Prealgebra Textbook

Second Edition

Chapter 6 Odd Solutions

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2012-2013

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Contents

Chapter 6

Ratio and Proportion

6.1 Introduction to Ratios and Rates

1. Write $0.14 : 0.44$ as a fraction, then multiplying numerator and denominator by 100 moves the decimal point 2 places to the right.

$$\begin{aligned} 0.14 : 0.44 &= \frac{0.14}{0.44} && \text{Write the ratio as a fraction.} \\ &= \frac{0.14 \cdot 100}{0.44 \cdot 100} && \text{Multiply numerator and denominator by 100.} \\ &= \frac{14}{44} \end{aligned}$$

Next, factor out the GCD and cancel.

$$\begin{aligned} &= \frac{7 \cdot 2}{22 \cdot 2} && \text{Factor out GCD.} \\ &= \frac{7 \cdot \cancel{2}}{22 \cdot \cancel{2}} && \text{Cancel.} \\ &= \frac{7}{22} \end{aligned}$$

3. Write $0.05 : 0.75$ as a fraction, then multiplying numerator and denominator by 100 moves the decimal point 2 places to the right.

$$\begin{aligned} 0.05 : 0.75 &= \frac{0.05}{0.75} && \text{Write the ratio as a fraction.} \\ &= \frac{0.05 \cdot 100}{0.75 \cdot 100} && \text{Multiply numerator and denominator by 100.} \\ &= \frac{5}{75} \end{aligned}$$

Next, factor out the GCD and cancel.

$$\begin{aligned} &= \frac{1 \cdot 5}{15 \cdot 5} && \text{Factor out GCD.} \\ &= \frac{1 \cdot \cancel{5}}{15 \cdot \cancel{5}} && \text{Cancel.} \\ &= \frac{1}{15} \end{aligned}$$

5. Write $0.1 : 0.95$ as a fraction, then multiplying numerator and denominator by 100 moves the decimal point 2 places to the right.

$$\begin{aligned} 0.1 : 0.95 &= \frac{0.1}{0.95} && \text{Write the ratio as a fraction.} \\ &= \frac{0.1 \cdot 100}{0.95 \cdot 100} && \text{Multiply numerator and denominator by 100.} \\ &= \frac{10}{95} \end{aligned}$$

Next, factor out the GCD and cancel.

$$\begin{aligned} &= \frac{2 \cdot 5}{19 \cdot 5} && \text{Factor out GCD.} \\ &= \frac{2 \cdot \cancel{5}}{19 \cdot \cancel{5}} && \text{Cancel.} \\ &= \frac{2}{19} \end{aligned}$$

7. Write $2\frac{2}{9} : 1\frac{1}{3}$ as a fraction, then change the mixed fractions to improper fractions.

$$\begin{aligned} 2\frac{2}{9} : 1\frac{1}{3} &= \frac{2\frac{2}{9}}{1\frac{1}{3}} && \text{Write the ratio as a fraction.} \\ &= \frac{\frac{20}{9}}{\frac{4}{3}} && \text{Mixed to improper fractions.} \end{aligned}$$

Invert and multiply.

$$\begin{aligned} &= \frac{20}{9} \cdot \frac{3}{4} && \text{Invert.} \\ &= \frac{60}{36} && \text{Multiply numerators and denominators.} \end{aligned}$$

Factor numerators and denominators, then cancel common factors.

$$\begin{aligned} &= \frac{2 \cdot 2 \cdot 3 \cdot 5}{2 \cdot 2 \cdot 3 \cdot 3} && \text{Factor numerators and denominators.} \\ &= \frac{5}{3} && \text{Cancel common factors.} \end{aligned}$$

9. Write $0.36 : 0.6$ as a fraction, then multiplying numerator and denominator by 100 moves the decimal point 2 places to the right.

$$\begin{aligned} 0.36 : 0.6 &= \frac{0.36}{0.6} && \text{Write the ratio as a fraction.} \\ &= \frac{0.36 \cdot 100}{0.6 \cdot 100} && \text{Multiply numerator and denominator by 100.} \\ &= \frac{36}{60} \end{aligned}$$

Next, factor out the GCD and cancel.

$$\begin{aligned} &= \frac{3 \cdot 12}{5 \cdot 12} && \text{Factor out GCD.} \\ &= \frac{3 \cdot \cancel{12}}{5 \cdot \cancel{12}} && \text{Cancel.} \\ &= \frac{3}{5} \end{aligned}$$

11. Write $15 : 21$ as a fraction, then reduce to lowest terms.

$$\begin{aligned} 15 : 21 &= \frac{15}{21} && \text{Write the ratio as a fraction.} \\ &= \frac{5 \cdot 3}{7 \cdot 3} && \text{Factor out greatest common factor.} \\ &= \frac{5 \cdot \cancel{3}}{7 \cdot \cancel{3}} && \text{Cancel.} \\ &= \frac{5}{7} \end{aligned}$$

13. Write $2\frac{8}{9} : 2\frac{2}{3}$ as a fraction, then change the mixed fractions to improper fractions.

$$\begin{aligned} 2\frac{8}{9} : 2\frac{2}{3} &= \frac{2\frac{8}{9}}{2\frac{2}{3}} && \text{Write the ratio as a fraction.} \\ &= \frac{\frac{26}{9}}{\frac{8}{3}} && \text{Mixed to improper fractions.} \end{aligned}$$

Invert and multiply.

$$= \frac{26}{9} \cdot \frac{3}{8} \qquad \text{Invert.}$$
$$= \frac{78}{72} \qquad \text{Multiply numerators and denominators.}$$

Factor numerators and denominators, then cancel common factors.

$$= \frac{2 \cdot 3 \cdot 13}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 3} \qquad \text{Factor numerators and denominators.}$$
$$= \frac{13}{2 \cdot 2 \cdot 3} \qquad \text{Cancel common factors.}$$

$$= \frac{13}{12}$$

15. Write $3\frac{8}{9} : 2\frac{1}{3}$ as a fraction, then change the mixed fractions to improper fractions.

$$3\frac{8}{9} : 2\frac{1}{3} = \frac{3\frac{8}{9}}{2\frac{1}{3}} \qquad \text{Write the ratio as a fraction.}$$
$$= \frac{\frac{35}{9}}{\frac{7}{3}} \qquad \text{Mixed to improper fractions.}$$

Invert and multiply.

$$= \frac{35}{9} \cdot \frac{3}{7} \qquad \text{Invert.}$$
$$= \frac{105}{63} \qquad \text{Multiply numerators and denominators.}$$

Factor numerators and denominators, then cancel common factors.

$$= \frac{3 \cdot 5 \cdot 7}{3 \cdot 3 \cdot 7} \qquad \text{Factor numerators and denominators.}$$
$$= \frac{5}{3} \qquad \text{Cancel common factors.}$$

17. Write $2\frac{5}{8} : 1\frac{3}{4}$ as a fraction, then change the mixed fractions to improper fractions.

$$2\frac{5}{8} : 1\frac{3}{4} = \frac{2\frac{5}{8}}{1\frac{3}{4}} \qquad \text{Write the ratio as a fraction.}$$

$$= \frac{\frac{21}{8}}{\frac{7}{4}} \qquad \text{Mixed to improper fractions.}$$

Invert and multiply.

$$= \frac{21}{8} \cdot \frac{4}{7} \qquad \text{Invert.}$$

$$= \frac{84}{56} \qquad \text{Multiply numerators and denominators.}$$

Factor numerators and denominators, then cancel common factors.

$$= \frac{2 \cdot 2 \cdot 3 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 7} \qquad \text{Factor numerators and denominators.}$$

$$= \frac{3}{2} \qquad \text{Cancel common factors.}$$

19. Write $10 : 35$ as a fraction, then reduce to lowest terms.

$$10 : 35 = \frac{10}{35} \qquad \text{Write the ratio as a fraction.}$$

$$= \frac{2 \cdot 5}{7 \cdot 5} \qquad \text{Factor out greatest common factor.}$$

$$= \frac{2 \cdot \cancel{5}}{7 \cdot \cancel{5}} \qquad \text{Cancel.}$$

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

21. Write $9 : 33$ as a fraction, then reduce to lowest terms.

$$9 : 33 = \frac{9}{33} \qquad \text{Write the ratio as a fraction.}$$

$$= \frac{3 \cdot 3}{11 \cdot 3} \qquad \text{Factor out greatest common factor.}$$

$$= \frac{3 \cdot \cancel{3}}{11 \cdot \cancel{3}} \qquad \text{Cancel.}$$

$$= \frac{3}{11}$$

23. Write $27 : 99$ as a fraction, then reduce to lowest terms.

$$\begin{aligned} 27 : 99 &= \frac{27}{99} && \text{Write the ratio as a fraction.} \\ &= \frac{3 \cdot 9}{11 \cdot 9} && \text{Factor out greatest common factor.} \\ &= \frac{3 \cdot \cancel{9}}{11 \cdot \cancel{9}} && \text{Cancel.} \\ &= \frac{3}{11} \end{aligned}$$

25. To find the rate for the first automobile, divide its mileage by its gas consumption.

$$\begin{aligned} \text{Rate 1} &= \frac{271.8\,\text{mi}}{10.1\,\text{gal}} && \text{Mileage/gallons.} \\ &= \frac{26.9\,\text{mi}}{1\,\text{gal}} && \text{Divide: } 271.8/10.1 = 26.9. \\ &= 26.9\,\text{mi/gal} \end{aligned}$$

To find the rate for the second automobile, divide its mileage by its gas consumption.

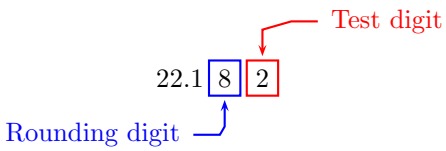
$$\begin{aligned} \text{Rate 2} &= \frac{257.9\,\text{mi}}{11.1\,\text{gal}} && \text{Mileage/gallons.} \\ &= \frac{23.2\,\text{mi}}{1\,\text{gal}} && \text{Divide: } 257.9/11.1 = 23.2. \\ &= 23.2\,\text{mi/gal} \end{aligned}$$

Rates are rounded to the nearest tenth of a mile per gallon. The first automobile has the better mileage per gallon.

27. Place 183 over 8.25 hours to get 183 dollars/8.25 hr. Divide 183 by 8.25 until the quotient contains three decimal places, one beyond the pennies (hundredths) place, which will serve as the test digit for rounding.

$$\begin{aligned} \frac{183\,\text{dollars}}{8.25\,\text{hours}} &\approx \frac{22.182\,\text{dollars}}{1\,\text{hour}} && \text{Divide: } 183/8.25 \approx 22.182. \\ &\approx 22.182 \end{aligned}$$

To round to the nearest penny (hundredth), identify the rounding digit (hundredths place) and the test digit (thousandths place).



Because the test digit is less than 5, leave rounding digit alone, then truncate the test digit. Thus, to the nearest penny, the hourly rate is 22.18 dollars per hour.

29. Place miles traveled over hours traveled and reduce.

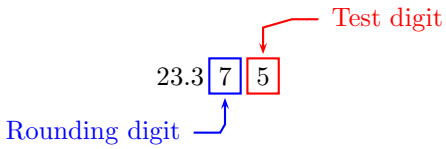
$$\begin{aligned}\frac{140\,\text{miles}}{4\,\text{hours}} &= \frac{35\,\text{miles}}{1\,\text{hour}} && \text{Divide: } 140/4 = 35.\\ &= 35\,\text{miles/hour}\end{aligned}$$

Hence, the average speed is 35 miles per hour.

31. Place 187 over 8 hours to get 187 dollars/8 hr. Divide 187 by 8 until the quotient contains three decimal places, one beyond the pennies (hundredths) place, which will serve as the test digit for rounding.

$$\begin{aligned}\frac{187\,\text{dollars}}{8\,\text{hours}} &\approx \frac{23.375\,\text{dollars}}{1\,\text{hour}} && \text{Divide: } 187/8 \approx 23.375.\\ &\approx 23.375\end{aligned}$$

To round to the nearest penny (hundredth), identify the rounding digit (hundredths place) and the test digit (thousandths place).



Because the test digit is greater than or equal to 5, add 1 to rounding digit, then truncate the test digit. Thus, to the nearest penny, the hourly rate is 23.38 dollars per hour.

33. To find the rate for the first automobile, divide its mileage by its gas consumption.

$$\begin{aligned}\text{Rate 1} &= \frac{234.2\,\text{mi}}{10.8\,\text{gal}} && \text{Mileage/gallons.}\\ &= \frac{21.7\,\text{mi}}{1\,\text{gal}} && \text{Divide: } 234.2/10.8 = 21.7.\\ &= 21.7\,\text{mi/gal}\end{aligned}$$

To find the rate for the second automobile, divide its mileage by its gas consumption.

$$\begin{aligned} \text{Rate 2} &= \frac{270.5\,\text{mi}}{10.8\,\text{gal}} && \text{Mileage/gallons.} \\ &= \frac{25.0\,\text{mi}}{1\,\text{gal}} && \text{Divide: } 270.5/10.8 = 25.0. \\ &= 25.0\,\text{mi/gal} \end{aligned}$$

Rates are rounded to the nearest tenth of a mile per gallon. The second automobile has the better mileage per gallon.

35. Place miles traveled over hours traveled and reduce.

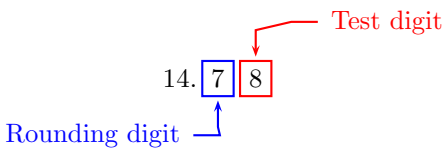
$$\begin{aligned} \frac{180\,\text{miles}}{5\,\text{hours}} &= \frac{36\,\text{miles}}{1\,\text{hour}} && \text{Divide: } 180/5 = 36. \\ &= 36\,\text{miles/hour} \end{aligned}$$

Hence, the average speed is 36 miles per hour.

37. Take the total distance traveled in miles over the total time in days and divide to the hundredths place. This will give us the test digit for rounding to the nearest tenth of a mile.

$$\begin{aligned} \frac{562\,\text{miles}}{38\,\text{days}} &\approx \frac{14.78\,\text{miles}}{1\,\text{day}} && \text{Divide: } 562/38 \approx 14.78. \\ &\approx 14.78 \end{aligned}$$

To round to the nearest tenth, identify the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to rounding digit, then truncate the test digit. Thus, to the nearest tenth of a mile, the daily rate of speed is 14.8 miles per day.

6.2 Introduction to Proportion

1. Consider

$$\frac{9}{7} = \frac{27}{21}$$

Cross multiply and simpilify.

$$\begin{aligned} 9 \cdot 21 &= 7 \cdot 27 && \text{Cross multiply.} \\ 189 &= 189 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{7}{2} = \frac{8}{9}$$

Cross multiply and simmplify.

$$\begin{aligned} 7 \cdot 9 &= 2 \cdot 8 && \text{Cross multiply.} \\ 63 &= 16 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

3. Consider

$$\frac{7}{6} = \frac{28}{24}$$

Cross multiply and simpilify.

$$\begin{aligned} 7 \cdot 24 &= 6 \cdot 28 && \text{Cross multiply.} \\ 168 &= 168 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{9}{5} = \frac{7}{3}$$

Cross multiply and simmplify.

$$\begin{aligned} 9 \cdot 3 &= 5 \cdot 7 && \text{Cross multiply.} \\ 27 &= 35 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

5. Consider

$$\frac{6}{5} = \frac{24}{20}$$

Cross multiply and simpilify.

$$\begin{aligned} 6 \cdot 20 &= 5 \cdot 24 && \text{Cross multiply.} \\ 120 &= 120 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{5}{2} = \frac{2}{8}$$

Cross multiply and simmplify.

$$\begin{aligned} 5 \cdot 8 &= 2 \cdot 2 && \text{Cross multiply.} \\ 40 &= 4 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

7. Consider

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

Cross multiply and simpilify.

$$\begin{aligned} 3 \cdot 14 &= 7 \cdot 6 && \text{Cross multiply.} \\ 42 &= 42 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{7}{4} = \frac{5}{9}$$

Cross multiply and simmplify.

$$\begin{aligned} 7 \cdot 9 &= 4 \cdot 5 && \text{Cross multiply.} \\ 63 &= 20 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

9. Consider

$$\frac{5}{4} = \frac{25}{20}$$

Cross multiply and simpilify.

$$\begin{aligned} 5 \cdot 20 &= 4 \cdot 25 && \text{Cross multiply.} \\ 100 &= 100 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{9}{3} = \frac{9}{6}$$

Cross multiply and simmplify.

$$\begin{aligned} 9 \cdot 6 &= 3 \cdot 9 && \text{Cross multiply.} \\ 54 &= 27 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

11. Consider

$$\frac{3}{5} = \frac{6}{10}$$

Cross multiply and simpilify.

$$\begin{aligned} 3 \cdot 10 &= 5 \cdot 6 && \text{Cross multiply.} \\ 30 &= 30 && \text{Simplify both sides.} \end{aligned}$$

Because this last statement is true, this is a true proportion. To provide some constrast, consider

$$\frac{3}{9} = \frac{9}{5}$$

Cross multiply and simmplify.

$$\begin{aligned} 3 \cdot 5 &= 9 \cdot 9 && \text{Cross multiply.} \\ 15 &= 81 && \text{Simplify both sides.} \end{aligned}$$

In this case, the last statement is false. Hence, this is not a true proportion. In similar fashion, readers should check that the remaining two choices are not proportions.

13. Cross multiply, then solve the resulting equation.

$$\frac{17}{3} = \frac{x}{18}$$ Orginial Proportion.

$$3 \cdot x = 17 \cdot 18$$ Product of means and extremes are equal.

$$3x = 306$$ Simplify.

$$\frac{3x}{3} = \frac{306}{3}$$ Divide both sides by 3.

$$x = 102$$ Simplify.

15. Cross multiply, then solve the resulting equation.

$$\frac{6x+10}{6} = \frac{11}{3}$$ Original Proportion.

$$3(6x+10) = 6(11)$$ Products of means and extremes are equal.

$$18x + 30 = 66$$ On the left, distribute.

