Chapter 2: Practice Problem Answers

PERCENTAGES, RATIOS AND PROPORTIONS

Convert the following decimals to percents.

***For problems 1-4, there are two methods to convert from decimals to percents:
  1. **Simply multiply by 100 and add the % sign.**
  2. **Or, use the simplified multiplication method of shifting the decimal point two places to the right and adding the % sign.**

1. 0.53

   0.53 x 100 = 53

   53%

   Or, use the simplified multiplication method of shifting the decimal point two places to the right.

   0.53 = 53
    →→

   53%

2. 2.79

   2.79 x 100 = 279

   279%

   Or, use the simplified multiplication method of shifting the decimal point two places to the right.

2.79 = 279
→→

279%

3. 7.8

7.8 x 100 = 780

780%

Or, use the simplified multiplication method of shifting the decimal point two places to the right.

7.80 = 780
→→

780%

4. 0.0035

0.0035 x 100 = 0.35

0.35%

Or, use the simplified multiplication method of shifting the decimal point two places to the right.

0.0035 = 0.35
→→

0.35%

Convert the following percents to decimals.

***For problems 5-8, there are two methods to convert from percents to decimals:**
  1. **Simply remove the % sign and divide by 100.**
  2. **Or, use the simplified division method of shifting the decimal point two places to the left after removing the % sign.**

5. 123%

123. ÷ 100 = 1.23

Or, use the simplified division method of shifting the decimal point two places to the left.

123 = 1.23
  ←←

6. 44%

44 ÷ 100 = 0.44

Or, use the simplified division method of shifting the decimal point two places to the left.

44. = 0.44
  ←←

7. 0.6%

0.6 ÷ 100 = 0.006

Or, use the simplified division method of shifting the decimal point two places to the left.

0.6 = 0.006
  ←←

8. 18%

18 ÷ 100 = 0.18

Or, use the simplified division method of shifting the decimal point two places to the left.

18. = 0.18
  ←←

Convert the following fractions to percents.

***For problems 9-12, to convert from fractions to percents, you must first divide the numerator by the denominator to get a decimal number. Then, convert the decimal to a percent by multiplying by 100 and adding the % sign, or using the simplified**

multiplication method of shifting the decimal point two places to the right and adding the % sign (See Problems 1-4).

9. 22/44

   22 ÷ 44 = 0.5

   0.5 x 100 = 50

   50%

   Or, use the simplified multiplication method of shifting the decimal point two places to the right.

   0.50 = 50

   →→

   50%

10. 1 14/16

   The mixed number must first be converted to an improper fraction.

   1 x 16 = 16

   16 + 14 = 30

   The 30 becomes the numerator, and the 16 remains the denominator, so the resulting improper fraction is 30/16.

   30 ÷ 16 = 1.875

   1.875 x 100 = 187.5

   187.5%

   Or, use the simplified multiplication method of shifting the decimal point two places to the right.

   1.875 = 187.5

   →→

   187.5%

11. 2/8

$2 \div 8 = 0.25$

$0.25 \times 100 = 25$

25%

Or, use the simplified multiplication method of shifting the decimal point two places to the right.

$0.25 = 25$
→→

25%

12. 3/5

$3 \div 5 = 0.6$

$0.6 \times 100 = 60$

60%

Or, use the simplified multiplication method of shifting the decimal point two places to the right.

$0.60 = 60$
→→

60%

Convert the following percents to fractions.

***For problems 13-16, to convert from percents to fractions, remove the % sign and place the number over 100. Reduce to lowest terms.

13. 89%

$$\frac{89}{100}$$

Cannot be reduced any further.

14. 65%

$$\frac{65}{100}$$

The fraction 65/100 must then be reduced to lowest terms.

$$\frac{65 \div 5}{100 \div 5} = \frac{13}{20}$$

15. 25 1/5%

The mixed number must first be converted to an improper fraction.

