end{array}$$
16. **0.3**, $\frac{3}{10}$, **30%** $3:10 = \frac{3}{10} = \frac{0.3}{1}$ $0.3 \xrightarrow{\curvearrowright} 0.3 = 30\%$

$$\begin{array}{r} 10 \overline{) 3.0} \\ \underline{30} \\ 0 \end{array}$$
17. **0.02**, **2%**, **1:50** $\frac{1}{50} = \frac{0.02}{1}$ $0.02 \xrightarrow{\curvearrowright} 0.02 = 2\%$

$$\begin{array}{r} 50 \overline{) 1.00} \\ \underline{100} \\ 0 \end{array}$$
18. $\frac{3}{50}$, **6%**, **3:50** $0.06 = 6\%$ $0.06 = \frac{6}{100} = \frac{3}{50}$

$$\begin{array}{r} \curvearrowright \\ 0.06 \end{array}$$
19. $\frac{1}{25}$, **4%**, **1:25** $0.04 = 4\%$ $4\% = \frac{4}{100} = \frac{1}{25}$

$$\begin{array}{r} \curvearrowright \\ 0.04 \end{array}$$
20. **0.1**, $\frac{1}{10}$, **1:10** $10\% = \frac{10}{100} = \frac{1}{10}$ $\frac{0.1}{1}$

$$\begin{array}{r} 10 \overline{) 1.0} \\ \underline{10} \\ 0 \end{array}$$
21. $1:25 = \frac{1}{25} =$ **0.04** $\frac{0.04}{1}$

$$\begin{array}{r} 25 \overline{) 1.00} \\ \underline{100} \\ 0 \end{array}$$
22. $\frac{10}{400} = \frac{1}{40} =$ **1:40**
23. $0.075 \xrightarrow{\curvearrowright} 0.075 = 7.5\%$
24. $17:34 = \frac{17}{34} = \frac{1}{2}$

25. $75\% = \frac{75}{100} = \frac{3}{4} = \mathbf{3:4}$

26. $X = 35\% \times 750$
 $X = 0.35 \times 750$
 $X = \mathbf{262.5}$

$$\begin{array}{r} 750 \\ \times 0.35 \\ \hline 3750 \\ 2250 \\ \hline 262.5 \end{array}$$

27. $X = 7\% \times 52$
 $X = 0.07 \times 52$
 $X = \mathbf{3.64}$

28. $X = 8.3\% \times 24$
 $X = 0.083 \times 24$
 $X = \mathbf{1.99}$

29. $1:40 = \frac{1}{40} = 0.025$

$$\begin{array}{r} 0.025 \\ 40 \overline{) 1.000} \\ \underline{80} \\ 200 \\ \underline{200} \\ 0 \end{array}$$

$1:400 = \frac{1}{400} = 0.0025$

$$\begin{array}{r} 0.0025 \\ 400 \overline{) 1.0000} \\ \underline{800} \\ 2000 \\ \underline{2000} \\ 0 \end{array}$$

$1:4 = \frac{1}{4} = 0.25$

$$\begin{array}{r} 0.25 \\ 4 \overline{) 1.00} \\ \underline{8} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

1:4 is the strongest solution.

30. $\frac{1}{10} = 0.1$

$$\begin{array}{r} 0.1 \\ 10 \overline{) 1.0} \\ \underline{10} \\ 0 \end{array}$$

$\frac{1}{200} = 0.005$

$$\begin{array}{r} 0.005 \\ 200 \overline{) 1.000} \\ \underline{1000} \\ 0 \end{array}$$

$\frac{1}{50} = 0.02$

$$\begin{array}{r} 0.02 \\ 50 \overline{) 1.00} \\ \underline{100} \\ 0 \end{array}$$

$\frac{1}{10}$ is the strongest solution.