On the right, multiply.

$$18x + 30 - 30 = 66 - 30$$ Subtract 30 from both sides.

$$18x = 36$$ Simplify.

$$\frac{18x}{18} = \frac{36}{18}$$ Divide both sides by 18.

$$x = 2$$ Simplify both sides.

17. Cross multiply, then solve the resulting equation.

$$\frac{17}{9} = \frac{x}{18}$$ Orginial Proportion.

$$9 \cdot x = 17 \cdot 18$$ Product of means and extremes are equal.

$$9x = 306$$ Simplify.

$$\frac{9x}{9} = \frac{306}{9}$$ Divide both sides by 9.

$$x = 34$$ Simplify.

19. Cross multiply, then solve the resulting equation.

$$\frac{11}{2} = \frac{x}{8}$$ Orginial Proportion.

$$2 \cdot x = 11 \cdot 8$$ Product of means and extremes are equal.

$$2x = 88$$ Simplify.

$$\frac{2x}{2} = \frac{88}{2}$$ Divide both sides by 2.

$$x = 44$$ Simplify.

21. Cross multiply, then solve the resulting equation.

$$\frac{7x+15}{15} = \frac{10}{3}$$ Original Proportion.

$$3(7x+15) = 15(10)$$ Products of means and extremes are equal.

$$21x + 45 = 150$$ On the left, distribute.

On the right, multiply.

$$21x + 45 - 45 = 150 - 45$$ Subtract 45 from both sides.

$$21x = 105$$ Simplify.

$$\frac{21x}{21} = \frac{105}{21}$$ Divide both sides by 21.

$$x = 5$$ Simplify both sides.

23. Cross multiply, then solve the resulting equation.

$$\frac{11}{2} = \frac{x}{10}$$ Orginial Proportion.

$$2 \cdot x = 11 \cdot 10$$ Product of means and extremes are equal.

$$2x = 110$$ Simplify.

$$\frac{2x}{2} = \frac{110}{2}$$ Divide both sides by 2.

$$x = 55$$ Simplify.

25. Cross multiply, then solve the resulting equation.

$$\frac{5x+8}{12} = \frac{2}{3}$$ Original Proportion.

$$3(5x+8) = 12(2)$$ Products of means and extremes are equal.

$$15x + 24 = 24$$ On the left, distribute.

On the right, multiply.

$$15x + 24 - 24 = 24 - 24$$ Subtract 24 from both sides.

$$15x = 0$$ Simplify.

$$\frac{15x}{15} = \frac{0}{15}$$ Divide both sides by 15.

$$x = 0$$ Simplify both sides.

27. Cross multiply, then solve the resulting equation.

$$\frac{2}{15} = \frac{24}{x}$$ Orginial Proportion.

$$2 \cdot x = 15 \cdot 24$$ Product of means and extremes are equal.

$$2x = 360$$ Simplify.

$$\frac{2x}{2} = \frac{360}{2}$$ Divide both sides by 2.

$$x = 180$$ Simplify.

29. Cross multiply, then solve the resulting equation.

$$\frac{3}{16} = \frac{6}{x}$$ Orginial Proportion.

$$3 \cdot x = 16 \cdot 6$$ Product of means and extremes are equal.

$$3x = 96$$ Simplify.

$$\frac{3x}{3} = \frac{96}{3}$$ Divide both sides by 3.

$$x = 32$$ Simplify.

31. Cross multiply, then solve the resulting equation.

$$\frac{5}{22} = \frac{20}{x}$$ Orginial Proportion.

$$5 \cdot x = 22 \cdot 20$$ Product of means and extremes are equal.

$$5x = 440$$ Simplify.

$$\frac{5x}{5} = \frac{440}{5}$$ Divide both sides by 5.

$$x = 88$$ Simplify.

33. Cross multiply, then solve the resulting equation.

$$\frac{2x+10}{6} = \frac{14}{3}$$ Original Proportion.

$$3(2x+10) = 6(14)$$ Products of means and extremes are equal.

$$6x + 30 = 84$$ On the left, distribute.

On the right, multiply.

$$6x + 30 - 30 = 84 - 30$$ Subtract 30 from both sides.

$$6x = 54$$ Simplify.

$$\frac{6x}{6} = \frac{54}{6}$$ Divide both sides by 6.

$$x = 9$$ Simplify both sides.

35. Cross multiply, then solve the resulting equation.

$$\frac{7}{2} = \frac{21}{x}$$ Orginial Proportion.

$$7 \cdot x = 2 \cdot 21$$ Product of means and extremes are equal.

$$7x = 42$$ Simplify.

$$\frac{7x}{7} = \frac{42}{7}$$ Divide both sides by 7.

$$x = 6$$ Simplify.

37. Let x represent the cost of 7 dog bones. 13 dog bones cost \$1.97. Assuming the rate for 13 dog bones at \$1.97 equals the rate for 7 dog bones at an unknown cost x, we can set up a proportion.

$$\frac{13 \text{ dog bones}}{1.97 \text{ dollars}} = \frac{7 \text{ dog bones}}{x \text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\frac{13}{1.97} = \frac{7}{x}$$ Original Proportion.

$$13 \cdot x = 1.97 \cdot 7$$ Product of means and extremes are equal.

$$13x = 13.79$$ Simplify.

$$\frac{13x}{13} = \frac{13.79}{13}$$ Divide both sides by 13.

$$x = 1.06076923076923$$ Simplify.

$$x = 1.06$$ Round to the nearest penny.

Thus, 7 dog bones costs \$1.06.

39. Let x represent the cost of 14 bananas. 7 bananas cost \$2.55. Assuming the rate for 7 bananas at \$2.55 equals the rate for 14 bananas at an unknown cost x, we can set up a proportion.

$$\frac{7 \text{ bananas}}{2.55 \text{ dollars}} = \frac{14 \text{ bananas}}{x \text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\frac{7}{2.55} = \frac{14}{x}$$ Original Proportion.

$$7 \cdot x = 2.55 \cdot 14$$ Product of means and extremes are equal.

$$7x = 35.7$$ Simplify.

$$\frac{7x}{7} = \frac{35.7}{7}$$ Divide both sides by 7.

$$x = 5.1$$ Simplify.

$$x = 5.10$$ Round to the nearest penny.

Thus, 14 bananas costs \$5.10.

41. Let x represent the cost of 11 oranges. 13 oranges cost \$3.61. Assuming the rate for 13 oranges at \$3.61 equals the rate for 11 oranges at an unknown cost x, we can set up a proportion.

$$\frac{13\text{ oranges}}{3.61\text{ dollars}} = \frac{11\text{ oranges}}{x\text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{13}{3.61} &= \frac{11}{x} && \text{Original Proportion.}\\
13 \cdot x &= 3.61 \cdot 11 && \text{Product of means and extremes are equal.}\\
13x &= 39.71 && \text{Simplify.}\\
\frac{13x}{13} &= \frac{39.71}{13} && \text{Divide both sides by 13.}\\
x &= 3.05461538461538 && \text{Simplify.}\\
x &= 3.05 && \text{Round to the nearest penny.}
\end{aligned}$$

Thus, 11 oranges costs \$3.05.

43. Let x represent the cost of 13 dog bones. 3 dog bones cost \$1.23. Assuming the rate for 3 dog bones at \$1.23 equals the rate for 13 dog bones at an unknown cost x, we can set up a proportion.

$$\frac{3\text{ dog bones}}{1.23\text{ dollars}} = \frac{13\text{ dog bones}}{x\text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{3}{1.23} &= \frac{13}{x} && \text{Original Proportion.}\\
3 \cdot x &= 1.23 \cdot 13 && \text{Product of means and extremes are equal.}\\
3x &= 15.99 && \text{Simplify.}\\
\frac{3x}{3} &= \frac{15.99}{3} && \text{Divide both sides by 3.}\\
x &= 5.33 && \text{Simplify.}\\
x &= 5.33 && \text{Round to the nearest penny.}
\end{aligned}$$

Thus, 13 dog bones costs \$5.33.

45. Let x represent the cost of 13 apples. 3 apples cost \$3.24. Assuming the rate for 3 apples at \$3.24 equals the rate for 13 apples at an unknown cost x, we can set up a proportion.

$$\frac{3\text{ apples}}{3.24\text{ dollars}} = \frac{13\text{ apples}}{x\text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{3}{3.24} &= \frac{13}{x} && \text{Original proportion.}\\
3 \cdot x &= 3.24 \cdot 13 && \text{Product of means and extremes are equal.}\\
3x &= 42.12 && \text{Simplify.}\\
\frac{3x}{3} &= \frac{42.12}{3} && \text{Divide both sides by 3.}\\
x &= 14.04 && \text{Simplify.}\\
x &= 14.04 && \text{Round to the nearest penny.}
\end{aligned}$$

Thus, 13 apples costs \$14.04.

47. Let x represent the cost of 8 dog bones. 4 dog bones cost \$1.03. Assuming the rate for 4 dog bones at \$1.03 equals the rate for 8 dog bones at an unknown cost x, we can set up a proportion.

$$\frac{4 \text{ dog bones}}{1.03 \text{ dollars}} = \frac{8 \text{ dog bones}}{x \text{ dollars}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{4}{1.03} &= \frac{8}{x} && \text{Original proportion.}\\
4 \cdot x &= 1.03 \cdot 8 && \text{Product of means and extremes are equal.}\\
4x &= 8.24 && \text{Simplify.}\\
\frac{4x}{4} &= \frac{8.24}{4} && \text{Divide both sides by 4.}\\
x &= 2.06 && \text{Simplify.}\\
x &= 2.06 && \text{Round to the nearest penny.}
\end{aligned}$$

Thus, 8 dog bones costs \$2.06.

49. Let x represent the cost in cents of 20 rolls when 5 rolls cost 12 cents. Now create a proportion using these two ratios.

$$\frac{5 \text{ rolls}}{12 \text{ cents}} = \frac{20 \text{ rolls}}{x \text{ cents}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{5}{12} &= \frac{20}{x} && \text{Original proportion.}\\
5 \cdot x &= 20 \cdot 12 && \text{Product of means and extremes are equal.}\\
\frac{5x}{5} &= \frac{20 \cdot 12}{5} && \text{Divide both sides by 5.}\\
x &= 48 && \text{Simplify.}
\end{aligned}$$

Thus, 20 rolls would cost 48 cents.

51. Let x represent the number of dumptrucks needed to remove 40,000 cubic yards of material when 3000 cubic yards of material requires 200 dumptrucks for removal. Now create a proportion using these two ratios.

$$\frac{3000\,\text{cubic yards}}{200\,\text{dumptrucks}} = \frac{40,000\,\text{cubic yards}}{x\,\text{dumptrucks}}$$

Now, let's drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{3000}{200} &= \frac{40,000}{x} && \text{Original proportion.}\\
3000 \cdot x &= 40,000 \cdot 200 && \text{Product of means and extremes are equal.}\\
3000x &= 8,000,000 && \text{Simplify.}\\
\frac{3000x}{3000} &= \frac{8,000,000}{3000} && \text{Divide both sides by 3000.}\\
x &\approx 2666.6 && \text{Simplify.}\\
x &= 2667 && \text{Round to the nearest whole number.}
\end{aligned}$$

Thus, approximately 2,667 dumptruck loads were required to remove 40,000 cubic yards of material from the landslide.

53. Let x represent the millions of US dollars that converts to 10 million Australian dollars when the exchange rate is such that 1.75 million Australian dollars represents \$1.64 million US dollars. Create a proportion using these two ratios.

$$\frac{1.75\,\text{million Australian dollars}}{1.64\,\text{million US dollars}} = \frac{10\,\text{million Australian dollars}}{x\,\text{million US dollars}}$$

Now, let's drop the units, cross multiply and solve. Your answer will be in the millions of US dollars.

$$\begin{aligned}
\frac{1.75}{1.64} &= \frac{10}{x} && \text{Original proportion.}\\
1.75 \cdot x &= 10 \cdot 1.64 && \text{Product of means and extremes are equal.}\\
1.75 \cdot x &= 16.4 && \text{Simplify.}\\
\frac{1.75x}{1.75} &= \frac{16.4}{1.75} && \text{Divide both sides by 1.75.}\\
x &\approx 9.371 && \text{Divide to three decimal places.}
\end{aligned}$$

Thus, to the nearest hundredth of a million dollars, 10 million in Australian dollars is equivalent to about \$9.73 million US dollars. Note that currency exchange rates fluctuate daily and these values will change accordingly.

6.3 Unit Conversion: American System

1. Multiply by the appropriate conversion factor.

$$\begin{aligned} 8\,\text{yd} &= 8\,\text{yd} \cdot \frac{3\,\text{ft}}{1\,\text{yd}} && \text{Apply } 3\,\text{ft}/1\,\text{yd}. \\ &= 8\,\cancel{\text{yd}} \cdot \frac{3\,\text{ft}}{1\,\cancel{\text{yd}}} && \text{Cancel common unit.} \\ &= 24\,\text{ft} && \text{Multiply.} \end{aligned}$$

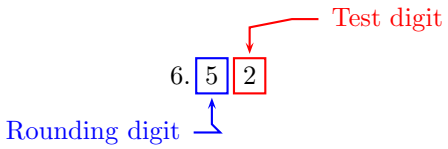
3. multiply by the appropriate conversion factor.

$$\begin{aligned} 261\,\text{ft} &= 261\,\text{ft} \cdot \frac{1\,\text{yd}}{3\,\text{ft}} && \text{Apply } 1\,\text{yd}/3\,\text{ft}. \\ &= 261\,\cancel{\text{ft}} \cdot \frac{1\,\text{yd}}{3\,\cancel{\text{ft}}} && \text{Cancel common unit.} \\ &= \frac{261}{3}\,\text{yd} && \text{Multiply fractions.} \\ &= 87\,\text{yd} && \text{Divide.} \end{aligned}$$

5. We multiply by a chain of conversion factors, the first to change inches to feet, the second to change feet to yards.

$$\begin{aligned} 235\,\text{in} &= 235\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{yd}}{3\,\text{ft}} && \text{Multiply by conversion factors.} \\ &= 235\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{yd}}{3\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= \frac{235 \cdot 1 \cdot 1}{12 \cdot 3}\,\text{yd} && \text{Multiply fractions.} \\ &= 6.52\,\text{yd} && \text{Simplify.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is less than 5, leave the rounding digit alone and truncate everything to the right of the rounding digit. Hence, to the nearest tenth of a yard, 235 inches is approximately 6.5 yards.

7. multiply by the appropriate conversion factor.

$$\begin{aligned} 141\,\text{ft} &= 141\,\text{ft} \cdot \frac{1\,\text{yd}}{3\,\text{ft}} && \text{Apply } 1\,\text{yd}/3\,\text{ft}. \\ &= 141\,\cancel{\text{ft}} \cdot \frac{1\,\text{yd}}{3\,\cancel{\text{ft}}} && \text{Cancel common unit.} \\ &= \frac{141}{3}\,\text{yd} && \text{Multiply fractions.} \\ &= 47\,\text{yd} && \text{Divide.} \end{aligned}$$

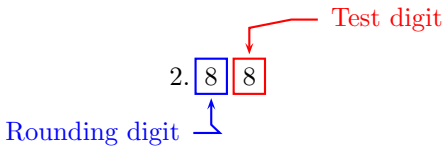
9. Multiply by the appropriate conversion factor.

$$\begin{aligned} 2.8\,\text{mi} &= 2.8\,\text{mi} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} && \text{Apply } 5280\,\text{ft}/1\,\text{mi}. \\ &= 2.8\,\cancel{\text{mi}} \cdot \frac{5280\,\text{ft}}{1\,\cancel{\text{mi}}} && \text{Cancel common unit.} \\ &= 14784\,\text{ft} && \text{Multiply.} \end{aligned}$$

11. We multiply by a chain of conversion factors, the first to change inches to feet, the second to change feet to yards.

$$\begin{aligned} 104\,\text{in} &= 104\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{yd}}{3\,\text{ft}} && \text{Multiply by conversion factors.} \\ &= 104\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{yd}}{3\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= \frac{104 \cdot 1 \cdot 1}{12 \cdot 3}\,\text{yd} && \text{Multiply fractions.} \\ &= 2.88\,\text{yd} && \text{Simplify.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

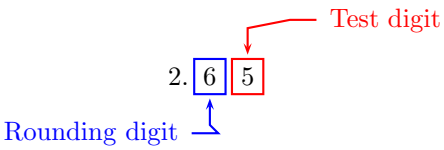


Because the test digit is greater than or equal to 5, add 1 to rounding digit and truncate everything to the right of the rounding digit. Hence, to the nearest tenth of a yard, 104 inches is approximately 2.9 yards.

13. We multiply by a chain of conversion factors, the first to change inches to feet, the second to change feet to miles.

$$\begin{aligned}
168372\,\text{in} &= 168372\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 168372\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{168372 \cdot 1 \cdot 1}{12 \cdot 5280}\,\text{mi} && \text{Multiply fractions.}\\
&= 2.65\,\text{mi} && \text{Simplify.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to the rounding digit and truncate everything after the rounding digit. Hence, to the nearest tenth of a mile, 168,372 inches is approximately 2.7 miles.

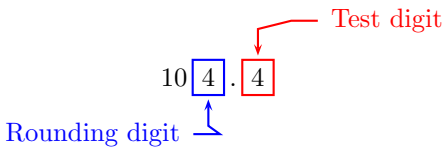
15. Multiply by the appropriate conversion factor.

$$\begin{aligned}
82\,\text{ft} &= 82\,\text{ft} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Apply } 12\,\text{in}/1\,\text{ft.}\\
&= 82\,\cancel{\text{ft}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common unit.}\\
&= 984\,\text{in} && \text{Multiply.}
\end{aligned}$$

17. We multiply by a chain of conversion factors, the first to change yards to feet, the second to change feet to inches.

$$\begin{aligned}
2.9\,\text{yd} &= 2.9\,\text{yd} \cdot \frac{3\,\text{ft}}{1\,\text{yd}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 2.9\,\cancel{\text{yd}} \cdot \frac{3\,\cancel{\text{ft}}}{1\,\cancel{\text{yd}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{2.9 \cdot 3 \cdot 12}{1 \cdot 1}\,\text{in} && \text{Multiply fractions.}\\
&= 104.4\,\text{in} && \text{Simplify.}
\end{aligned}$$

Locate the rounding digit in the units place and the test digit in the tenths place.

