

TOPIC: PROPORTIONS

Intro to Proportions

◆ A **proportion** is two ratios or rates that are _____ to each other (e.g. $\frac{4}{8} = \frac{1}{2}$).

New

Writing Proportions

5 is to 12 as 30 is to 72

$\frac{\quad}{\quad} = \frac{\quad}{\quad}$

EXAMPLE

Express each statement as a proportion.

Four apples cost \$12, and six apples cost \$18

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PRACTICE

Express the sentence as a proportion.

(A) Ten is to fifteen as four is to six.

(B) Two thirds is to one fifth as two fifths is to one ninth.

PRACTICE

Express the sentence as a proportion.

(A) A recipe uses 3 cups of rice for 5 cups of broth, and 15 cups of rice for 25 cups of broth.

(B) A car travels 80 miles in 2 hours and 120 miles in 3 hours.

PRACTICE

Express the sentence as a proportion.

(A) A paint mixture uses 2.5 liters of blue paint for every 4 liters of white paint, and another mixture uses 7.5 liters of blue paint for every 12 liters of white paint.

(B) A trail map shows 3.6 miles in 1.2 hours, while another section shows 7 miles in $2\frac{1}{3}$ hours.

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Determine If Proportions Are True

◆ A proportion is **true** if the ratios are _____.

Simplest Form	Cross Products
$\frac{4}{12} \stackrel{?}{=} \frac{5}{15}$ ____ = ____ ____ = ____	$\frac{4}{12} \stackrel{?}{=} \frac{5}{15}$ __ · __ = __ · __ __ = __

EXAMPLE

Determine whether the ratios from a true proportion.

(A) $\frac{3}{8} \stackrel{?}{=} \frac{9}{24}$

(B) $\frac{8}{4} \stackrel{?}{=} \frac{10}{5\frac{1}{2}}$

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PRACTICE

Determine whether the proportion is true or false.

(A) $\frac{1\frac{2}{3}}{3} \stackrel{?}{=} \frac{3\frac{1}{3}}{6}$

(B) $\frac{2.4}{6} \stackrel{?}{=} \frac{1.2}{4}$

PRACTICE

Use cross products to determine whether the proportion is true or false.

(A) $\frac{7}{4} \stackrel{?}{=} \frac{20}{12}$

(B) $\frac{4}{9} \stackrel{?}{=} \frac{12}{27}$

PRACTICE

Write the sentence as a proportion then determine whether the proportion is true or false.

(A) One and eight tenths is to two as four and five tenths is to five.

(B) Four bags of flour costs \$12, and eight bags of flour costs \$18.

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Solving Proportions

- ◆ When one number of a proportion is unknown, we can use _____ to set up an equation and solve.
 - Check your work by substituting the answer back into the proportion and then determine if it's true.

New

Solving With Cross Products

Solve

$$\underline{\quad} \cdot \underline{\quad} = \underline{\quad} \cdot \underline{\quad}$$

$$\underline{\quad} = \underline{\quad}$$

$$\underline{\quad} = \underline{\quad}$$

$$\frac{4}{12} = \frac{5}{x}$$

Check

$$\frac{4}{12} = \frac{5}{\underline{\quad}}$$

$$\underline{\quad} \cdot \underline{\quad} = \underline{\quad} \cdot \underline{\quad}$$

$$\underline{\quad} = \underline{\quad}$$

EXAMPLE

Solve the proportion using cross products.

$$\frac{8}{\frac{1}{3}} = \frac{24}{p}$$

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PRACTICE

Solve the proportion using cross products.

(A) $\frac{5}{8} = \frac{k}{24}$

(B) $\frac{2.5}{5} = \frac{p}{12}$

(C) $\frac{1}{\frac{3}{8}} = \frac{2}{\frac{5}{n}}$

EXAMPLE

Solve the proportion using cross products.

A movie theater sells 4 tickets for \$36. How many tickets were bought for \$63?