$$31. 1680 \times \frac{20}{400} = 1680 \times \frac{1}{20} = \frac{1680}{20} = \frac{168}{2} = \mathbf{84}$$

$$32. \frac{4}{75} \div \frac{1}{300} = \frac{4}{75} \times \frac{300}{1} = \frac{1200}{75} = \mathbf{16}$$

$$\begin{array}{r} 16 \\ 75 \overline{)1200} \\ \underline{75} \\ 450 \\ \underline{450} \\ 0 \end{array}$$

$$33. \frac{3}{15} \times 5 = \frac{15}{15} = \mathbf{1}$$

$$34. 2.2 \times 250 \div 500 = 550 \div 500 = \frac{550}{500} = \mathbf{1.1}$$

$$\begin{array}{r} 1.1 \\ 500 \overline{)550.0} \\ \underline{500} \\ 500 \\ \underline{500} \\ 0 \end{array}$$

$$35. 0.6 \times \frac{200}{1.2} = \frac{120}{1.2} = \mathbf{100}$$

$$\begin{array}{r} 100 \\ 1.2 \overline{)120.0} \\ \underline{12} \\ 000 \end{array}$$

$$36. 11\frac{7}{9} \times 3 = \frac{106}{9} \times 3 = \frac{318}{9} = \mathbf{35.33}$$

$$\begin{array}{r} 35.33 \\ 9 \overline{)318.00} \\ \underline{27} \\ 48 \\ \underline{45} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 3 \end{array}$$

$$37. \frac{1}{8} \div \frac{1}{3} \times 2 = \frac{1}{8} \times \frac{3}{1} \times 2 = \frac{3}{8} \times 2 = \frac{6}{8} = \mathbf{0.75}$$

$$\begin{array}{r} 0.75 \\ 8 \overline{)6.00} \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

$$38. \frac{7}{4} \times 12 = \mathbf{21}$$

$$39. \frac{9}{0.6} \times 8 = \frac{72}{0.6} = \mathbf{120}$$

$$\begin{array}{r} 120 \\ 0.6 \overline{)72.0} \\ \underline{6} \\ 12 \\ \underline{12} \\ 00 \end{array}$$

40. $\frac{0.4}{0.1} \times 22.5 = 4 \times 22.5 = \mathbf{90}$

41. $\frac{3}{8} \times 368 = \mathbf{138}$ nurses

$\frac{1}{8} \times 368 = \mathbf{46}$ maintenance/cleaners

$\frac{1}{4} \times 368 = \mathbf{92}$ technicians and 92 others

42. $125 \times 0.2 = \mathbf{25}$ g protein

$$\begin{array}{r} 125 \\ \times 0.2 \\ \hline 25.0 = 25 \end{array}$$

$125 \times 0.05 = \mathbf{6.25}$ g fat

$$\begin{array}{r} 125 \\ \times 0.05 \\ \hline 6.25 = 6.25 \end{array}$$

43. $308 \times 0.75 = \mathbf{231}$ points needed to pass

$$\begin{array}{r} 308 \\ \times 0.75 \\ \hline 2156 \\ \underline{1540} \\ 231.00 \end{array}$$

44. $\frac{27 \text{ minutes}}{90 \text{ calories}} \times 200 \text{ calories} = \frac{20 \times 27 \text{ minutes}}{9} = \frac{540 \text{ minutes}}{9} = \mathbf{60}$ minutes

45. $0.25 \times 200 = \mathbf{50}$ mL

$$\begin{array}{r} 200 \\ \times 0.25 \\ \hline 1000 \\ \underline{400} \\ 50.00 \end{array}$$

46. $60 \times 0.45 = \mathbf{27}$ mg

$$\begin{array}{r} 60 \\ \times 0.45 \\ \hline 300 \\ \underline{240} \\ 27.00 \end{array}$$

47. $\frac{6.75 \text{ mg}}{1 \text{ minute}} \times 42 \text{ minutes} = 6.75 \text{ mg} \times 42 = \mathbf{283.5}$ mg of medication

$$\begin{array}{r} 6.75 \\ \times 42 \\ \hline 1350 \\ \underline{2700} \\ 283.50 \end{array}$$

48. $60 \text{ kg} \times 0.05 = \mathbf{3}$ kg

49. $0.17 \times \$12.56 = 2.14$

$$\begin{array}{r} \$12.56 \\ - 2.14 \\ \hline \$10.42 \end{array}$$

Instructor's Solutions Manual to Accompany *Dosage Calculations*, Fourth Canadian Edition

50. $10\% \text{ of } 150 = 0.10 \times 150 = 15$

150 mg first dose
- 15
135 mg second dose
- 15
120 mg third dose
- 15
105 mg fourth dose
- 15
90 mg fifth dose
- 15
75 mg sixth dose

6 total doses