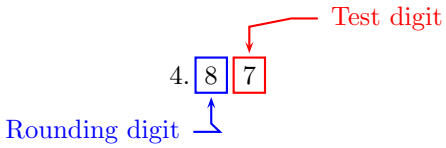


Because the test digit is less than 5, leave the rounding digit alone and truncate everything to the right of the decimal point. Hence, to the nearest inch, 2.9 yards is approximately 104 inches.

19. Multiply by the appropriate conversion factor.

$$\begin{aligned} 25756\,\text{ft} &= 25756\,\text{ft} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} && \text{Apply } 1\,\text{mi}/5280\,\text{ft}. \\ &= 25756\,\cancel{\text{ft}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} && \text{Cancel common unit.} \\ &= \frac{25756}{5280}\,\text{mi} && \text{Multiply.} \\ &= 4.87\,\text{mi} && \text{Carry division to two decimal places.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a mile, 25,756 feet is approximately 4.9 miles.

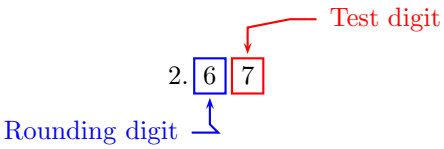
21. Multiply by the appropriate conversion factor.

$$\begin{aligned} 5\,\text{yd} &= 5\,\text{yd} \cdot \frac{3\,\text{ft}}{1\,\text{yd}} && \text{Apply } 3\,\text{ft}/1\,\text{yd}. \\ &= 5\,\cancel{\text{yd}} \cdot \frac{3\,\text{ft}}{1\,\cancel{\text{yd}}} && \text{Cancel common unit.} \\ &= 15\,\text{ft} && \text{Multiply.} \end{aligned}$$

23. We multiply by a chain of conversion factors, the first to change inches to feet, the second to change feet to miles.

$$\begin{aligned}
169312\,\text{in} &= 169312\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 169312\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{169312 \cdot 1 \cdot 1}{12 \cdot 5280}\,\text{mi} && \text{Multiply fractions.}\\
&= 2.67\,\text{mi} && \text{Simplify.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

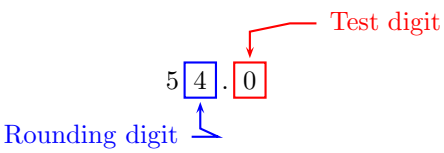


Because the test digit is greater than or equal to 5, add 1 to the rounding digit and truncate everything after the rounding digit. Hence, to the nearest tenth of a mile, 169,312 inches is approximately 2.7 miles.

25. We multiply by a chain of conversion factors, the first to change yards to feet, the second to change feet to inches.

$$\begin{aligned}
1.5\,\text{yd} &= 1.5\,\text{yd} \cdot \frac{3\,\text{ft}}{1\,\text{yd}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 1.5\,\cancel{\text{yd}} \cdot \frac{3\,\cancel{\text{ft}}}{1\,\cancel{\text{yd}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{1.5 \cdot 3 \cdot 12}{1 \cdot 1}\,\text{in} && \text{Multiply fractions.}\\
&= 54.0\,\text{in} && \text{Simplify.}
\end{aligned}$$

Locate the rounding digit in the units place and the test digit in the tenths place.



Because the test digit is less than 5, leave the rounding digit alone and truncate everything to the right of the decimal point. Hence, to the nearest inch, 1.5 yards is approximately 54 inches.

27. Multiply by the appropriate conversion factor.

$$\begin{aligned} 360\,\text{in} &= 360\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} && \text{Apply } 1\,\text{ft}/12\,\text{in.} \\ &= 360\,\cancel{\text{in}} \cdot \frac{1\,\text{ft}}{12\,\cancel{\text{in}}} && \text{Cancel common unit.} \\ &= \frac{360}{12}\,\text{ft} && \text{Multiply.} \\ &= 30\,\text{ft} && \text{Divide.} \end{aligned}$$

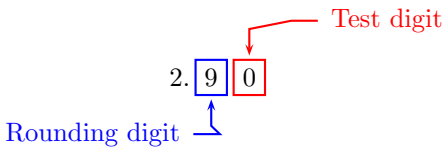
29. Multiply by the appropriate conversion factor.

$$\begin{aligned} 48\,\text{in} &= 48\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} && \text{Apply } 1\,\text{ft}/12\,\text{in.} \\ &= 48\,\cancel{\text{in}} \cdot \frac{1\,\text{ft}}{12\,\cancel{\text{in}}} && \text{Cancel common unit.} \\ &= \frac{48}{12}\,\text{ft} && \text{Multiply.} \\ &= 4\,\text{ft} && \text{Divide.} \end{aligned}$$

31. Multiply by the appropriate conversion factor.

$$\begin{aligned} 15363\,\text{ft} &= 15363\,\text{ft} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} && \text{Apply } 1\,\text{mi}/5280\,\text{ft.} \\ &= 15363\,\cancel{\text{ft}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} && \text{Cancel common unit.} \\ &= \frac{15363}{5280}\,\text{mi} && \text{Multiply.} \\ &= 2.90\,\text{mi} && \text{Carry division to two decimal places.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is less than 5, leave the rounding digit alone, then truncate.. Hence, to the nearest tenth of a mile, 15,363 feet is approximately 2.9 miles.

33. We multiply by a chain of conversion factors, the first to change miles to feet, the second to change feet to inches.

$$\begin{aligned}
1.7\,\text{mi} &= 1.7\,\text{mi} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 1.7\,\cancel{\text{mi}} \cdot \frac{5280\,\cancel{\text{ft}}}{1\,\cancel{\text{mi}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{1.7 \cdot 5280 \cdot 12}{1 \cdot 1}\,\text{ft} && \text{Multiply fractions.}\\
&= 107712\,\text{in} && \text{Simplify.}
\end{aligned}$$

Hence, 1.7 miles equals 107,712 inches.

35. We multiply by a chain of conversion factors, the first to change miles to feet, the second to change feet to inches.

$$\begin{aligned}
3.1\,\text{mi} &= 3.1\,\text{mi} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Multiply by conversion factors.}\\
&= 3.1\,\cancel{\text{mi}} \cdot \frac{5280\,\cancel{\text{ft}}}{1\,\cancel{\text{mi}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.}\\
&= \frac{3.1 \cdot 5280 \cdot 12}{1 \cdot 1}\,\text{ft} && \text{Multiply fractions.}\\
&= 196416\,\text{in} && \text{Simplify.}
\end{aligned}$$

Hence, 3.1 miles equals 196,416 inches.

37. Multiply by the appropriate conversion factor.

$$\begin{aligned}
3.6\,\text{mi} &= 3.6\,\text{mi} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} && \text{Apply } 5280\,\text{ft}/1\,\text{mi}.\\
&= 3.6\,\cancel{\text{mi}} \cdot \frac{5280\,\text{ft}}{1\,\cancel{\text{mi}}} && \text{Cancel common unit.}\\
&= 19008\,\text{ft} && \text{Multiply.}
\end{aligned}$$

39. Multiply by the appropriate conversion factor.

$$\begin{aligned}
18\,\text{ft} &= 18\,\text{ft} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Apply } 12\,\text{in}/1\,\text{ft}.\\
&= 18\,\cancel{\text{ft}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common unit.}\\
&= 216\,\text{in} && \text{Multiply.}
\end{aligned}$$

41. Multiply by the appropriate conversion factor.

$$\begin{aligned} 5\frac{1}{8}\,\text{lb} &= 5\frac{1}{8}\,\text{lb}\cdot\frac{16\,\text{oz}}{1\,\text{lb}} && \text{Apply } 16\,\text{oz}/1\,\text{lb}. \\ &= 5\frac{1}{8}\,\cancel{\text{lb}}\cdot\frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{41}{8}\cdot 16\right)\text{oz} && \text{Mixed to improper fraction.} \\ &= 82\,\text{oz} \end{aligned}$$

Hence, $5\frac{1}{8}$ pounds equals 82 ounces.

43. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned} 2.4\,\text{ton} &= 2.4\,\text{ton}\cdot\frac{2000\,\text{lb}}{1\,\text{ton}}\cdot\frac{16\,\text{oz}}{1\,\text{lb}} && \text{Multiply by conversion factors.} \\ &= 2.4\,\cancel{\text{ton}}\cdot\frac{2000\,\cancel{\text{lb}}}{1\,\cancel{\text{ton}}}\cdot\frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common units.} \\ &= \left(\frac{2.4\cdot 2000\cdot 16}{1\cdot 1}\right)\text{oz} && \text{Multiply.} \\ &= 76800\,\text{oz} \end{aligned}$$

Hence, 2.4 tons equals 76,800 ounces.

45. Multiply by the appropriate conversion factor.

$$\begin{aligned} 34\,\text{oz} &= 34\,\text{oz}\cdot\frac{1\,\text{lb}}{16\,\text{oz}} && \text{Apply } 1\,\text{lb}/16\,\text{oz}. \\ &= 34\,\cancel{\text{oz}}\cdot\frac{1\,\text{lb}}{16\,\cancel{\text{oz}}} && \text{Cancel common unit.} \\ &= \frac{34}{16}\,\text{lb} && \text{Multiply.} \\ &= \frac{17}{8}\,\text{lb} && \text{Reduce.} \\ &= 2\frac{1}{8}\,\text{lb} && \text{Change to mixed fraction.} \end{aligned}$$

47. Multiply by the appropriate conversion factor.

$$\begin{aligned} 2.2\,\text{ton} &= 2.2\,\text{ton}\cdot\frac{2000\,\text{lb}}{1\,\text{ton}} && \text{Apply } 2000\,\text{lb}/1\,\text{ton}. \\ &= 2.2\,\cancel{\text{ton}}\cdot\frac{2000\,\text{lb}}{1\,\cancel{\text{ton}}} && \text{Cancel common unit.} \\ &= \left(\frac{2.2\cdot 2000}{1}\right)\text{lb} && \text{Multiply.} \\ &= 4400\,\text{lb} \end{aligned}$$

Hence, 2.2 tons equals 4,400 pounds.

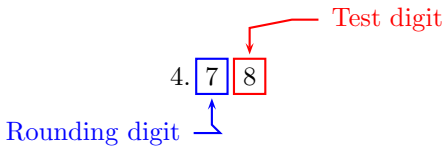
49. Multiply by the appropriate conversion factor.

$$\begin{aligned}
70\,\text{oz} &= 70\,\text{oz} \cdot \frac{1\,\text{lb}}{16\,\text{oz}} && \text{Apply } 1\,\text{lb}/16\,\text{oz}. \\
&= 70\,\cancel{\text{oz}} \cdot \frac{1\,\text{lb}}{16\,\cancel{\text{oz}}} && \text{Cancel common unit.} \\
&= \frac{70}{16}\,\text{lb} && \text{Multiply.} \\
&= \frac{35}{8}\,\text{lb} && \text{Reduce.} \\
&= 4\,\frac{3}{8}\,\text{lb} && \text{Change to mixed fraction.}
\end{aligned}$$

51. Multiply by the appropriate conversion factor.

$$\begin{aligned}
9560\,\text{lb} &= 9560\,\text{lb} \cdot \frac{1\,\text{ton}}{2000\,\text{lb}} && \text{Apply } 1\,\text{ton}/2000\,\text{lb}. \\
&= 9560\,\cancel{\text{lb}} \cdot \frac{1\,\text{ton}}{2000\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\
&= \left(\frac{9560}{2000}\right)\,\text{ton} && \text{Multiply.} \\
&= 4.78\,\text{ton} && \text{Divide.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate.. Hence, to the nearest tenth of a ton, 9,560 pounds is approximately 4.8 tons.

53. Multiply by the appropriate conversion factor.

$$\begin{aligned} 2\frac{1}{2}\,\text{lb} &= 2\frac{1}{2}\,\text{lb}\cdot\frac{16\,\text{oz}}{1\,\text{lb}} && \text{Apply } 16\,\text{oz}/1\,\text{lb}.\\ &= 2\frac{1}{2}\,\cancel{\text{lb}}\cdot\frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common unit.}\\ &= \left(\frac{5}{2}\cdot 16\right)\text{oz} && \text{Mixed to improper fraction.}\\ &= 40\,\text{oz} \end{aligned}$$

Hence, $2\frac{1}{2}$ pounds equals 40 ounces.

55. Multiply by the appropriate conversion factor.

$$\begin{aligned} 5.9\,\text{ton} &= 5.9\,\text{ton}\cdot\frac{2000\,\text{lb}}{1\,\text{ton}} && \text{Apply } 2000\,\text{lb}/1\,\text{ton}.\\ &= 5.9\,\cancel{\text{ton}}\cdot\frac{2000\,\text{lb}}{1\,\cancel{\text{ton}}} && \text{Cancel common unit.}\\ &= \left(\frac{5.9\cdot 2000}{1}\right)\text{lb} && \text{Multiply.}\\ &= 11800\,\text{lb} \end{aligned}$$

Hence, 5.9 tons equals 11,800 pounds.

57. This problem requires multiplying by a chain of conversion factors.

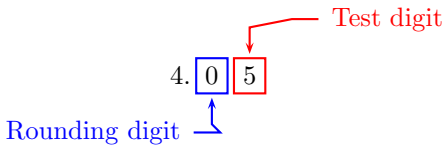
$$\begin{aligned} 2.5\,\text{ton} &= 2.5\,\text{ton}\cdot\frac{2000\,\text{lb}}{1\,\text{ton}}\cdot\frac{16\,\text{oz}}{1\,\text{lb}} && \text{Multiply by conversion factors.}\\ &= 2.5\,\cancel{\text{ton}}\cdot\frac{2000\,\cancel{\text{lb}}}{1\,\cancel{\text{ton}}}\cdot\frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common units.}\\ &= \left(\frac{2.5\cdot 2000\cdot 16}{1\cdot 1}\right)\text{oz} && \text{Multiply.}\\ &= 80000\,\text{oz} \end{aligned}$$

Hence, 2.5 tons equals 80,000 ounces.

59. Multiply by the appropriate conversion factor.

$$\begin{aligned} 8111\,\text{lb} &= 8111\,\text{lb}\cdot\frac{1\,\text{ton}}{2000\,\text{lb}} && \text{Apply } 1\,\text{ton}/2000\,\text{lb}.\\ &= 8111\,\cancel{\text{lb}}\cdot\frac{1\,\text{ton}}{2000\,\cancel{\text{lb}}} && \text{Cancel common unit.}\\ &= \left(\frac{8111}{2000}\right)\text{ton} && \text{Multiply.}\\ &= 4.0555\,\text{ton} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate.. Hence, to the nearest tenth of a ton, 8,111 pounds is approximately 4.1 tons.

61. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
4.5625\,\text{pt} &= 4.5625\,\text{pt} \cdot \frac{2\,\text{c}}{1\,\text{pt}} \cdot \frac{8\,\text{fl oz}}{1\,\text{c}} && \text{Multiply by conversion factors.}\\
&= 4.5625\,\cancel{\text{pt}} \cdot \frac{2\,\cancel{\text{c}}}{1\,\cancel{\text{pt}}} \cdot \frac{8\,\text{fl oz}}{1\,\cancel{\text{c}}} && \text{Cancel common units.}\\
&= \left(\frac{4.5625 \cdot 2 \cdot 8}{1 \cdot 1}\right)\,\text{fl oz} && \text{Multiply fractions.}\\
&= 73\,\text{fl oz} && \text{Multiply.}
\end{aligned}$$

Hence, 4.5625 pints equals 73 fluid ounces.

63. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
32\,\text{fl oz} &= 32\,\text{fl oz} \cdot \frac{1\,\text{c}}{8\,\text{fl oz}} \cdot \frac{1\,\text{pt}}{2\,\text{c}} && \text{Multiply by conversion factors.}\\
&= 32\,\cancel{\text{fl oz}} \cdot \frac{1\,\cancel{\text{c}}}{8\,\cancel{\text{fl oz}}} \cdot \frac{1\,\text{pt}}{2\,\cancel{\text{c}}} && \text{Cancel common units.}\\
&= \left(\frac{32 \cdot 1 \cdot 1}{8 \cdot 2}\right)\,\text{pt} && \text{Multiply fractions.}\\
&= \frac{32}{16}\,\text{pt} && \text{Multiply.}\\
&= 2\,\text{pt} && \text{Divide.}
\end{aligned}$$

Hence, 32 fluid ounces equals 2 pints.

65. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
3.7\,\text{gal} &= 3.7\,\text{gal} \cdot \frac{4\,\text{qt}}{1\,\text{gal}} \cdot \frac{2\,\text{pt}}{1\,\text{qt}} && \text{Multiply by conversion factors.}\\
&= 3.7\,\cancel{\text{gal}} \cdot \frac{4\,\cancel{\text{qt}}}{1\,\cancel{\text{gal}}} \cdot \frac{2\,\text{pt}}{1\,\cancel{\text{qt}}} && \text{Cancel common units.}\\
&= \left(\frac{3.7 \cdot 4 \cdot 2}{1 \cdot 1}\right)\,\text{pt} && \text{Multiply.}\\
&= 29.6\,\text{pt}
\end{aligned}$$

Hence, 3.7 gallons equals 29.6 pints.

67. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
216\,\text{pt} &= 216\,\text{pt} \cdot \frac{1\,\text{qt}}{2\,\text{pt}} \cdot \frac{1\,\text{gal}}{4\,\text{qt}} && \text{Multiply by conversion factors.}\\
&= 216\,\cancel{\text{pt}} \cdot \frac{1\,\cancel{\text{qt}}}{2\,\cancel{\text{pt}}} \cdot \frac{1\,\text{gal}}{4\,\cancel{\text{qt}}} && \text{Cancel common units.}\\
&= \left(\frac{216 \cdot 1 \cdot 1}{2 \cdot 4}\right)\,\text{gal} && \text{Multiply fractions.}\\
&= \frac{216}{8}\,\text{gal} && \text{Multiply.}\\
&= 27\,\text{gal} && \text{Divide.}
\end{aligned}$$

Hence, 216 pints equals 27 gallons.

69. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
544\,\text{fl oz} &= 544\,\text{fl oz} \cdot \frac{1\,\text{c}}{8\,\text{fl oz}} \cdot \frac{1\,\text{pt}}{2\,\text{c}} && \text{Multiply by conversion factors.}\\
&= 544\,\cancel{\text{fl oz}} \cdot \frac{1\,\cancel{\text{c}}}{8\,\cancel{\text{fl oz}}} \cdot \frac{1\,\text{pt}}{2\,\cancel{\text{c}}} && \text{Cancel common units.}\\
&= \left(\frac{544 \cdot 1 \cdot 1}{8 \cdot 2}\right)\,\text{pt} && \text{Multiply fractions.}\\
&= \frac{544}{16}\,\text{pt} && \text{Multiply.}\\
&= 34\,\text{pt} && \text{Divide.}
\end{aligned}$$

Hence, 544 fluid ounces equals 34 pints.

71. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
112\,\text{pt} &= 112\,\text{pt} \cdot \frac{1\,\text{qt}}{2\,\text{pt}} \cdot \frac{1\,\text{gal}}{4\,\text{qt}} && \text{Multiply by conversion factors.}\\
&= 112\,\cancel{\text{pt}} \cdot \frac{1\,\cancel{\text{qt}}}{2\,\cancel{\text{pt}}} \cdot \frac{1\,\text{gal}}{4\,\cancel{\text{qt}}} && \text{Cancel common units.}\\
&= \left(\frac{112 \cdot 1 \cdot 1}{2 \cdot 4}\right)\text{gal} && \text{Multiply fractions.}\\
&= \frac{112}{8}\,\text{gal} && \text{Multiply.}\\
&= 14\,\text{gal} && \text{Divide.}
\end{aligned}$$

Hence, 112 pints equals 14 gallons.

73. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
7.7\,\text{gal} &= 7.7\,\text{gal} \cdot \frac{4\,\text{qt}}{1\,\text{gal}} \cdot \frac{2\,\text{pt}}{1\,\text{qt}} && \text{Multiply by conversion factors.}\\
&= 7.7\,\cancel{\text{gal}} \cdot \frac{4\,\cancel{\text{qt}}}{1\,\cancel{\text{gal}}} \cdot \frac{2\,\text{pt}}{1\,\cancel{\text{qt}}} && \text{Cancel common units.}\\
&= \left(\frac{7.7 \cdot 4 \cdot 2}{1 \cdot 1}\right)\text{pt} && \text{Multiply.}\\
&= 61.6\,\text{pt}
\end{aligned}$$

Hence, 7.7 gallons equals 61.6 pints.

75. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
3.875\,\text{pt} &= 3.875\,\text{pt} \cdot \frac{2\,\text{c}}{1\,\text{pt}} \cdot \frac{8\,\text{fl oz}}{1\,\text{c}} && \text{Multiply by conversion factors.}\\
&= 3.875\,\cancel{\text{pt}} \cdot \frac{2\,\cancel{\text{c}}}{1\,\cancel{\text{pt}}} \cdot \frac{8\,\text{fl oz}}{1\,\cancel{\text{c}}} && \text{Cancel common units.}\\
&= \left(\frac{3.875 \cdot 2 \cdot 8}{1 \cdot 1}\right)\text{fl oz} && \text{Multiply fractions.}\\
&= 62\,\text{fl oz} && \text{Multiply.}
\end{aligned}$$

Hence, 3.875 pints equals 62 fluid ounces.

77. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
7.8\,\text{yr} &= 7.8\,\text{yr} \cdot \frac{365\,\text{day}}{1\,\text{yr}} \cdot \frac{24\,\text{hr}}{1\,\text{day}} && \text{Multiply by conversion factors.}\\
&= 7.8\,\cancel{\text{yr}} \cdot \frac{365\,\cancel{\text{day}}}{1\,\cancel{\text{yr}}} \cdot \frac{24\,\text{hr}}{1\,\cancel{\text{day}}} && \text{Cancel common units.}\\
&= \left(\frac{7.8 \cdot 365 \cdot 24}{1 \cdot 1}\right)\text{hr} && \text{Multiply fractions.}\\
&= 68328\,\text{hr} && \text{Multiply.}
\end{aligned}$$

Hence, 7.8 years equals 68,328 hours.

79. This problem requires multiplying by a chain of conversion factors.

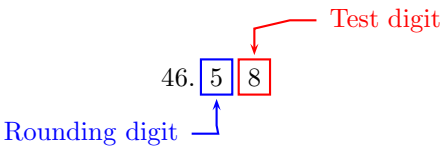
$$\begin{aligned}
7.6\,\text{yr} &= 7.6\,\text{yr} \cdot \frac{365\,\text{day}}{1\,\text{yr}} \cdot \frac{24\,\text{hr}}{1\,\text{day}} && \text{Multiply by conversion factors.}\\
&= 7.6\,\cancel{\text{yr}} \cdot \frac{365\,\cancel{\text{day}}}{1\,\cancel{\text{yr}}} \cdot \frac{24\,\text{hr}}{1\,\cancel{\text{day}}} && \text{Cancel common units.}\\
&= \left(\frac{7.6 \cdot 365 \cdot 24}{1 \cdot 1}\right)\text{hr} && \text{Multiply fractions.}\\
&= 66576\,\text{hr} && \text{Multiply.}
\end{aligned}$$

Hence, 7.6 years equals 66,576 hours.

81. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
4025005\,\text{s} &= 4025005\,\text{s} \cdot \frac{1\,\text{min}}{60\,\text{s}} \cdot \frac{1\,\text{hr}}{60\,\text{min}} \cdot \frac{1\,\text{day}}{24\,\text{hr}} && \text{Multiply by conversion factors.}\\
&= 4025005\,\cancel{\text{s}} \cdot \frac{1\,\cancel{\text{min}}}{60\,\cancel{\text{s}}} \cdot \frac{1\,\cancel{\text{hr}}}{60\,\cancel{\text{min}}} \cdot \frac{1\,\text{day}}{24\,\cancel{\text{hr}}} && \text{Cancel common units.}\\
&= \left(\frac{4025005 \cdot 1 \cdot 1 \cdot 1}{60 \cdot 60 \cdot 24}\right)\text{day} && \text{Multiply fractions.}\\
&= \left(\frac{4025005}{86400}\right)\text{day} && \text{Multiply fractions.}\\
&= 46.5857060185185\,\text{day} && \text{Divide.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a day, 4,025,005 seconds is approximately 46.6 days.

83. This problem requires multiplying by a chain of conversion factors.

$$
\begin{aligned}
37668\,\text{hr} &= 37668\,\text{hr} \cdot \frac{1\,\text{day}}{24\,\text{hr}} \cdot \frac{1\,\text{yr}}{365\,\text{day}} && \text{Multiply by conversion factors.}\\
&= 37668\,\cancel{\text{hr}} \cdot \frac{1\,\cancel{\text{day}}}{24\,\cancel{\text{hr}}} \cdot \frac{1\,\text{yr}}{365\,\cancel{\text{day}}} && \text{Cancel common units.}\\
&= \left(\frac{37668 \cdot 1 \cdot 1}{24 \cdot 365}\right)\text{yr} && \text{Multiply fractions.}\\
&= 4.3\,\text{yr} && \text{Multiply.}
\end{aligned}
$$

Hence, 37,668 hours equals 4.3 years.

85. This problem requires multiplying by a chain of conversion factors.

$$
\begin{aligned}
22776\,\text{hr} &= 22776\,\text{hr} \cdot \frac{1\,\text{day}}{24\,\text{hr}} \cdot \frac{1\,\text{yr}}{365\,\text{day}} && \text{Multiply by conversion factors.}\\
&= 22776\,\cancel{\text{hr}} \cdot \frac{1\,\cancel{\text{day}}}{24\,\cancel{\text{hr}}} \cdot \frac{1\,\text{yr}}{365\,\cancel{\text{day}}} && \text{Cancel common units.}\\
&= \left(\frac{22776 \cdot 1 \cdot 1}{24 \cdot 365}\right)\text{yr} && \text{Multiply fractions.}\\
&= 2.6\,\text{yr} && \text{Multiply.}
\end{aligned}
$$

Hence, 22,776 hours equals 2.6 years.

87. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
96\,\text{day} &= 96\,\text{day} \cdot \frac{24\,\text{hr}}{1\,\text{day}} \cdot \frac{60\,\text{min}}{1\,\text{hr}} \cdot \frac{60\,\text{s}}{1\,\text{min}} && \text{Multiply by conversion factors.}\\
&= 96\,\cancel{\text{day}} \cdot \frac{24\,\cancel{\text{hr}}}{1\,\cancel{\text{day}}} \cdot \frac{60\,\cancel{\text{min}}}{1\,\cancel{\text{hr}}} \cdot \frac{60\,\text{s}}{1\,\cancel{\text{min}}} && \text{Cancel common units.}\\
&= \left(\frac{96 \cdot 24 \cdot 60 \cdot 60}{1 \cdot 1 \cdot 1}\right)\text{s} && \text{Multiply fractions.}\\
&= 8294400\,\text{s} && \text{Multiply.}
\end{aligned}$$

Hence, 96 days equals 8,294,400 seconds.

89. This problem requires multiplying by a chain of conversion factors.

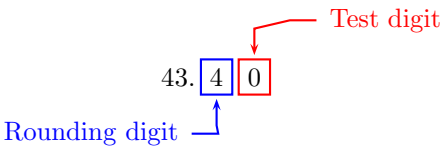
$$\begin{aligned}
40\,\text{day} &= 40\,\text{day} \cdot \frac{24\,\text{hr}}{1\,\text{day}} \cdot \frac{60\,\text{min}}{1\,\text{hr}} \cdot \frac{60\,\text{s}}{1\,\text{min}} && \text{Multiply by conversion factors.}\\
&= 40\,\cancel{\text{day}} \cdot \frac{24\,\cancel{\text{hr}}}{1\,\cancel{\text{day}}} \cdot \frac{60\,\cancel{\text{min}}}{1\,\cancel{\text{hr}}} \cdot \frac{60\,\text{s}}{1\,\cancel{\text{min}}} && \text{Cancel common units.}\\
&= \left(\frac{40 \cdot 24 \cdot 60 \cdot 60}{1 \cdot 1 \cdot 1}\right)\text{s} && \text{Multiply fractions.}\\
&= 3456000\,\text{s} && \text{Multiply.}
\end{aligned}$$

Hence, 40 days equals 3,456,000 seconds.

91. This problem requires multiplying by a chain of conversion factors.

$$\begin{aligned}
3750580\,\text{s} &= 3750580\,\text{s} \cdot \frac{1\,\text{min}}{60\,\text{s}} \cdot \frac{1\,\text{hr}}{60\,\text{min}} \cdot \frac{1\,\text{day}}{24\,\text{hr}} && \text{Multiply by conversion factors.}\\
&= 3750580\,\cancel{\text{s}} \cdot \frac{1\,\cancel{\text{min}}}{60\,\cancel{\text{s}}} \cdot \frac{1\,\cancel{\text{hr}}}{60\,\cancel{\text{min}}} \cdot \frac{1\,\text{day}}{24\,\cancel{\text{hr}}} && \text{Cancel common units.}\\
&= \left(\frac{3750580 \cdot 1 \cdot 1 \cdot 1}{60 \cdot 60 \cdot 24}\right)\text{day} && \text{Multiply fractions.}\\
&= \left(\frac{3750580}{86400}\right)\text{day} && \text{Multiply fractions.}\\
&= 43.4094907407407\,\text{day} && \text{Divide.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

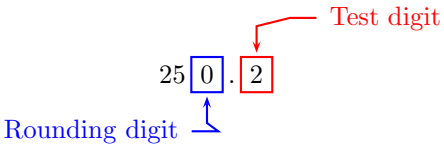


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a day, 3,750,580 seconds is approximately 43.4 days.

93. There are 5280 feet in a mile, 60 minutes in an hour, and 60 seconds in a minute.

$$
\begin{aligned}
367\,\frac{\text{ft}}{\text{s}} &\approx 367\,\frac{\text{ft}}{\text{s}} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} \cdot \frac{60\,\text{min}}{1\,\text{h}} \cdot \frac{60\,\text{s}}{1\,\text{min}} && \text{Conversion factors.}\\
&\approx 367\,\frac{\cancel{\text{ft}}}{\cancel{\text{s}}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} \cdot \frac{60\,\cancel{\text{min}}}{1\,\text{h}} \cdot \frac{60\,\cancel{\text{s}}}{1\,\cancel{\text{min}}} && \text{Cancel common units.}\\
&\approx \frac{367 \cdot 1 \cdot 60 \cdot 60}{5280 \cdot 1 \cdot 1}\,\frac{\text{mi}}{\text{hr}} && \text{Multiply fractions.}\\
&\approx 250.2\,\frac{\text{mi}}{\text{hr}} && \text{Multiply and divide.}
\end{aligned}
$$

To round to the nearest mile per hour, identify the rounding and test digits.

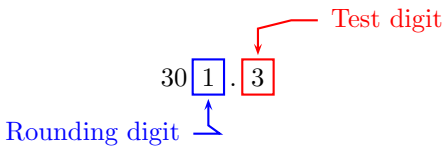


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest mile per hour, the speed is approximately 250 miles per hour.

95. There are 5280 feet in a mile, 60 minutes in an hour, and 60 seconds in a minute.

$$
\begin{aligned}
442\,\frac{\text{ft}}{\text{s}} &\approx 442\,\frac{\text{ft}}{\text{s}} \cdot \frac{1\,\text{mi}}{5280\,\text{ft}} \cdot \frac{60\,\text{min}}{1\,\text{h}} \cdot \frac{60\,\text{s}}{1\,\text{min}} && \text{Conversion factors.}\\
&\approx 442\,\frac{\cancel{\text{ft}}}{\cancel{\text{s}}} \cdot \frac{1\,\text{mi}}{5280\,\cancel{\text{ft}}} \cdot \frac{60\,\cancel{\text{min}}}{1\,\text{h}} \cdot \frac{60\,\cancel{\text{s}}}{1\,\cancel{\text{min}}} && \text{Cancel common units.}\\
&\approx \frac{442 \cdot 1 \cdot 60 \cdot 60}{5280 \cdot 1 \cdot 1}\,\frac{\text{mi}}{\text{hr}} && \text{Multiply fractions.}\\
&\approx 301.3\,\frac{\text{mi}}{\text{hr}} && \text{Multiply and divide.}
\end{aligned}
$$

To round to the nearest mile per hour, identify the rounding and test digits.

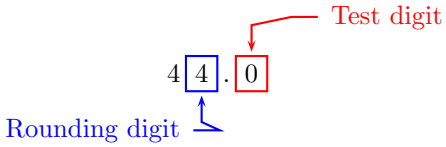


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest mile per hour, the speed is approximately 301 miles per hour.

97. There are 5280 feet in a mile, 60 minutes in an hour, and 60 seconds in a minute.

$$
\begin{aligned}
30\,\frac{\text{mi}}{\text{h}} &\approx 30\,\frac{\text{mi}}{\text{h}} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} \cdot \frac{1\,\text{h}}{60\,\text{min}} \cdot \frac{1\,\text{min}}{60\,\text{s}} && \text{Conversion factors.}\\
&\approx 30\,\frac{\cancel{\text{mi}}}{\not{\text{h}}} \cdot \frac{5280\,\text{ft}}{1\,\cancel{\text{mi}}} \cdot \frac{1\,\not{\text{h}}}{60\,\cancel{\text{min}}} \cdot \frac{1\,\cancel{\text{min}}}{60\,\text{s}} && \text{Cancel common units.}\\
&\approx \frac{30 \cdot 5280 \cdot 1 \cdot 1}{1 \cdot 60 \cdot 60}\,\frac{\text{ft}}{\text{s}} && \text{Multiply fractions.}\\
&\approx 44.0\,\frac{\text{ft}}{\text{s}} && \text{Multiply and divide.}
\end{aligned}
$$

To round to the nearest foot per second, identify the rounding and test digits.

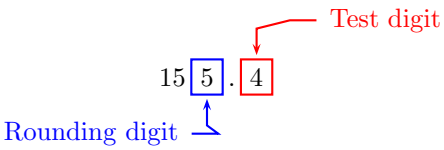


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest foot per second, the speed is approximately 44 feet per second.

99. There are 5280 feet in a mile, 60 minutes in an hour, and 60 seconds in a minute.

$$
\begin{aligned}
106\,\frac{\text{mi}}{\text{h}} &\approx 106\,\frac{\text{mi}}{\text{h}} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} \cdot \frac{1\,\text{h}}{60\,\text{min}} \cdot \frac{1\,\text{min}}{60\,\text{s}} && \text{Conversion factors.}\\
&\approx 106\,\frac{\cancel{\text{mi}}}{\not{\text{h}}} \cdot \frac{5280\,\text{ft}}{1\,\cancel{\text{mi}}} \cdot \frac{1\,\not{\text{h}}}{60\,\cancel{\text{min}}} \cdot \frac{1\,\cancel{\text{min}}}{60\,\text{s}} && \text{Cancel common units.}\\
&\approx \frac{106 \cdot 5280 \cdot 1 \cdot 1}{1 \cdot 60 \cdot 60}\,\frac{\text{ft}}{\text{s}} && \text{Multiply fractions.}\\
&\approx 155.4\,\frac{\text{ft}}{\text{s}} && \text{Multiply and divide.}
\end{aligned}
$$

To round to the nearest foot per second, identify the rounding and test digits.



Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest foot per second, the speed is approximately 155 feet per second.

101. The relationship between pounds and tons is 1 ton = 2000 pounds. Create a ratio whose numerator is 1 ton and denominator 2000 pounds. Since the numerator and denominator are equivalent, this ratio has a value 1. Multiply by this conversion factor. Cancelling the common units of pounds, your answer will be in tons.

$$\begin{aligned} 3200\,\text{lb} &= 3200\,\text{lb} \cdot \frac{1\,\text{ton}}{2000\,\text{lb}} && \text{Apply 1 ton/2000 lb.} \\ &= 3200\,\cancel{\text{lb}} \cdot \frac{1\,\text{ton}}{2000\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{3200}{2000}\right)\,\text{ton} && \text{Multiply.} \\ &= 1.6\,\text{ton} && \text{Divide.} \end{aligned}$$

Hence, Joe lifted 1.6 tons.

103. We want to know how many "two-minutes" are in one year. One way to do this is to form a proportion.

Let x represent the number of pipes that break in one year when one pipe breaks every two minutes. Now create a proportion using these two ratios.

$$\frac{2\,\text{min}}{1\,\text{pipe}} = \frac{1\,\text{year}}{x\,\text{pipes}}$$

To solve this proportion, we need to have consistent units. Convert the year to minutes.

$$\begin{aligned} 1\,\text{yr} &= 1\,\text{yr} \cdot \frac{365\,\text{day}}{1\,\text{yr}} \cdot \frac{24\,\text{hr}}{1\,\text{day}} \cdot \frac{60\,\text{min}}{1\,\text{hour}} && \text{Multiply by conversion factors.} \\ &= 1\,\cancel{\text{yr}} \cdot \frac{365\,\cancel{\text{day}}}{1\,\cancel{\text{yr}}} \cdot \frac{24\,\text{hr}}{1\,\cancel{\text{day}}} \cdot \frac{60\,\text{min}}{1\,\cancel{\text{hour}}} && \text{Cancel common units.} \\ &= \left(\frac{1 \cdot 365 \cdot 24 \cdot 60}{1 \cdot 1 \cdot 1}\right)\,\text{min} && \text{Multiply fractions.} \\ &= 525600\,\text{min} && \text{Multiply.} \end{aligned}$$

Thus there are 525,600 minutes in one year. Rewrite the proportion using this value.

$$\frac{2\,\text{min}}{1\,\text{pipe}} = \frac{525600\,\text{min}}{x\,\text{pipes}}$$

Now, we can drop the units, cross multiply and solve.

$$\begin{aligned}
\frac{2}{1} &= \frac{525600}{x} && \text{Original proportion.}\\
2 \cdot x &= 525600 \cdot 1 && \text{Product of means and extremes are equal.}\\
\frac{2x}{2} &= \frac{525600}{2} && \text{Divide both sides by 2.}\\
x &= 262800 && \text{Simplify.}
\end{aligned}$$

Thus, in the US, 262,800 pipes break each year.

6.4 Unit Conversion: Metric System

1. The metric system prefix centi means "1/100"

3. The metric system prefix hecto means "100"

5. The metric system prefix deci means "1/10"

7. The metric system prefix mg means "milligram."

9. The metric system prefix m means "meter."

11. The metric system prefix kL means "kilolitre" or "kiloliter."

13. The metric system prefix hm means "hectometer."

15. The metric system prefix dam means "dekameter."

17. The metric system prefix dL means "decilitre" or "deciliter."

19. The metric system prefix hg means "hectogram."

21. The metric system prefix dg means "decigram."

23. The metric system prefix hL means "hectolitre" or "hectoliter."

25. To change 5,490 millimeters to meters, apply the appropriate conversion factor.

$$\begin{aligned} 5490\,\text{cm} &= 5490\,\text{mm} \cdot \frac{1\,\text{m}}{1000\,\text{mm}} && \text{Apply conversion factor.} \\ &= 5490\,\cancel{\text{mm}} \cdot \frac{1\,\text{m}}{1000\,\cancel{\text{mm}}} && \text{Cancel common unit.} \\ &= \left(\frac{5490 \cdot 1}{1000}\right)\,\text{m} && \text{Multiply fractions.} \\ &= 5.49\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 5,490 millimeters equals 5.49 meters.

27. To change 64 meters to millimeters, apply the appropriate conversion factor.

$$\begin{aligned} 64\,\text{m} &= 64\,\text{m} \cdot \frac{1000\,\text{mm}}{1\,\text{m}} && \text{Apply conversion factor.} \\ 64\,\cancel{\text{m}} &= 64\,\cancel{\text{m}} \cdot \frac{1000\,\text{mm}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{64 \cdot 1000}{1}\right)\,\text{mm} && \text{Multiply fractions.} \\ &= 64000\,\text{mm} && \text{Simplify.} \end{aligned}$$

Hence, 64 meters equals 64,000 millimeters.

29. To change 4,571 millimeters to meters, apply the appropriate conversion factor.

$$\begin{aligned} 4571\,\text{cm} &= 4571\,\text{mm} \cdot \frac{1\,\text{m}}{1000\,\text{mm}} && \text{Apply conversion factor.} \\ &= 4571\,\cancel{\text{mm}} \cdot \frac{1\,\text{m}}{1000\,\cancel{\text{mm}}} && \text{Cancel common unit.} \\ &= \left(\frac{4571 \cdot 1}{1000}\right)\,\text{m} && \text{Multiply fractions.} \\ &= 4.571\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 4,571 millimeters equals 4.571 meters.

31. To change 15 meters to centimeters, apply the appropriate conversion factor.

$$\begin{aligned} 15\,\text{m} &= 15\,\text{m} \cdot \frac{100\,\text{cm}}{1\,\text{m}} && \text{Apply conversion factor.} \\ 15\,\cancel{\text{m}} &= 15\,\cancel{\text{m}} \cdot \frac{100\,\text{cm}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{15 \cdot 100}{1}\right)\text{cm} && \text{Multiply fractions.} \\ &= 1500\,\text{cm} && \text{Simplify.} \end{aligned}$$

Hence, 15 meters equals 1,500 centimeters.

33. To change 569 centimeters to meters, apply the appropriate conversion factor.

$$\begin{aligned} 569\,\text{cm} &= 569\,\text{cm} \cdot \frac{1\,\text{m}}{100\,\text{cm}} && \text{Apply conversion factor.} \\ &= 569\,\cancel{\text{cm}} \cdot \frac{1\,\text{m}}{100\,\cancel{\text{cm}}} && \text{Cancel common unit.} \\ &= \left(\frac{569 \cdot 1}{100}\right)\text{m} && \text{Multiply fractions.} \\ &= 5.69\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 569 centimeters equals 5.69 meters.

35. To change 79 meters to centimeters, apply the appropriate conversion factor.

$$\begin{aligned} 79\,\text{m} &= 79\,\text{m} \cdot \frac{100\,\text{cm}}{1\,\text{m}} && \text{Apply conversion factor.} \\ 79\,\cancel{\text{m}} &= 79\,\cancel{\text{m}} \cdot \frac{100\,\text{cm}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{79 \cdot 100}{1}\right)\text{cm} && \text{Multiply fractions.} \\ &= 7900\,\text{cm} && \text{Simplify.} \end{aligned}$$

Hence, 79 meters equals 7,900 centimeters.

37. To change 7.6 kilometers to meters, apply the appropriate conversion factor.

$$\begin{aligned} 7.6\,\text{km} &= 7.6\,\text{km} \cdot \frac{1000\,\text{m}}{1\,\text{km}} && \text{Apply conversion factor.} \\ &= 7.6\,\cancel{\text{km}} \cdot \frac{1000\,\text{m}}{1\,\cancel{\text{km}}} && \text{Cancel common unit.} \\ &= \left(\frac{7.6 \cdot 1000}{1}\right)\,\text{m} && \text{Multiply fractions.} \\ &= 7600\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 7.6 kilometers equals 7,600 meters.

39. To change 861 centimeters to meters, apply the appropriate conversion factor.

$$\begin{aligned} 861\,\text{cm} &= 861\,\text{cm} \cdot \frac{1\,\text{m}}{100\,\text{cm}} && \text{Apply conversion factor.} \\ &= 861\,\cancel{\text{cm}} \cdot \frac{1\,\text{m}}{100\,\cancel{\text{cm}}} && \text{Cancel common unit.} \\ &= \left(\frac{861 \cdot 1}{100}\right)\,\text{m} && \text{Multiply fractions.} \\ &= 8.61\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 861 centimeters equals 8.61 meters.

41. To change 4,826 meters to kilometers, apply the appropriate conversion factor.

$$\begin{aligned} 4826\,\text{m} &= 4826\,\text{m} \cdot \frac{1\,\text{km}}{1000\,\text{m}} && \text{Apply conversion factor.} \\ &= 4826\,\cancel{\text{m}} \cdot \frac{1\,\text{km}}{1000\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{4826 \cdot 1}{1000}\right)\,\text{km} && \text{Multiply fractions.} \\ &= 4.826\,\text{km} && \text{Simplify.} \end{aligned}$$

Hence, 4,826 meters equals 4.826 kilometers.

43. To change 4,724 meters to kilometers, apply the appropriate conversion factor.

$$\begin{aligned} 4724\,\text{m} &= 4724\,\text{m} \cdot \frac{1\,\text{km}}{1000\,\text{m}} && \text{Apply conversion factor.} \\ &= 4724\,\cancel{\text{m}} \cdot \frac{1\,\text{km}}{1000\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{4724 \cdot 1}{1000}\right)\,\text{km} && \text{Multiply fractions.} \\ &= 4.724\,\text{km} && \text{Simplify.} \end{aligned}$$

Hence, 4,724 meters equals 4.724 kilometers.

45. To change 6.5 kilometers to meters, apply the appropriate conversion factor.

$$\begin{aligned} 6.5\,\text{km} &= 6.5\,\text{km} \cdot \frac{1000\,\text{m}}{1\,\text{km}} && \text{Apply conversion factor.} \\ &= 6.5\,\cancel{\text{km}} \cdot \frac{1000\,\text{m}}{1\,\cancel{\text{km}}} && \text{Cancel common unit.} \\ &= \left(\frac{6.5 \cdot 1000}{1}\right)\,\text{m} && \text{Multiply fractions.} \\ &= 6500\,\text{m} && \text{Simplify.} \end{aligned}$$

Hence, 6.5 kilometers equals 6,500 meters.

47. To change 17 meters to millimeters, apply the appropriate conversion factor.

$$\begin{aligned} 17\,\text{m} &= 17\,\text{m} \cdot \frac{1000\,\text{mm}}{1\,\text{m}} && \text{Apply conversion factor.} \\ 17\,\cancel{\text{m}} &= 17\,\cancel{\text{m}} \cdot \frac{1000\,\text{mm}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= \left(\frac{17 \cdot 1000}{1}\right)\,\text{mm} && \text{Multiply fractions.} \\ &= 17000\,\text{mm} && \text{Simplify.} \end{aligned}$$

Hence, 17 meters equals 17,000 millimeters.

49. To change 512 milligrams to centigrams, we need to apply a chain of conversion factors.

$$\begin{aligned}
512\,\text{mg} &= 512\,\text{mg} \cdot \frac{1\,\text{g}}{1000\,\text{mg}} \cdot \frac{100\,\text{cg}}{1\,\text{g}} && \text{Apply conversion factors.}\\
&= 512\,\cancel{\text{mg}} \cdot \frac{1\,\cancel{\text{g}}}{1000\,\cancel{\text{mg}}} \cdot \frac{100\,\text{cg}}{1\,\cancel{\text{g}}} && \text{Cancel common units.}\\
&= \left(\frac{512 \cdot 1 \cdot 100}{1000 \cdot 1}\right)\,\text{cg} && \text{Multiply fractions.}\\
&= 51.2\,\text{cg} && \text{Simplify.}
\end{aligned}$$

Hence, 512 milligrams equals 51.2 centigrams.

51. To change 541 milligrams to centigrams, we need to apply a chain of conversion factors.

$$\begin{aligned}
541\,\text{mg} &= 541\,\text{mg} \cdot \frac{1\,\text{g}}{1000\,\text{mg}} \cdot \frac{100\,\text{cg}}{1\,\text{g}} && \text{Apply conversion factors.}\\
&= 541\,\cancel{\text{mg}} \cdot \frac{1\,\cancel{\text{g}}}{1000\,\cancel{\text{mg}}} \cdot \frac{100\,\text{cg}}{1\,\cancel{\text{g}}} && \text{Cancel common units.}\\
&= \left(\frac{541 \cdot 1 \cdot 100}{1000 \cdot 1}\right)\,\text{cg} && \text{Multiply fractions.}\\
&= 54.1\,\text{cg} && \text{Simplify.}
\end{aligned}$$

Hence, 541 milligrams equals 54.1 centigrams.

53. To change 70 grams to centigrams, apply the appropriate conversion factor.

$$\begin{aligned}
70\,\text{g} &= 70\,\text{g} \cdot \frac{100\,\text{cg}}{1\,\text{g}} && \text{Apply conversion factor.}\\
70\,\cancel{\text{g}} &= 70\,\cancel{\text{g}} \cdot \frac{100\,\text{cg}}{1\,\cancel{\text{g}}} && \text{Cancel common unit.}\\
&= \left(\frac{70 \cdot 100}{1}\right)\,\text{cg} && \text{Multiply fractions.}\\
&= 7000\,\text{cg} && \text{Simplify.}
\end{aligned}$$

Hence, 70 grams equals 7,000 centigrams.

55. To change 53 centigrams to milligrams, we need to apply a chain of conversion factors.

$$\begin{aligned}
53\,\text{cg} &= 53\,\text{cg} \cdot \frac{1\,\text{g}}{100\,\text{cg}} \cdot \frac{1000\,\text{mg}}{1\,\text{g}} && \text{Apply conversion factors.}\\
&= 53\,\cancel{\text{cg}} \cdot \frac{1\,\cancel{\text{g}}}{100\,\cancel{\text{cg}}} \cdot \frac{1000\,\text{mg}}{1\,\cancel{\text{g}}} && \text{Cancel common units.}\\
&= \left(\frac{53 \cdot 1 \cdot 1000}{100 \cdot 1}\right)\,\text{mg} && \text{Multiply fractions.}\\
&= 530\,\text{mg} && \text{Simplify.}
\end{aligned}$$

Hence, 53 centigrams equals 530 milligrams.

57. To change 83 kilograms to grams, apply the appropriate conversion factor.

$$\begin{aligned}
83\,\text{kg} &= 83\,\text{kg} \cdot \frac{1000\,\text{g}}{1\,\text{kg}} && \text{Apply conversion factor.}\\
83\,\cancel{\text{kg}} &= 83\,\cancel{\text{kg}} \cdot \frac{1000\,\text{g}}{1\,\cancel{\text{kg}}} && \text{Cancel common unit.}\\
&= \left(\frac{83 \cdot 1000}{1}\right)\,\text{g} && \text{Multiply fractions.}\\
&= 83000\,\text{g} && \text{Simplify.}
\end{aligned}$$

Hence, 83 kilograms equals 83,000 grams.

59. To change 8,196 grams to kilograms, apply the appropriate conversion factor.

$$\begin{aligned}
8196\,\text{cm} &= 8196\,\text{g} \cdot \frac{1\,\text{kg}}{1000\,\text{g}} && \text{Apply conversion factor.}\\
&= 8196\,\cancel{\text{g}} \cdot \frac{1\,\text{kg}}{1000\,\cancel{\text{g}}} && \text{Cancel common unit.}\\
&= \left(\frac{8196 \cdot 1}{1000}\right)\,\text{kg} && \text{Multiply fractions.}\\
&= 8.196\,\text{kg} && \text{Simplify.}
\end{aligned}$$

Hence, 8,196 grams equals 8.196 kilograms.

61. To change 564 centigrams to grams, apply the appropriate conversion factor.

$$\begin{aligned} 564\,\text{cg} &= 564\,\text{cg} \cdot \frac{1\,\text{g}}{100\,\text{cg}} && \text{Apply conversion factor.} \\ &= 564\,\cancel{\text{cg}} \cdot \frac{1\,\text{g}}{100\,\cancel{\text{cg}}} && \text{Cancel common unit.} \\ &= \left(\frac{564 \cdot 1}{100}\right)\,\text{g} && \text{Multiply fractions.} \\ &= 5.64\,\text{g} && \text{Simplify.} \end{aligned}$$

Hence, 564 centigrams equals 5.64 grams.

63. To change 38 grams to centigrams, apply the appropriate conversion factor.

$$\begin{aligned} 38\,\text{g} &= 38\,\text{g} \cdot \frac{100\,\text{cg}}{1\,\text{g}} && \text{Apply conversion factor.} \\ 38\,\cancel{\text{g}} &= 38\,\cancel{\text{g}} \cdot \frac{100\,\text{cg}}{1\,\cancel{\text{g}}} && \text{Cancel common unit.} \\ &= \left(\frac{38 \cdot 100}{1}\right)\,\text{cg} && \text{Multiply fractions.} \\ &= 3800\,\text{cg} && \text{Simplify.} \end{aligned}$$

Hence, 38 grams equals 3,800 centigrams.

65. To change 77 centigrams to milligrams, we need to apply a chain of conversion factors.

$$\begin{aligned} 77\,\text{cg} &= 77\,\text{cg} \cdot \frac{1\,\text{g}}{100\,\text{cg}} \cdot \frac{1000\,\text{mg}}{1\,\text{g}} && \text{Apply conversion factors.} \\ &= 77\,\cancel{\text{cg}} \cdot \frac{1\,\cancel{\text{g}}}{100\,\cancel{\text{cg}}} \cdot \frac{1000\,\text{mg}}{1\,\cancel{\text{g}}} && \text{Cancel common units.} \\ &= \left(\frac{77 \cdot 1 \cdot 1000}{100 \cdot 1}\right)\,\text{mg} && \text{Multiply fractions.} \\ &= 770\,\text{mg} && \text{Simplify.} \end{aligned}$$

Hence, 77 centigrams equals 770 milligrams.

