NAME _____ DATE Key PERIOD _____

2-6 Notes

Ratios and Proportions

Example 1: Determine whether the ratios $\frac{24}{36}$ and $\frac{12}{18}$ are equivalent ratios. Write *yes* or *no*. Justify your answer.

$\frac{24}{36} = \frac{2}{3}$ $\frac{12}{18} = \frac{2}{3}$

yes! both reduce to 2/3

Exercises

Determine whether each pair of ratios are equivalent ratios. Write *yes* or *no*.

1. $\frac{1}{2}, \frac{16}{32}$

yes! $\frac{16}{32} = \frac{1}{2}$

2. $\frac{5}{8}, \frac{10}{15}$

no! $\frac{10}{15} = \frac{2}{3}$

3. $\frac{10}{20}, \frac{25}{49}$

$\frac{10}{20} = \frac{1}{2}$ $\frac{25}{49}$ already reduced

no

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 $\frac{x}{5} = \frac{10}{13}$.

$13x = 5(10)$

$13x = 50$

$x = \frac{50}{13}$

Solve each proportion. If necessary, round to the nearest hundredth.

1. $\frac{-3}{x} = \frac{2}{8}$

$-24 = 2x$

$-12 = x$

2. $\frac{4}{b-2} = \frac{4}{12}$

$12(4) = 4(b-2)$

$48 = 4b - 8$

$+8 \quad +8$

$56 = 4b$

$b = 14$

3. $\frac{1.5}{x} = \frac{12}{x}$

$1.5x = 12x$

no solution!

$x = 0$ will not work in denominator ↓ undefined!

Use a proportion to solve each problem.

10. **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?

$\frac{1"}{5mi} = \frac{50"}{x mi}$ $1x = 5(50)$ $x = 250$ miles long

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

$\frac{24}{1hr} = \frac{72}{x hrs}$ $\frac{24x}{24} = \frac{72}{24}$

$x = 3$ hrs

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2-7 *Percent of Change*

Percent of Change When an increase or decrease in an amount is expressed as a percent, the percent is called the **percent of change.** If the new number is greater than the original number, the percent of change is a **percent of increase.** If the new number is less than the original number, the percent of change is the **percent of decrease.**

Example 1: Find the percent of increase.
original: 30
new: 66

Step 1: find the amount of change 36

Step 2: find the percent of increase by dividing amount of change by original number.

$\frac{36}{30} = 1.2$ or 120% increase

Example 2: Find the percent of decrease.
new: 22 original: 48

step 1: 48 - 22 = 26

step 2: $\frac{26}{48} = 54.17\%$

Exercises

State whether each percent of change is a percent of *increase* or a percent of *decrease.* Then find each percent of change. Round to the nearest whole percent.

1. original: 50 (increase) 50 - 50 = 30
   new: 80
   $\frac{30}{50} = .6 = 60\%$ increase

2. original: 90 (increase) change = 10
   new: 100
   $\frac{10}{90} = .111 = 11.1\%$ increase

3. original: 45 (decrease) 45 - 20 = 25
   new: 20
   $\frac{25}{45} = .555 = 55.6\%$

4. **VIDEOS** The original selling price of a new sports video was $65.00. Due to the demand the price was increased to $87.75. What was the percent of increase over the original price?

   87.75 - 65 = 22.75

   $\frac{22.75}{65} = .35 = 35\%$ increase

5. **SCHOOL** A high school paper increased its sales by 75% when it ran an issue featuring a contest to win a class party. Before the contest issue, 10% of the school's 800 students bought the paper. How many students bought the contest issue?

   10% of 800
   $= \frac{1}{10}(800) = 80$

   increase: 75% of 80
   $= .75(80) = 60$ more sales

   80 + 60 = 140 students

6. **BASEBALL** Baseball tickets cost $15 for general admission or $20 for box seats. The sales tax on each ticket is 8%. What is the final cost of each type of ticket,

   15(1.08) = $16.20

   20(1.08) = $21.60