

PROPORTIONS A **proportion** is an equation that states that two ratios are equivalent. The general form of a proportion is given below.

READING

This proportion is read
"a is to b as c is to d."

$$\frac{a}{b} = \frac{c}{d} \text{ where } b \neq 0, d \neq 0$$

If one of the numbers in a proportion is unknown, you can solve the proportion to find the unknown number. To solve a proportion with a variable in the numerator, you can use the same methods you used to solve equations.

EXAMPLE 2 Solve a proportion

Solve the proportion $\frac{11}{6} = \frac{x}{30}$.

$$\frac{11}{6} = \frac{x}{30} \quad \text{Write original proportion.}$$

$$30 \cdot \frac{11}{6} = 30 \cdot \frac{x}{30} \quad \text{Multiply each side by 30.}$$

$$\frac{330}{6} = x \quad \text{Simplify.}$$

$$55 = x \quad \text{Divide.}$$



GUIDED PRACTICE for Example 2

Solve the proportion. Check your solution.

3. $\frac{w}{35} = \frac{4}{7}$

4. $\frac{9}{2} = \frac{m}{12}$

5. $\frac{z}{54} = \frac{5}{9}$

SETTING UP A PROPORTION There are different ways to set up a proportion. Consider the following problem.

A recipe for tomato salsa calls for 30 tomatoes to make 12 pints of salsa. How many tomatoes are needed to make 4 pints of salsa?

The tables below show two ways of arranging the information from the problem. In each table, x represents the number of tomatoes needed to make 4 pints of salsa. The proportions follow from the tables.

AVOID ERRORS

You cannot write a proportion that compares pints to tomatoes and tomatoes to pints.

$$\frac{\text{pints}}{\text{tomatoes}} \neq \frac{\text{tomatoes}}{\text{pints}}$$

	Tomatoes	Pints
Smaller recipe	x	4
Normal recipe	30	12

Proportion: $\frac{x}{30} = \frac{4}{12}$

	Smaller recipe	Normal recipe
Tomatoes	x	30
Pints	4	12

Proportion: $\frac{x}{4} = \frac{30}{12}$