67. To change 5,337 grams to kilograms, apply the appropriate conversion factor.

$$\begin{aligned} 5337\,\text{cm} &= 5337\,\text{g} \cdot \frac{1\,\text{kg}}{1000\,\text{g}} && \text{Apply conversion factor.} \\ &= 5337\,\cancel{\text{g}} \cdot \frac{1\,\text{kg}}{1000\,\cancel{\text{g}}} && \text{Cancel common unit.} \\ &= \left(\frac{5337 \cdot 1}{1000}\right)\,\text{kg} && \text{Multiply fractions.} \\ &= 5.337\,\text{kg} && \text{Simplify.} \end{aligned}$$

Hence, 5,337 grams equals 5.337 kilograms.

69. To change 15 kilograms to grams, apply the appropriate conversion factor.

$$\begin{aligned} 15\,\text{kg} &= 15\,\text{kg} \cdot \frac{1000\,\text{g}}{1\,\text{kg}} && \text{Apply conversion factor.} \\ 15\,\cancel{\text{kg}} &= 15\,\cancel{\text{kg}} \cdot \frac{1000\,\text{g}}{1\,\cancel{\text{kg}}} && \text{Cancel common unit.} \\ &= \left(\frac{15 \cdot 1000}{1}\right)\,\text{g} && \text{Multiply fractions.} \\ &= 15000\,\text{g} && \text{Simplify.} \end{aligned}$$

Hence, 15 kilograms equals 15,000 grams.

71. To change 833 centigrams to grams, apply the appropriate conversion factor.

$$\begin{aligned} 833\,\text{cg} &= 833\,\text{cg} \cdot \frac{1\,\text{g}}{100\,\text{cg}} && \text{Apply conversion factor.} \\ &= 833\,\cancel{\text{cg}} \cdot \frac{1\,\text{g}}{100\,\cancel{\text{cg}}} && \text{Cancel common unit.} \\ &= \left(\frac{833 \cdot 1}{100}\right)\,\text{g} && \text{Multiply fractions.} \\ &= 8.33\,\text{g} && \text{Simplify.} \end{aligned}$$

Hence, 833 centigrams equals 8.33 grams.

73. To change 619,560 centilitres to kilolitres, we apply a chain of conversion factors.

$$\begin{aligned} 619560\,\text{cL} &= 619560\,\text{cL} \cdot \frac{1\,\text{L}}{100\,\text{cL}} \cdot \frac{1\,\text{kL}}{1000\,\text{L}} && \text{Apply conversion factors.} \\ &= 619560\,\cancel{\text{cL}} \cdot \frac{1\,\cancel{\text{L}}}{100\,\cancel{\text{cL}}} \cdot \frac{1\,\text{kL}}{1000\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= \left(\frac{619560 \cdot 1 \cdot 1}{100 \cdot 1000}\right)\text{kL} && \text{Multiply fractions.} \\ &= 6.1956\,\text{kL} && \text{Simmplify.} \end{aligned}$$

Hence, 619,560 centilitres equals 6.1956 kilolitres.

75. To change 15.2 litres to millilitres, we apply the appropriate conversion factor.

$$\begin{aligned} 15.2\,\text{L} &= 15.2\,\text{L} \cdot \frac{1000\,\text{mL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 15.2\,\cancel{\text{L}} \cdot \frac{1000\,\text{mL}}{1\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= 15200\,\text{mL} && \text{Simplify.} \end{aligned}$$

Hence, 15.2 litres equals 15,200 millilitres.

77. To change 10,850 centilitres to litres, we apply the appropriate conversion factor.

$$\begin{aligned} 10850\,\text{cL} &= 10850\,\text{cL} \cdot \frac{1\,\text{L}}{100\,\text{cL}} && \text{Apply conversion factors.} \\ &= 10850\,\cancel{\text{cL}} \cdot \frac{1\,\text{L}}{100\,\cancel{\text{cL}}} && \text{Cancel common unit.} \\ &= \left(\frac{10850 \cdot 1}{100}\right)\text{L} && \text{Multiply fractions.} \\ &= 108.5\,\text{L} && \text{Simplify.} \end{aligned}$$

Hence, 10,850 centilitres equals 108.5 litres.

79. To change 10.7 litres to millilitres, we apply the appropriate conversion factor.

$$\begin{aligned} 10.7\,\text{L} &= 10.7\,\text{L} \cdot \frac{1000\,\text{mL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 10.7\,\cancel{\text{L}} \cdot \frac{1000\,\text{mL}}{1\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= 10700\,\text{mL} && \text{Simplify.} \end{aligned}$$

Hence, 10.7 litres equals 10,700 millilitres.

81. To change 15,665 millilitres to litres, we apply the appropriate conversion factor.

$$\begin{aligned} 15665\,\text{mL} &= 15665\,\text{mL} \cdot \frac{1\,\text{L}}{1000\,\text{mL}} && \text{Apply conversion factors.} \\ &= 15665\,\cancel{\text{mL}} \cdot \frac{1\,\text{L}}{1000\,\cancel{\text{mL}}} && \text{Cancel common unit.} \\ &= \left(\frac{15665 \cdot 1}{1000}\right)\text{L} && \text{Multiply fractions.} \\ &= 15.665\,\text{L} && \text{Simplify.} \end{aligned}$$

Hence, 15,665 millilitres equals 15.665 litres.

83. To change 6.3 kilolitres to centilitres, we need a chain of conversion factors.

$$\begin{aligned} 6.3\,\text{kL} &= 6.3\,\text{kL} \cdot \frac{1000\,\text{L}}{1\,\text{kL}} \cdot \frac{100\,\text{cL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 6.3\,\cancel{\text{kL}} \cdot \frac{1000\,\cancel{\text{L}}}{1\,\cancel{\text{kL}}} \cdot \frac{100\,\text{cL}}{1\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= \left(\frac{6.3 \cdot 1000 \cdot 100}{1 \cdot 1}\right)\text{cL} && \text{Multiply fractions.} \\ &= 630000\,\text{cL} && \text{Simplify.} \end{aligned}$$

Hence, 6.3 kilolitres equals 630,000 centilitres.

85. To change 4.5 kilolitres to centilitres, we need a chain of conversion factors.

$$\begin{aligned} 4.5\,\text{kL} &= 4.5\,\text{kL} \cdot \frac{1000\,\text{L}}{1\,\text{kL}} \cdot \frac{100\,\text{cL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 4.5\,\cancel{\text{kL}} \cdot \frac{1000\,\cancel{\text{L}}}{1\,\cancel{\text{kL}}} \cdot \frac{100\,\text{cL}}{1\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= \left(\frac{4.5 \cdot 1000 \cdot 100}{1 \cdot 1}\right)\text{cL} && \text{Multiply fractions.} \\ &= 450000\,\text{cL} && \text{Simplify.} \end{aligned}$$

Hence, 4.5 kilolitres equals 450,000 centilitres.

87. To change 10.6 litres to centilitres, we apply the appropriate conversion factor.

$$\begin{aligned} 10.6\,\text{L} &= 10.6\,\text{L} \cdot \frac{100\,\text{cL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 10.6\,\cancel{\text{L}} \cdot \frac{100\,\text{cL}}{1\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= 1060\,\text{cL} && \text{Simplify.} \end{aligned}$$

Hence, 10.6 litres equals 1,060 centilitres.

89. To change 14,383 centilitres to litres, we apply the appropriate conversion factor.

$$\begin{aligned} 14383\,\text{cL} &= 14383\,\text{cL} \cdot \frac{1\,\text{L}}{100\,\text{cL}} && \text{Apply conversion factors.} \\ &= 14383\,\cancel{\text{cL}} \cdot \frac{1\,\text{L}}{100\,\cancel{\text{cL}}} && \text{Cancel common unit.} \\ &= \left(\frac{14383 \cdot 1}{100}\right)\text{L} && \text{Multiply fractions.} \\ &= 143.83\,\text{L} && \text{Simplify.} \end{aligned}$$

Hence, 14,383 centilitres equals 143.83 litres.

91. To change 9.9 litres to centilitres, we apply the appropriate conversion factor.

$$\begin{aligned} 9.9\,\text{L} &= 9.9\,\text{L} \cdot \frac{100\,\text{cL}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 9.9\,\cancel{\text{L}} \cdot \frac{100\,\text{cL}}{1\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= 990\,\text{cL} && \text{Simplify.} \end{aligned}$$

Hence, 9.9 litres equals 990 centilitres.

93. To change 407,331 centilitres to kilolitres, we apply a chain of conversion factors.

$$\begin{aligned} 407331\,\text{cL} &= 407331\,\text{cL} \cdot \frac{1\,\text{L}}{100\,\text{cL}} \cdot \frac{1\,\text{kL}}{1000\,\text{L}} && \text{Apply conversion factors.} \\ &= 407331\,\cancel{\text{cL}} \cdot \frac{1\,\cancel{\text{L}}}{100\,\cancel{\text{cL}}} \cdot \frac{1\,\text{kL}}{1000\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= \left(\frac{407331 \cdot 1 \cdot 1}{100 \cdot 1000}\right)\text{kL} && \text{Multiply fractions.} \\ &= 4.07331\,\text{kL} && \text{Simmplify.} \end{aligned}$$

Hence, 407,331 centilitres equals 4.07331 kilolitres.

95. To change 14,968 millilitres to litres, we apply the appropriate conversion factor.

$$\begin{aligned} 14968\,\text{mL} &= 14968\,\text{mL} \cdot \frac{1\,\text{L}}{1000\,\text{mL}} && \text{Apply conversion factors.} \\ &= 14968\,\cancel{\text{mL}} \cdot \frac{1\,\text{L}}{1000\,\cancel{\text{mL}}} && \text{Cancel common unit.} \\ &= \left(\frac{14968 \cdot 1}{1000}\right)\text{L} && \text{Multiply fractions.} \\ &= 14.968\,\text{L} && \text{Simplify.} \end{aligned}$$

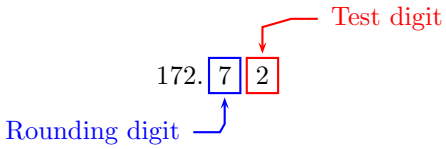
Hence, 14,968 millilitres equals 14.968 litres.

6.5 Unit Conversion: Applications

1. Multiply by the given conversion ratio.

$$\begin{aligned} 68\,\text{in} &= 68\,\text{in} \cdot \frac{2.54\,\text{cm}}{1\,\text{in}} && \text{Apply conversion factor.} \\ &= 68\,\cancel{\text{in}} \cdot \frac{2.54\,\text{cm}}{1\,\cancel{\text{in}}} && \text{Cancel common unit.} \\ &= 172.72\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

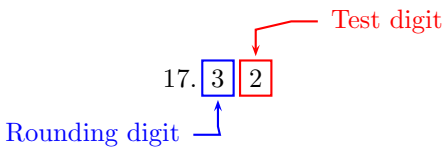


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a centimeter, 68 inches is approximately 172.7 centimeters.

3. Multiply by the given conversion ratio.

$$\begin{aligned} 44\,\text{cm} &= 44\,\text{cm} \cdot \frac{1\,\text{in}}{2.54\,\text{cm}} && \text{Apply conversion factor.} \\ &= 44\,\cancel{\text{cm}} \cdot \frac{1\,\text{in}}{2.54\,\cancel{\text{cm}}} && \text{Cancel common unit.} \\ &= \left(\frac{44}{2.54}\right)\,\text{in} && \text{Multiply.} \\ &= 17.3228346456693\,\text{in} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

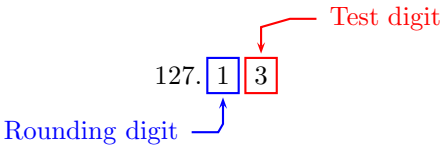


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a inch, 44 centimeters is approximately 17.3 inches.

5. Multiply by the given conversion ratio.

$$\begin{aligned} 79\,\text{mi} &= 79\,\text{mi} \cdot \frac{1.6093\,\text{km}}{1\,\text{mi}} && \text{Apply conversion factor.} \\ &= 79\,\cancel{\text{mi}} \cdot \frac{1.6093\,\text{km}}{1\,\cancel{\text{mi}}} && \text{Cancel common unit.} \\ &= 127.1347\,\text{km} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

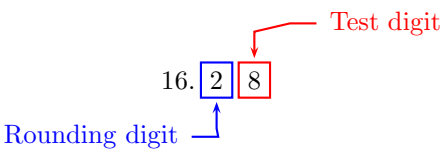


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a kilometer, 79 miles is approximately 127.1 kilometers.

7. This will require a chain of conversion factors.

$$\begin{aligned} 1489\,\text{cm} &= 1489\,\text{cm} \cdot \frac{1\,\text{m}}{100\,\text{cm}} \cdot \frac{1\,\text{yd}}{0.9144\,\text{m}} && \text{Apply conversion factors.} \\ &= 1489\,\cancel{\text{cm}} \cdot \frac{1\,\cancel{\text{m}}}{100\,\cancel{\text{cm}}} \cdot \frac{1\,\text{yd}}{0.9144\,\cancel{\text{m}}} && \text{Cancel common units.} \\ &= \left(\frac{1489}{91.44}\right)\,\text{yd} && \text{Multiply.} \\ &= 16.2839020122485\,\text{yd} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

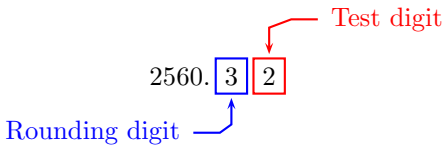


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a yard, 1489 centimeters is approximately 16.3 yards.

9. This will require a chain of conversion factors.

$$\begin{aligned} 28\,\text{yd} &= 28\,\text{yd} \cdot \frac{0.9144\,\text{m}}{1\,\text{yd}} \cdot \frac{100\,\text{cm}}{1\,\text{m}} && \text{Apply conversion factors.} \\ &= 28\,\cancel{\text{yd}} \cdot \frac{0.9144\,\cancel{\text{m}}}{1\,\cancel{\text{yd}}} \cdot \frac{100\,\text{cm}}{1\,\cancel{\text{m}}} && \text{Cancel common units.} \\ &= 2560.32\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

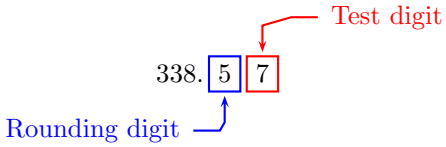


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a centimeter, 28 yards is approximately 2560.3 centimeters.

11. This will require a chain of conversion factors.

$$\begin{aligned} 8.6\,\text{m} &= 8.6\,\text{m} \cdot \frac{3.2808\,\text{ft}}{1\,\text{m}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Apply conversion factors.} \\ &= 8.6\,\cancel{\text{m}} \cdot \frac{3.2808\,\cancel{\text{ft}}}{1\,\cancel{\text{m}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= 338.57856\,\text{in} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

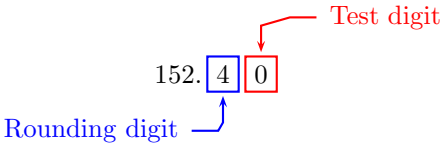


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a inch, 8.6 meters is approximately 338.6 inches.

13. Multiply by the given conversion ratio.

$$\begin{aligned} 60\,\text{in} &= 60\,\text{in} \cdot \frac{2.54\,\text{cm}}{1\,\text{in}} && \text{Apply conversion factor.} \\ &= 60\,\cancel{\text{in}} \cdot \frac{2.54\,\text{cm}}{1\,\cancel{\text{in}}} && \text{Cancel common unit.} \\ &= 152.4\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

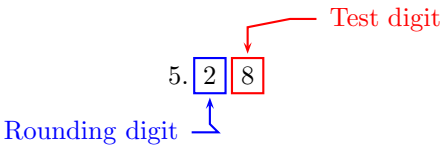


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a centimeter, 60 inches is approximately 152.4 centimeters.

15. This will require a chain of conversion factors.

$$\begin{aligned} 208\,\text{in} &= 208\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{m}}{3.2808\,\text{ft}} && \text{Apply conversion factors.} \\ &= 208\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{m}}{3.2808\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= \left(\frac{208}{12 \cdot 3.2808}\right)\text{m} && \text{Multiply.} \\ &= 5.28326424449321\,\text{m} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

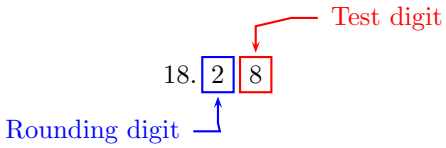


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a meter, 208 inches is approximately 5.3 meters.

17. Multiply by the given conversion ratio.

$$\begin{aligned} 20\,\text{yd} &= 20\,\text{yd} \cdot \frac{1\,\text{m}}{1.0936\,\text{yd}} && \text{Apply conversion factor.} \\ &= 20\,\cancel{\text{yd}} \cdot \frac{1\,\text{m}}{1.0936\,\cancel{\text{yd}}} && \text{Cancel common unit.} \\ &= \left(\frac{20}{1.0936}\right)\,\text{m} && \text{Multiply.} \\ &= 18.2882223847842\,\text{m} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

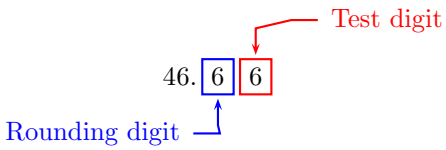


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a meter, 20 yards is approximately 18.3 meters.

19. Multiply by the given conversion ratio.

$$\begin{aligned} 29\,\text{mi} &= 29\,\text{mi} \cdot \frac{1.6093\,\text{km}}{1\,\text{mi}} && \text{Apply conversion factor.} \\ &= 29\,\cancel{\text{mi}} \cdot \frac{1.6093\,\text{km}}{1\,\cancel{\text{mi}}} && \text{Cancel common unit.} \\ &= 46.6697\,\text{km} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

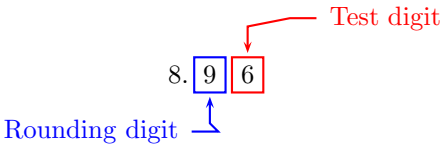


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a kilometer, 29 miles is approximately 46.7 kilometers.