25 x 5 = 125

125 + 1 = 126

The 126 becomes the numerator, and the 5 remains the denominator, so the resulting improper fraction is 126/5.

$$\frac{126}{5} \div 100$$

Multiply 126/5 by the reciprocal of 100 by inverting it.

$$\frac{126}{5} \times \frac{1}{100}$$

$$\frac{(126 \times 1)}{(5 \times 100)} = \frac{126}{500}$$

The fraction 126/500 must then be reduced to lowest terms.

$$\frac{126 \div 2}{500 \div 2} = \frac{63}{250}$$

16. 40%

$$\frac{40}{100}$$

The fraction 40/100 must then be reduced to lowest terms.

$$\frac{40 \div 20}{100 \div 20} = \frac{2}{5}$$

Solve the following practical problems involving percentages.

17. What is 60% of 85?

$$\frac{X}{85} = \frac{60}{100}$$

$$\frac{\cancel{85}}{1} \times \frac{X}{\cancel{85}} = \frac{60}{100} \times \frac{85}{1}$$

$$X = \frac{60 \times 85}{100}$$

$$X = 51$$

Therefore, 60% of 85 is 51.

18. What is 6 1/4% of 200?

$$\frac{X}{200} = \frac{6\ 1/4}{100}$$

$$X = (6\ 1/4 \div 100) \times 200$$

However, the mixed number must first be converted to an improper fraction in order to solve for X.

$$6 \times 4 = 24$$

$$24 + 1 = 25$$

The 25 becomes the numerator, and the 4 remains the denominator, so the resulting improper fraction is 25/4.

X = [(25/4) 100] x 200

Multiply 25/4 by the reciprocal of 100 by inverting it.

$$\frac{25}{4} \times \frac{1}{100} = \frac{(25 \times 1)}{(4 \times 100)} = \frac{25}{400}$$

X = (25/400) x 200

X = 12.5

Therefore, 6 1/4% of 200 is 12.5.

19. What percentage of 125 is 46?

$$\frac{X}{100} = \frac{46}{125}$$

X = (46/125) x 100

X = 36.8

Therefore, 46 is 36.8% of 125.

20. What percent of 54 is 243?

$$\frac{X}{100} = \frac{243}{54}$$

X = (243/54) x 100

X = 450

Therefore, 243 is 450% of 54.

Convert the following ratios to fractions.

***For problems 21-24, to convert from ratios to fractions, simply replace the colon with a slanted line (fraction bar). Reduce to lowest terms.

21. 6:45

$$\frac{6}{45}$$

The fraction 6/45 must then be reduced to lowest terms.

$$\frac{6 \div 3}{45 \div 3} = \frac{2}{15}$$

22. 2:20

$$\frac{2}{20}$$

The fraction 2/20 must then be reduced to lowest terms.

$$\frac{2 \div 2}{20 \div 2} = \frac{1}{10}$$

23. 15:90

$$\frac{15}{90}$$

The fraction 15/90 must then be reduced to lowest terms.

$$\frac{15 \div 15}{90 \div 15} = \frac{1}{6}$$

24. 28:49

$$\frac{28}{49}$$

The fraction 28/49 must then be reduced to lowest terms.

$$\frac{28 \div 7}{49 \div 7} = \frac{4}{7}$$

Convert the following fractions to ratios.

***For problems 25-28, to convert from fractions to ratios, simply replace the slanted line (fraction bar) with a colon.

25. 4/5

    4:5

26. 12/15

    The fraction must be converted to lowest terms before converting to a ratio.

    $$\frac{12 \div 3}{15 \div 3} = \frac{4}{5}$$

    4:5

27. 1/8

    1:8

28. 7/9

    7:9

Convert the following ratios to percents.

***For problems 29-32, to convert from ratios to percents, first convert the ratio into a fraction, and then divide the numerator by the denominator to get a decimal number. Simply multiply the resulting decimal number by 100 and add the % sign.

