Example 1  Write Ratios as Fractions
Express the ratio 8 golden retrievers out of 20 dogs as a fraction in simplest form.

\[
\frac{8}{20} = \frac{2}{5} \quad \text{Divide the numerator and denominator by the GCF, 4.}
\]

\[
\frac{8}{20} \div 4
\]

The ratio of golden retrievers to dogs is 2 to 5. This means that for every 5 dogs, 2 of them are golden retrievers.

Example 2  Write Ratios as Fractions
Express the ratio 2 yards to 4 feet as a fraction in simplest form.

\[
\frac{2 \text{ yards}}{4 \text{ feet}} = \frac{6 \text{ feet}}{4 \text{ feet}} \quad \text{Convert 2 yards to feet.}
\]

\[
= \frac{3 \text{ feet}}{2 \text{ feet}} \quad \text{Divide the numerator and denominator by the GCF, 2.}
\]

Written in simplest form, the ratio is 3 to 2.

Example 3  Find Unit Rate
SHOPPING  A 20-ounce box of cereal is priced at $3.80, and a 36-ounce box of the same cereal is priced at $6.45. Which box has the lower cost per ounce of cereal?
Find and compare the unit rates of the packages.

\[
\frac{3.80 \text{ dollars}}{20 \text{ ounces}} = \frac{0.19 \text{ dollars}}{1 \text{ ounce}} \quad \text{Divide the numerator and denominator by 20 to get a denominator of 1.}
\]

\[
\div 20 \quad \text{For the 20-ounce box, the unit rate is $0.19 per ounce.}
\]

\[
\div 36
\]

\[
\frac{6.45 \text{ dollars}}{36 \text{ ounces}} \approx \frac{0.179 \text{ dollars}}{1 \text{ ounce}} \quad \text{Divide the numerator and denominator by 36 to get a denominator of 1.}
\]

\[
\div 36 \quad \text{For the 36-ounce box, the unit rate is about $0.179 per ounce.}
\]

So, the 36 ounce box has a lower cost per ounce.
Example 4  Convert Rates

TRAVEL  A car travels at a rate of 60 miles per hour. How many feet is this per second?

You need to convert $\frac{60 \text{ mi}}{1 \text{ h}}$ to $\frac{? \text{ ft}}{1 \text{ s}}$. There are 5280 feet in 1 mile and 3600 seconds in 1 hour. Write 60 miles per hour as $\frac{60 \text{ mi}}{1 \text{ h}}$.

\[
\frac{60 \text{ mi}}{1 \text{ h}} = \frac{60 \text{ mi}}{1 \text{ h}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \div \frac{3600 \text{ s}}{1 \text{ h}} \quad \text{Convert miles to feet and hours to seconds.}
\]

\[
= \frac{60 \text{ mi}}{1 \text{ h}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} \quad \text{The reciprocal of } \frac{3600 \text{ s}}{1 \text{ h}} \text{ is } \frac{1 \text{ h}}{3600 \text{ s}}.
\]

\[
= \frac{60 \text{ mi}}{1 \text{ h}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ h}}{3600 \text{ s}} \quad \text{Divide the common factors and units.}
\]

\[
= \frac{88 \text{ ft}}{\text{s}} \quad \text{Simplify.}
\]

So, 60 miles per hour is equivalent to 88 feet per second.