21. Multiply by the given conversion ratio.

$$\begin{aligned} 8.2\,\text{m} &= 8.2\,\text{m} \cdot \frac{1.0936\,\text{yd}}{1\,\text{m}} && \text{Apply conversion factor.} \\ &= 8.2\,\cancel{\text{m}} \cdot \frac{1.0936\,\text{yd}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= 8.96752\,\text{yd} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

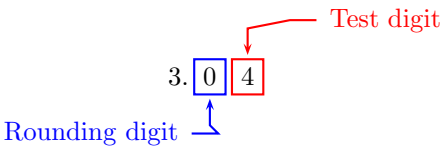


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a yard, 8.2 meters is approximately 9.0 yards.

23. Multiply by the given conversion ratio.

$$\begin{aligned} 4.9\,\text{km} &= 4.9\,\text{km} \cdot \frac{1\,\text{mi}}{1.6093\,\text{km}} && \text{Apply conversion factor.} \\ &= 4.9\,\cancel{\text{km}} \cdot \frac{1\,\text{mi}}{1.6093\,\cancel{\text{km}}} && \text{Cancel common unit.} \\ &= \left(\frac{4.9}{1.6093}\right)\,\text{mi} && \text{Divide.} \\ &= 3.04480208786429\,\text{mi} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

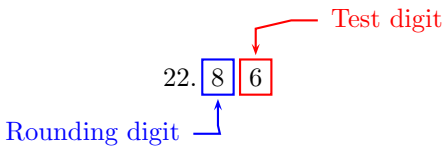


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a mile, 4.9 kilometers is approximately 3.0 miles.

25. Multiply by the given conversion ratio.

$$\begin{aligned} 25\,\text{yd} &= 25\,\text{yd} \cdot \frac{1\,\text{m}}{1.0936\,\text{yd}} && \text{Apply conversion factor.} \\ &= 25\,\cancel{\text{yd}} \cdot \frac{1\,\text{m}}{1.0936\,\cancel{\text{yd}}} && \text{Cancel common unit.} \\ &= \left(\frac{25}{1.0936}\right)\,\text{m} && \text{Multiply.} \\ &= 22.8602779809802\,\text{m} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

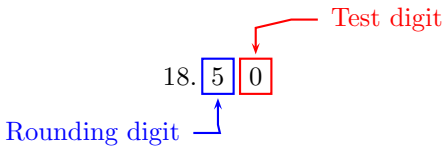


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a meter, 25 yards is approximately 22.9 meters.

27. Multiply by the given conversion ratio.

$$\begin{aligned} 47\,\text{cm} &= 47\,\text{cm} \cdot \frac{1\,\text{in}}{2.54\,\text{cm}} && \text{Apply conversion factor.} \\ &= 47\,\cancel{\text{cm}} \cdot \frac{1\,\text{in}}{2.54\,\cancel{\text{cm}}} && \text{Cancel common unit.} \\ &= \left(\frac{47}{2.54}\right)\,\text{in} && \text{Multiply.} \\ &= 18.503937007874\,\text{in} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

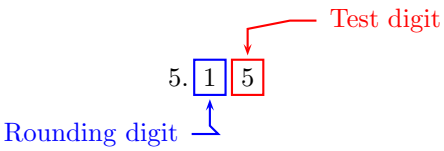


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a inch, 47 centimeters is approximately 18.5 inches.

29. Multiply by the given conversion ratio.

$$\begin{aligned} 8.3\,\text{km} &= 8.3\,\text{km} \cdot \frac{1\,\text{mi}}{1.6093\,\text{km}} && \text{Apply conversion factor.} \\ &= 8.3\,\cancel{\text{km}} \cdot \frac{1\,\text{mi}}{1.6093\,\cancel{\text{km}}} && \text{Cancel common unit.} \\ &= \left(\frac{8.3}{1.6093}\right)\text{mi} && \text{Divide.} \\ &= 5.15752190393339\,\text{mi} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

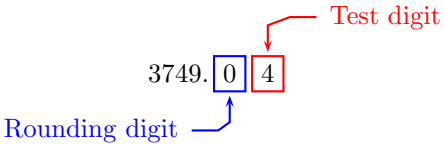


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a mile, 8.3 kilometers is approximately 5.2 miles.

31. This will require a chain of conversion factors.

$$\begin{aligned} 41\,\text{yd} &= 41\,\text{yd} \cdot \frac{0.9144\,\text{m}}{1\,\text{yd}} \cdot \frac{100\,\text{cm}}{1\,\text{m}} && \text{Apply conversion factors.} \\ &= 41\,\cancel{\text{yd}} \cdot \frac{0.9144\,\cancel{\text{m}}}{1\,\cancel{\text{yd}}} \cdot \frac{100\,\text{cm}}{1\,\cancel{\text{m}}} && \text{Cancel common units.} \\ &= 3749.04\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

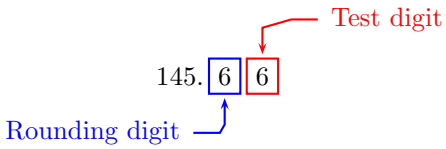


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a centimeter, 41 yards is approximately 3749.0 centimeters.

33. This will require a chain of conversion factors.

$$\begin{aligned} 3.7\,\text{m} &= 3.7\,\text{m} \cdot \frac{3.2808\,\text{ft}}{1\,\text{m}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} && \text{Apply conversion factors.} \\ &= 3.7\,\cancel{\text{m}} \cdot \frac{3.2808\,\cancel{\text{ft}}}{1\,\cancel{\text{m}}} \cdot \frac{12\,\text{in}}{1\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= 145.66752\,\text{in} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

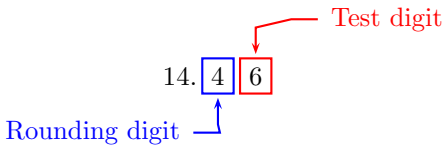


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a inch, 3.7 meters is approximately 145.7 inches.

35. This will require a chain of conversion factors.

$$\begin{aligned} 1323\,\text{cm} &= 1323\,\text{cm} \cdot \frac{1\,\text{m}}{100\,\text{cm}} \cdot \frac{1\,\text{yd}}{0.9144\,\text{m}} && \text{Apply conversion factors.} \\ &= 1323\,\cancel{\text{cm}} \cdot \frac{1\,\cancel{\text{m}}}{100\,\cancel{\text{cm}}} \cdot \frac{1\,\text{yd}}{0.9144\,\cancel{\text{m}}} && \text{Cancel common units.} \\ &= \left(\frac{1323}{91.44}\right)\,\text{yd} && \text{Multiply.} \\ &= 14.4685039370079\,\text{yd} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

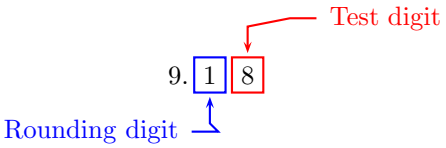


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a yard, 1323 centimeters is approximately 14.5 yards.

37. Multiply by the given conversion ratio.

$$\begin{aligned} 8.4\,\text{m} &= 8.4\,\text{m} \cdot \frac{1.0936\,\text{yd}}{1\,\text{m}} && \text{Apply conversion factor.} \\ &= 8.4\,\cancel{\text{m}} \cdot \frac{1.0936\,\text{yd}}{1\,\cancel{\text{m}}} && \text{Cancel common unit.} \\ &= 9.18624\,\text{yd} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

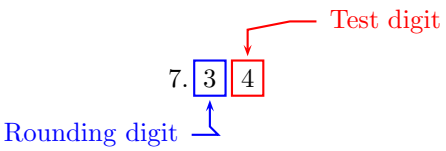


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a yard, 8.4 meters is approximately 9.2 yards.

39. This will require a chain of conversion factors.

$$\begin{aligned} 289\,\text{in} &= 289\,\text{in} \cdot \frac{1\,\text{ft}}{12\,\text{in}} \cdot \frac{1\,\text{m}}{3.2808\,\text{ft}} && \text{Apply conversion factors.} \\ &= 289\,\cancel{\text{in}} \cdot \frac{1\,\cancel{\text{ft}}}{12\,\cancel{\text{in}}} \cdot \frac{1\,\text{m}}{3.2808\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= \left(\frac{289}{12 \cdot 3.2808}\right)\text{m} && \text{Multiply.} \\ &= 7.34068926278143\,\text{m} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

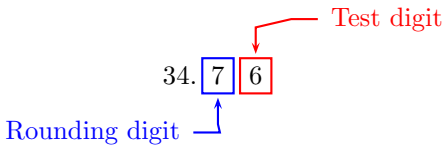


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a meter, 289 inches is approximately 7.3 meters.

41. Multiply by the appropriate conversion factor.

$$\begin{aligned} 15.8\,\text{kg} &= 15.8\,\text{kg} \cdot \frac{2.2\,\text{lb}}{1\,\text{kg}} && \text{Apply conversion factor.} \\ &= 15.8\,\cancel{\text{kg}} \cdot \frac{2.2\,\text{lb}}{1\,\cancel{\text{kg}}} && \text{Cancel common unit.} \\ &= 34.76\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

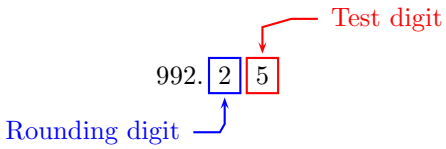


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a pound, 15.8 kilograms is approximately 34.8 pounds.

43. Multiply by the appropriate conversion factor.

$$\begin{aligned} 35\,\text{oz} &= 35\,\text{oz} \cdot \frac{28.35\,\text{g}}{1\,\text{oz}} && \text{Apply conversion factor.} \\ &= 35\,\cancel{\text{oz}} \cdot \frac{28.35\,\text{g}}{1\,\cancel{\text{oz}}} && \text{Cancel common unit.} \\ &= 992.25\,\text{g} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

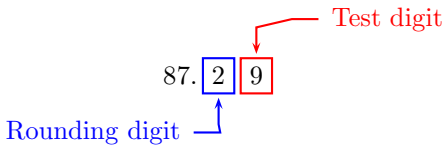


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a gram, 35 ounces is approximately 992.3 grams.

45. Multiply by a chain of conversion factors.

$$\begin{aligned} 2.48\,\text{kg} &= 2.48\,\text{kg} \cdot \frac{2.2\,\text{lb}}{1\,\text{kg}} \cdot \frac{16\,\text{oz}}{1\,\text{lb}} && \text{Apply conversion factors.} \\ &= 2.48\,\cancel{\text{kg}} \cdot \frac{2.2\,\cancel{\text{lb}}}{1\,\cancel{\text{kg}}} \cdot \frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common units.} \\ &= 87.296\,\text{oz} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

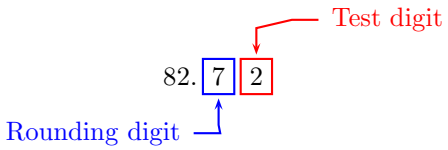


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of an ounce, 2.48 kilograms is approximately 87.3 ounces.

47. Multiply by a chain of conversion factors.

$$\begin{aligned} 2.35\,\text{kg} &= 2.35\,\text{kg} \cdot \frac{2.2\,\text{lb}}{1\,\text{kg}} \cdot \frac{16\,\text{oz}}{1\,\text{lb}} && \text{Apply conversion factors.} \\ &= 2.35\,\cancel{\text{kg}} \cdot \frac{2.2\,\cancel{\text{lb}}}{1\,\cancel{\text{kg}}} \cdot \frac{16\,\text{oz}}{1\,\cancel{\text{lb}}} && \text{Cancel common units.} \\ &= 82.72\,\text{oz} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

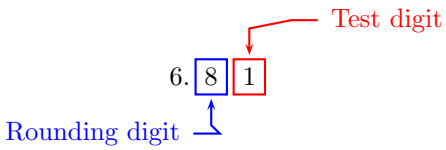


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an ounce, 2.35 kilograms is approximately 82.7 ounces.

49. Multiply by the appropriate conversion factor.

$$\begin{aligned} 15\,\text{lb} &= 15\,\text{lb} \cdot \frac{1\,\text{kg}}{2.2\,\text{lb}} && \text{Apply conversion factor.} \\ &= 15\,\cancel{\text{lb}} \cdot \frac{1\,\text{kg}}{2.2\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{15}{2.2}\right)\,\text{kg} && \text{Multiply.} \\ &= 6.81818181818182\,\text{kg} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

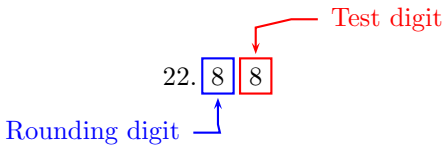


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a kilogram, 15 pounds is approximately 6.8 kilograms.

51. Multiply by the appropriate conversion factor.

$$\begin{aligned} 10.4\,\text{kg} &= 10.4\,\text{kg} \cdot \frac{2.2\,\text{lb}}{1\,\text{kg}} && \text{Apply conversion factor.} \\ &= 10.4\,\cancel{\text{kg}} \cdot \frac{2.2\,\text{lb}}{1\,\cancel{\text{kg}}} && \text{Cancel common unit.} \\ &= 22.88\,\text{cm} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

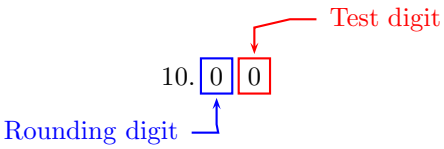


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a pound, 10.4 kilograms is approximately 22.9 pounds.

53. Multiply by the appropriate conversion factor.

$$\begin{aligned} 352\,\text{oz} &= 352\,\text{oz} \cdot \frac{1\,\text{lb}}{16\,\text{oz}} \cdot \frac{1\,\text{kg}}{2.2\,\text{lb}} && \text{Apply conversion factor.} \\ &= 352\,\cancel{\text{oz}} \cdot \frac{1\,\cancel{\text{lb}}}{16\,\cancel{\text{oz}}} \cdot \frac{1\,\text{kg}}{2.2\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{352}{35.2}\right)\text{kg} && \text{Multiply.} \\ &= 10\,\text{kg} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

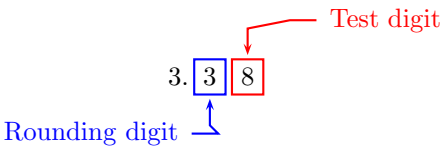


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an kilogram, 352 ounces is approximately 10.0 kilograms.

55. Multiply by the appropriate conversion factor.

$$\begin{aligned} 96\,\text{g} &= 96\,\text{g} \cdot \frac{1\,\text{oz}}{28.35\,\text{g}} && \text{Apply conversion factor.} \\ &= 96\,\cancel{\text{g}} \cdot \frac{1\,\text{oz}}{28.35\,\cancel{\text{g}}} && \text{Cancel common unit.} \\ &= \left(\frac{96}{28.35}\right)\text{oz} && \text{Multiply.} \\ &= 3.38624338624339\,\text{oz} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

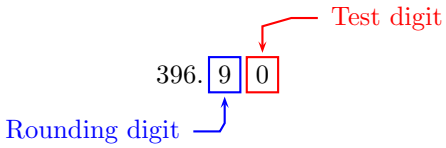


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of an ounce, 96 grams is approximately 3.4 ounces.

57. Multiply by the appropriate conversion factor.

$$\begin{aligned} 14\,\text{oz} &= 14\,\text{oz} \cdot \frac{28.35\,\text{g}}{1\,\text{oz}} && \text{Apply conversion factor.} \\ &= 14\,\cancel{\text{oz}} \cdot \frac{28.35\,\text{g}}{1\,\cancel{\text{oz}}} && \text{Cancel common unit.} \\ &= 396.9\,\text{g} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

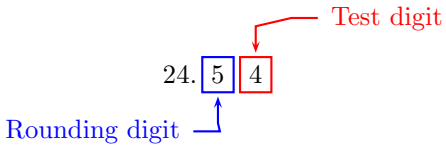


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a gram, 14 ounces is approximately 396.9 grams.

59. Multiply by the appropriate conversion factor.

$$\begin{aligned} 54\,\text{lb} &= 54\,\text{lb} \cdot \frac{1\,\text{kg}}{2.2\,\text{lb}} && \text{Apply conversion factor.} \\ &= 54\,\cancel{\text{lb}} \cdot \frac{1\,\text{kg}}{2.2\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{54}{2.2}\right)\,\text{kg} && \text{Multiply.} \\ &= 24.5454545454545\,\text{kg} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

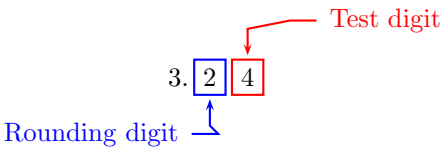


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a kilogram, 54 pounds is approximately 24.5 kilograms.

61. Multiply by the appropriate conversion factor.

$$\begin{aligned} 92\,\text{g} &= 92\,\text{g} \cdot \frac{1\,\text{oz}}{28.35\,\text{g}} && \text{Apply conversion factor.} \\ &= 92\,\cancel{\text{g}} \cdot \frac{1\,\text{oz}}{28.35\,\cancel{\text{g}}} && \text{Cancel common unit.} \\ &= \left(\frac{92}{28.35}\right)\text{oz} && \text{Multiply.} \\ &= 3.24514991181658\,\text{oz} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

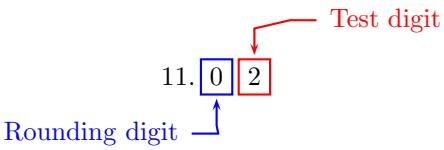


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an ounce, 92 grams is approximately 3.2 ounces.