29. 12:16

    $$\frac{12}{16}$$

12 ÷ 16 = 0.75

0.75 x 100 = 75

Therefore, the ratio 12:16 is equal to 75%.

30. 2:5

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

2 ÷ 5 = 0.4

0.4 x 100 = 40

Therefore, the ratio 2:5 is equal to 40%.

31. 8:20

$$\frac{8}{20}$$

8 ÷ 20 = 0.4

0.4 x 100 = 40

Therefore, the ratio 8:20 is equal to 40%.

32. 5:30

$$\frac{5}{30}$$

5 ÷ 30 = 0.1667

0.1667 x 100 = 16.67

Therefore, the ratio 5:30 is equal to 16.67%.

Convert the following percents to ratios.

***For problems 33-36, to convert from percents to ratios, remove the % sign and place the number over 100. Reduce the fraction to lowest terms and then replace the slanted line (fraction bar) with a colon.**

33. 44%

$$\frac{44}{100}$$

The fraction 44/100 must then be reduced to lowest terms

$$\frac{44 \div 4}{100 \div 4} = \frac{11}{25}$$

11/25 = 11:245

Therefore, 44% is equal to 11:25.

34. 76%

$$\frac{76}{100}$$

The fraction 76/100 must then be reduced to lowest terms.

$$\frac{76 \div 4}{100 \div 4} = \frac{19}{25}$$

19/25 = 19:25

Therefore, 76% is equal to 19:25.

35. 82%

$$\frac{82}{100}$$

The fraction 82/100 must then be reduced to lowest terms.

$$\frac{82 \div 2}{100 \div 2} = \frac{41}{50}$$

41/50 = 41:50

Therefore, 82% is equal to 41:50.

36. 6%

$$\frac{6}{100}$$

The fraction 6/100 must then be reduced to lowest terms.

$$\frac{6 \div 2}{100 \div 2} = \frac{3}{50}$$

3/50 = 3:50

Therefore, 6% is equal to 3:50.

Solve for the unknown in the following proportions.

37. 4.5:9 :: X:80

$$\frac{4.5}{9} = \frac{X}{80}$$

9 X = 360

$$\frac{9 X}{9} = \frac{360}{9}$$

X = 40

38. X :16 :: 3:4

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

4 X = 48

$$\frac{4 X}{4} = \frac{48}{4}$$

X = 12

39. 1:X ::5:15

$$\frac{1}{X} = \frac{5}{15}$$

5 X = 15

$$\frac{5X}{5} = \frac{15}{5}$$

X = 3

40. 5:8 :: 66:X

$$\frac{5}{8} = \frac{66}{X}$$

5 X = 528

$$\frac{5X}{5} = \frac{528}{5}$$

X = 105.6

Solve the following practical problems involving proportions.

***Remember, when setting up proportions, the units in the numerators must match and the units in the denominators must match.

41. A pediatric patient is ordered a dose of 2.5 mL of amoxicillin. If amoxicillin is available as a 250 mg/5 mL suspension, how many mg is the patient receiving?

$$\frac{X\ mg}{2.5\ mL} = \frac{250\ mg}{5\ mL}$$

$$X\ mg = \frac{250\ mg \times 2.5\ \cancel{mL}}{5\ \cancel{mL}}$$

X mg = 125 mg

Therefore, 2.5 mL of a 250 mg/5 mL oral suspension contains 125 mg of amoxicillin.

42. If clindamycin injection is available as a 900 mg/6 mL vial, how many mL are needed to fill a clindamycin 150 mg order?

$\dfrac{X\ mL}{150\ mg} = \dfrac{6\ mL}{900\ mg}$

X mL = $\dfrac{6\ mL \times 150\ \cancel{mg}}{900\ \cancel{mg}}$

X mL = 1 mL

Therefore, 150 mg of Clindamyin is contained in 1 mL of a 900 mg/6 mL injection.

