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
$\frac{4}{12} \stackrel{?}{=} \frac{5}{15}$	$\frac{4}{12} \stackrel{?}{=} \frac{5}{15}$
$\frac{\quad}{\quad} = \frac{\quad}{\quad}$	$\_\_ \cdot \_\_ = \_\_ \cdot \_\_$
$\_\_ = \_\_$	$\_\_ = \_\_$

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***) $\dfrac{1\frac{2}{3}}{3} \stackrel{?}{=} \dfrac{3\frac{1}{3}}{6}$

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

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

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

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

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**

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

Solve

$\_ \cdot \_ = \_ \cdot \_$

$\_\_\_\_ = \_\_\_\_$

$\_\_ = \_\_$

Check

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

$\_ \cdot \_ = \_ \cdot \_$

$\_\_\_\_ = \_\_\_\_$

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

EXAMPLE Solve the proportion using cross products.

$$\frac{15}{5p+3} = \frac{5}{7}$$

EXAMPLE Solve the proportion using cross products.

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