NAME _____ DATE _____ PERIOD ____

3-6 Study Guide and Intervention *(continued)*

Ratios and Proportions

Solve Proportions If a proportion involves a variable, you can use cross products to solve the proportion. In the proportion $\frac{x}{5} = \frac{10}{13}$, x and 13 are called **extremes** and 5 and 10 are called **means**. In a proportion, the product of the extremes is equal to the product of the means.

Means-Extremes Property of Proportions	For any numbers a, b, c, and d, if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Example **Solve $\frac{x}{5} = \frac{10}{13}$.**

$\frac{x}{5} = \frac{10}{13}$	Original proportion
$13(x) = 5(10)$	Cross products
$13x = 50$	Simplify.
$\frac{13x}{13} = \frac{50}{13}$	Divide each side by 13.
$x = 3\frac{11}{13}$	Simplify.

The solution is $3\frac{11}{13}$.

EXAMPLE

$\frac{x-6}{4} = \frac{9}{5}$ Use cross-products

$5(x-6) = 4 \cdot 9$

$5x - 30 = 36$ Add 30 to both sides

$5x = 66$ Divide each side by 5

$x = \frac{66}{5}$

LOOK

BE NEAT

(#) Circle the problem #

→ WRITE original problem

SHOW WORK

BOX ANSWER

CK if required

UNDERLINE

Exercises

Solve each proportion.

1. $\frac{-3}{x} = \frac{2}{8}$
2. $\frac{1}{t} = \frac{5}{3}$
3. $\frac{0.1}{2} = \frac{0.5}{x}$
4. $\frac{x+1}{4} = \frac{3}{4}$
5. $\frac{4}{6} = \frac{8}{x}$
6. $\frac{x}{21} = \frac{3}{63}$
7. $\frac{9}{y+1} = \frac{18}{54}$
8. $\frac{3}{d} = \frac{18}{3}$
9. $\frac{5}{8} = \frac{p}{24}$
10. $\frac{4}{b-2} = \frac{4}{12}$
11. $\frac{1.5}{x} = \frac{12}{x}$
12. $\frac{3+y}{4} = \frac{-y}{8}$
13. $\frac{a-8}{12} = \frac{15}{3}$
14. $\frac{12}{k} = \frac{24}{k}$
15. $\frac{2+w}{6} = \frac{12}{9}$

Use a proportion to solve each problem.

16. **MODELS** To make a model of the Guadeloupe River bed, Hermie used 1 inch of clay for 5 miles of the river's actual length. His model river was 50 inches long. How long is the Guadeloupe River?

17. **EDUCATION** Josh finished 24 math problems in one hour. At that rate, how many hours will it take him to complete 72 problems?