43. Vancomycin is compounded as a 1,000 mg/40 mL oral suspension. If a patient's dose is 750 mg, how many mL will be administered?

$\dfrac{X\ mL}{750\ mg} = \dfrac{40\ mL}{1{,}000\ mg}$

X mL = $\dfrac{40\ mL \times 750\ \cancel{mg}}{1{,}000\ \cancel{mg}}$

X mL = 30 mL

Therefore, 750 mg of Vancomycin is contained in 30 mL of a 1,000 mg/40 mL oral suspension.

44. If an IV solution is labeled as 0.45% sodium chloride, how many grams of sodium chloride will a 500 mL bag contain?

$\dfrac{X\ g}{500\ mL} = \dfrac{0.45\ g}{100\ mL}$

X g = $\dfrac{0.45\ g \times 500\ \cancel{mL}}{100\ \cancel{mL}}$

X g = 2.25 g

Therefore, a 500 mL bag of 0.45% sodium chloride solution contains 2.25 g of sodium chloride.

***Note: % = X g/100 mL**

45. If a 50 mL syringe contains 12.5 g of dextrose, what percent of dextrose does the syringe contain?

$$\frac{X\ g}{100\ mL} = \frac{12.5\ g}{50\ mL}$$

$$X\ g = \frac{12.5\ g \times 100\ \cancel{mL}}{50\ \cancel{mL}}$$

X g = 25 g

Since both the drug and the total mixture are weighed in grams, the units (g/g) cancel out and the concentration is expressed as a percentage.

Therefore, the syringe contains a 25% solution of dextrose.

***Note: 1 kg = 2.2 lbs**

46. If a patient weighs 132 lbs, how much does the patient weigh in kg?

$$\frac{X\ kg}{132\ lb} = \frac{1\ kg}{2.2\ lb}$$

$$X\ kg = \frac{1\ kg \times 132\ \cancel{lb}}{2.2\ \cancel{lb}}$$

X kg = 60 kg

Therefore, a 132 lb patient weighs 60 kg.

47. If a patient weighs 80 kg, how much does the patient weigh in lbs?

$$\frac{X\ lb}{80\ kg} = \frac{2.2\ lb}{1\ kg}$$

$$X\ lb = \frac{2.2\ lb \times 80\ \cancel{kg}}{1\ \cancel{kg}}$$

X kg = 176 lbs

Therefore, an 80 kg patient weighs 176 lbs.

48. Acetaminophen extra strength tablets are available as 500 mg tablets. If a patient was prescribed a dose of 1,000 mg of extra strength acetaminophen, how many tablets will he need to take?

$\dfrac{\text{X tabs}}{1{,}000 \text{ mg}} = \dfrac{1 \text{ tab}}{500 \text{ mg}}$

X tabs = $\dfrac{1 \text{ tab x } 1{,}000 \text{ mg}}{500 \text{ mg}}$

X tabs = 2 tabs

Therefore, the patient would need to take 2 tablets of extra strength acetaminophen to get his dose of 1,000 mg.

49. A patient presents with a compound of 30 g of hydrocortisone combined with 10 g of zinc oxide. What is the ratio of hydrocortisone to the total amount of the compound?

Total amount of compound = 30 g + 10 g = 40 g

Amount of hydrocortisone/total amount of compound = 30 g/40 g

The fraction 30/40 must be reduced to lowest terms.

$\dfrac{30 \div 10}{40 \div 10} = \dfrac{3}{4}$

3/4 = 3:4

Therefore, the ratio of hydrocortisone to the total amount of the compound is 3:4.

50. Using the information in the previous problem, what percentage of the compound is zinc oxide?

$\dfrac{\text{X}}{100} = \dfrac{10 \text{ g}}{40 \text{ g}}$

X = $\dfrac{10 \text{ g x } 100}{40 \text{ g}}$

X = 25

Therefore, the percent of zinc oxide in this compound is 25%.