63. Multiply by the appropriate conversion factor.

$$\begin{aligned} 388\,\text{oz} &= 388\,\text{oz} \cdot \frac{1\,\text{lb}}{16\,\text{oz}} \cdot \frac{1\,\text{kg}}{2.2\,\text{lb}} && \text{Apply conversion factor.} \\ &= 388\,\cancel{\text{oz}} \cdot \frac{1\,\cancel{\text{lb}}}{16\,\cancel{\text{oz}}} \cdot \frac{1\,\text{kg}}{2.2\,\cancel{\text{lb}}} && \text{Cancel common unit.} \\ &= \left(\frac{388}{35.2}\right)\text{kg} && \text{Multiply.} \\ &= 11.0227272727273\,\text{kg} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

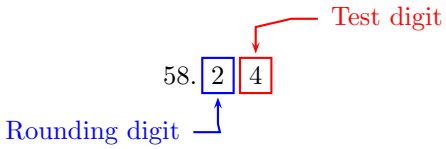


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an kilogram, 388 ounces is approximately 11.0 kilograms.

65. Multiply by the appropriate conversion factor.

$$\begin{aligned} 55.1\,\text{L} &= 55.1\,\text{L} \cdot \frac{1\,\text{qt}}{0.946\,\text{L}} && \text{Apply conversion factor.} \\ &= 55.1\,\cancel{\text{L}} \cdot \frac{1\,\text{qt}}{0.946\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= \left(\frac{55.1}{0.946}\right)\,\text{qt} && \text{Multiply.} \\ &= 58.2452431289641\,\text{qt} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

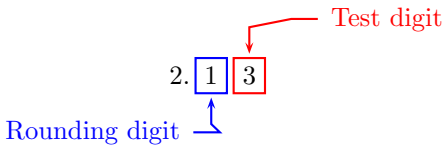


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an quart, 55.1 litres is approximately 58.2 quarts.

67. This requires a chain of conversion factors.

$$\begin{aligned} 72073\,\text{fl oz} &= 72073\,\text{fl oz} \cdot \frac{1\,\text{L}}{33.8\,\text{fl oz}} \cdot \frac{1\,\text{kL}}{1000\,\text{L}} && \text{Apply conversion factors.} \\ &= 72073\,\cancel{\text{fl oz}} \cdot \frac{1\,\cancel{\text{L}}}{33.8\,\cancel{\text{fl oz}}} \cdot \frac{1\,\text{kL}}{1000\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= \left(\frac{72073}{33800}\right)\,\text{kL} && \text{Multiply.} \\ &= 2.13233727810651\,\text{kL} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an kilolitre, 72073 fluiud ounces is approximately 2.1 kilolitres.

69. This requires a chain of conversion factors.

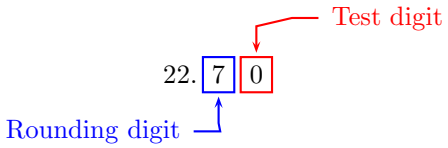
$$\begin{aligned} 2.5\,\text{kL} &= 2.5\,\text{kL} \cdot \frac{1000\,\text{L}}{1\,\text{kL}} \cdot \frac{33.8\,\text{fl oz}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 2.5\,\cancel{\text{kL}} \cdot \frac{1000\,\cancel{\text{L}}}{1\,\cancel{\text{kL}}} \cdot \frac{33.8\,\text{fl oz}}{1\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= 84500\,\text{fl oz} && \text{Multiply.} \end{aligned}$$

Hence, 2.5 kilolitres equals 84500 fluid ounces.

71. Multiply by the appropriate conversion factor.

$$\begin{aligned} 24\,\text{qt} &= 24\,\text{qt} \cdot \frac{0.946\,\text{L}}{1\,\text{qt}} && \text{Apply conversion factor.} \\ &= 24\,\cancel{\text{qt}} \cdot \frac{0.946\,\text{L}}{1\,\cancel{\text{qt}}} && \text{Cancel common unit.} \\ &= 22.704\,\text{L} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

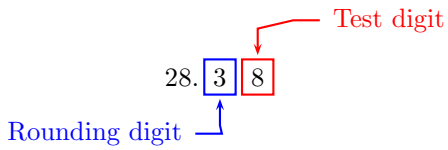


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a litre, 24 quarts is approximately 22.7 liters.

73. Multiply by the appropriate conversion factor.

$$\begin{aligned} 30\,\text{qt} &= 30\,\text{qt} \cdot \frac{0.946\,\text{L}}{1\,\text{qt}} && \text{Apply conversion factor.} \\ &= 30\,\cancel{\text{qt}} \cdot \frac{0.946\,\text{L}}{1\,\cancel{\text{qt}}} && \text{Cancel common unit.} \\ &= 28.38\,\text{L} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

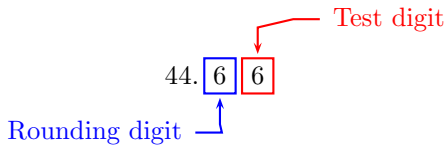


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a litre, 30 quarts is approximately 28.4 liters.

75. Multiply by the appropriate conversion factor.

$$\begin{aligned} 11.8\,\text{gal} &= 11.8\,\text{gal} \cdot \frac{3.785\,\text{L}}{1\,\text{gal}} && \text{Apply conversion factor.} \\ &= 11.8\,\cancel{\text{gal}} \cdot \frac{3.785\,\text{L}}{1\,\cancel{\text{gal}}} && \text{Cancel common unit.} \\ &= 44.663\,\text{L} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

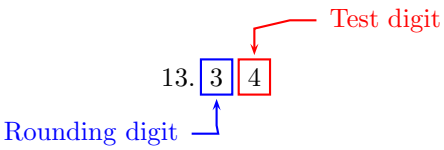


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a litre, 11.8 gallons is approximately 44.7 liters.

77. Multiply by the appropriate conversion factor.

$$\begin{aligned} 50.5\,\text{L} &= 50.5\,\text{L} \cdot \frac{1\,\text{gal}}{3.785\,\text{L}} && \text{Apply conversion factor.} \\ &= 50.5\,\cancel{\text{L}} \cdot \frac{1\,\text{gal}}{3.785\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= \left(\frac{50.5}{3.785}\right)\,\text{gal} && \text{Multiply.} \\ &= 13.3421400264201\,\text{gal} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.



Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an gallon, 50.5 litres is approximately 13.3 gallons.

79. This requires a chain of conversion factors.

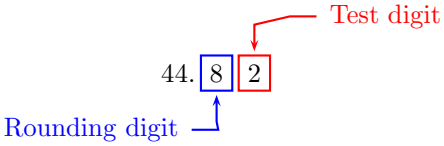
$$\begin{aligned} 8.3\,\text{kL} &= 8.3\,\text{kL} \cdot \frac{1000\,\text{L}}{1\,\text{kL}} \cdot \frac{33.8\,\text{fl oz}}{1\,\text{L}} && \text{Apply conversion factors.} \\ &= 8.3\,\cancel{\text{kL}} \cdot \frac{1000\,\cancel{\text{L}}}{1\,\cancel{\text{kL}}} \cdot \frac{33.8\,\text{fl oz}}{1\,\cancel{\text{L}}} && \text{Cancel common units.} \\ &= 280540\,\text{fl oz} && \text{Multiply.} \end{aligned}$$

Hence, 8.3 kilolitres equals 280540 fluid ounces.

81. Multiply by the appropriate conversion factor.

$$\begin{aligned} 42.4\,\text{L} &= 42.4\,\text{L} \cdot \frac{1\,\text{qt}}{0.946\,\text{L}} && \text{Apply conversion factor.} \\ &= 42.4\,\cancel{\text{L}} \cdot \frac{1\,\text{qt}}{0.946\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= \left(\frac{42.4}{0.946}\right)\,\text{qt} && \text{Multiply.} \\ &= 44.8202959830867\,\text{qt} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

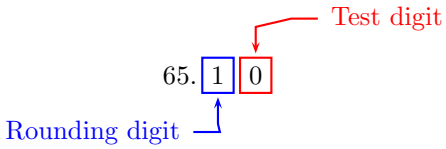


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an quart, 42.4 litres is approximately 44.8 quarts.

83. Multiply by the appropriate conversion factor.

$$\begin{aligned} 17.2\,\text{gal} &= 17.2\,\text{gal} \cdot \frac{3.785\,\text{L}}{1\,\text{gal}} && \text{Apply conversion factor.} \\ &= 17.2\,\cancel{\text{gal}} \cdot \frac{3.785\,\text{L}}{1\,\cancel{\text{gal}}} && \text{Cancel common unit.} \\ &= 65.102\,\text{L} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

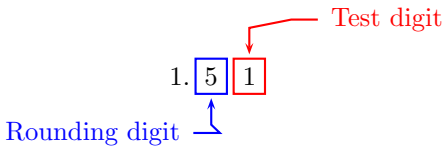


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a litre, 17.2 gallons is approximately 65.1 liters.

85. This requires a chain of conversion factors.

$$\begin{aligned} 51274\,\text{fl oz} &= 51274\,\text{fl oz} \cdot \frac{1\,\text{L}}{33.8\,\text{fl oz}} \cdot \frac{1\,\text{kL}}{1000\,\text{L}} && \text{Apply conversion factors.} \\ &= 51274\,\cancel{\text{fl oz}} \cdot \frac{1\,\cancel{\text{L}}}{33.8\,\cancel{\text{fl oz}}} \cdot \frac{1\,\text{kL}}{1000\,\cancel{\text{L}}} && \text{Cancel common unit.} \\ &= \left(\frac{51274}{33800}\right)\,\text{kL} && \text{Multiply.} \\ &= 1.51698224852071\,\text{kL} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

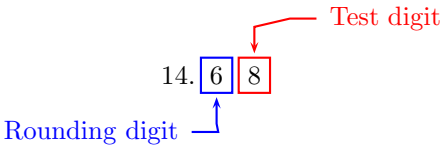


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of an kilolitre, 51274 fluiud ounces is approximately 1.5 kilolitres.

87. Multiply by the appropriate conversion factor.

$$\begin{aligned}
55.6\,\text{L} &= 55.6\,\text{L} \cdot \frac{1\,\text{gal}}{3.785\,\text{L}} && \text{Apply conversion factor.}\\
&= 55.6\,\cancel{\text{L}} \cdot \frac{1\,\text{gal}}{3.785\,\cancel{\text{L}}} && \text{Cancel common unit.}\\
&= \left(\frac{55.6}{3.785}\right)\,\text{gal} && \text{Multiply.}\\
&= 14.6895640686922\,\text{gal} && \text{Divide.}
\end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

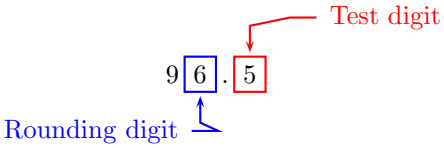


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of an gallon, 55.6 litres is approximately 14.7 gallons.

89. There are 0.6214 miles in a kilometer.

$$\begin{aligned}
60\,\frac{\text{mi}}{\text{hr}} &\approx 60\,\frac{\text{mi}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\text{mi}} && \text{Apply conversion factor.}\\
&\approx 60\,\frac{\cancel{\text{mi}}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\cancel{\text{mi}}} && \text{Cancel common units.}\\
&\approx \frac{60 \cdot 1}{0.6214}\,\frac{\text{km}}{\text{hr}} && \text{Multiply fractions.}\\
&\approx 96.5\,\frac{\text{km}}{\text{hr}} && \text{Multiply and divide.}
\end{aligned}$$

To round to the nearest kilometer per hour, identify the rounding and test digits.

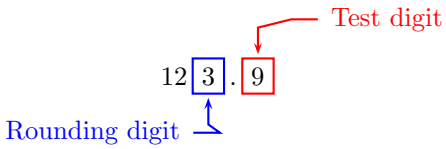


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Thus, to the nearest kilometer per hour, the speed is approximately 97 kilometers per hour.

91. There are 0.6214 miles in a kilometer.

$$\begin{aligned} 77\,\frac{\text{mi}}{\text{hr}} &\approx 77\,\frac{\text{mi}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\text{mi}} && \text{Apply conversion factor.} \\ &\approx 77\,\frac{\cancel{\text{mi}}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\cancel{\text{mi}}} && \text{Cancel common units.} \\ &\approx \frac{77 \cdot 1}{0.6214}\,\frac{\text{km}}{\text{hr}} && \text{Multiply fractions.} \\ &\approx 123.9\,\frac{\text{km}}{\text{hr}} && \text{Multiply and divide.} \end{aligned}$$

To round to the nearest kilometer per hour, identify the rounding and test digits.

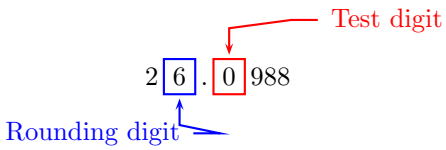


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Thus, to the nearest kilometer per hour, the speed is approximately 124 kilometers per hour.

93. There are 0.6214 miles in a kilometer.

$$\begin{aligned} 42\,\frac{\text{km}}{\text{h}} &\approx 42\,\frac{\text{km}}{\text{h}} \cdot \frac{0.6214\,\text{mi}}{1\,\text{km}} && \text{Apply conversion factor.} \\ &\approx 42\,\frac{\cancel{\text{km}}}{\text{h}} \cdot \frac{0.6214\,\text{mi}}{1\,\cancel{\text{km}}} && \text{Cancel common units.} \\ &\approx \frac{42 \cdot 0.6214}{1}\,\frac{\text{mi}}{\text{h}} && \text{Multiply fractions.} \\ &\approx 26.0988\,\frac{\text{mi}}{\text{h}} \end{aligned}$$

To round to the nearest mile per hour, identify the rounding and test digits.

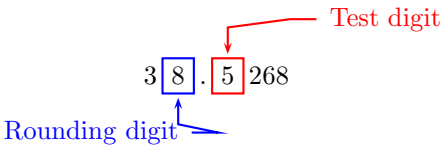


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest mile per hour, the speed is approximately 26 miles per hour.

95. There are 0.6214 miles in a kilometer.

$$\begin{aligned} 62\,\frac{\text{km}}{\text{h}} &\approx 62\,\frac{\text{km}}{\text{h}} \cdot \frac{0.6214\,\text{mi}}{1\,\text{km}} && \text{Apply conversion factor.} \\ &\approx 62\,\frac{\cancel{\text{km}}}{\text{h}} \cdot \frac{0.6214\,\text{mi}}{1\,\cancel{\text{km}}} && \text{Cancel common units.} \\ &\approx \frac{62 \cdot 0.6214}{1}\,\frac{\text{mi}}{\text{h}} && \text{Multiply fractions.} \\ &\approx 38.5268\,\frac{\text{mi}}{\text{h}} \end{aligned}$$

To round to the nearest mile per hour, identify the rounding and test digits.

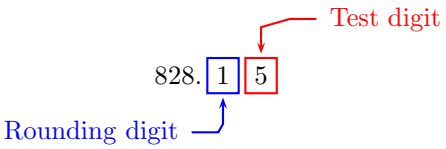


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Thus, to the nearest mile per hour, the speed is approximately 39 miles per hour.

97. Note that 1 meter is approximately 3.2808 feet.

$$\begin{aligned} 2717\,\text{feet} &= 2717\,\text{feet} \cdot \frac{1\,\text{m}}{3.2808\,\text{ft}} && \text{Apply conversion factor.} \\ &= 2717\,\cancel{\text{feet}} \cdot \frac{1\,\text{m}}{3.2808\,\cancel{\text{ft}}} && \text{Cancel common units.} \\ &= \left(\frac{2717}{3.2808}\right)\,\text{m} && \text{Multiply.} \\ &\approx 828.15\,\text{m} && \text{Divide.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

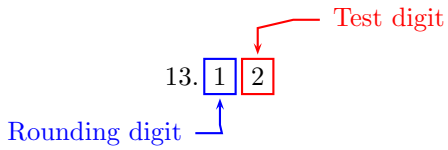


Because the test digit is greater than or equal to 5, add 1 to the rounding digit, then truncate. Hence, to the nearest tenth of a meter, 2,717 feet is approximately 828.2 meters.

99. Note that 1 meter is approximately 3.2808 feet.

$$\begin{aligned} 4\,\text{m} &= 4\,\text{m} \cdot \frac{3.2808\,\text{ft}}{1\,\text{m}} && \text{Apply conversion factor.} \\ &= 4\,\cancel{\text{m}} \cdot \frac{3.2808\,\text{ft}}{1\,\cancel{\text{m}}} && \text{Cancel common units.} \\ &= 13.12\,\text{ft} && \text{Multiply.} \end{aligned}$$

Locate the rounding digit in the tenths place and the test digit in the hundredths place.

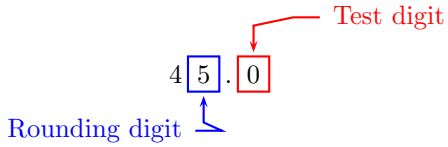


Because the test digit is less than 5, leave the rounding digit alone, then truncate. Hence, to the nearest tenth of a foot, 4 meters is approximately 13.1 feet.

101. There are 0.6214 miles in a kilometer.

$$\begin{aligned} 28\,\frac{\text{mi}}{\text{hr}} &\approx 28\,\frac{\text{mi}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\text{mi}} && \text{Apply conversion factor.} \\ &\approx 28\,\frac{\cancel{\text{mi}}}{\text{hr}} \cdot \frac{1\,\text{km}}{0.6214\,\cancel{\text{mi}}} && \text{Cancel common units.} \\ &\approx \frac{28 \cdot 1}{0.6214}\,\frac{\text{km}}{\text{hr}} && \text{Multiply fractions.} \\ &\approx 45.0\,\frac{\text{km}}{\text{hr}} && \text{Multiply and divide.} \end{aligned}$$

To round to the nearest kilometer per hour, identify the rounding and test digits.



Because the test digit is less than 5, leave the rounding digit alone, then truncate. Thus, to the nearest kilometer per hour, the solar plane lifted off no more than approximately 45 kilometers per hour.