

Chapter 3 – Ratio and Proportion Study Card

Vocabulary:

Ratio – a comparison of two different numbers or objects

Rate – a ratio that compares 2 different units of measure

Proportion – an equation that contains 2 equal ratios

Writing a ratio (3 ways)

Ex: If a class has 12 boys and 7 girls the ratio of boys to girls can be written as:

$$12 \text{ to } 7, \quad 12:7, \quad \frac{12}{7}$$

Equivalent Ratios

To find an equal ratio multiply or divide both parts of the ratio by the same number (same as equivalent fraction)

Ex: $6:8 = 18:24$

$$6 \times 3 = 18 \text{ and } 8 \times 3 = 24$$

Ratios in Simplest Form

Write the ratio 20:25 in simplest form

$$\frac{20}{25} \div 5 = \frac{4}{5}$$

(The process is the same as reducing a fraction.)

Testing for Equal Ratios

Is $24:30 = \frac{40}{50}$?

1. Simplest form

$$\frac{24 \div 6}{30 \div 6} = \frac{4}{5}$$

$$\frac{40 \div 10}{50 \div 10} = \frac{4}{5}$$

Yes!!!

2. Product of the Means and Extremes

$$24:30 = 40:50$$

$$\begin{array}{r} 50 \\ \times 24 \\ \hline 1,200 \end{array} \quad \begin{array}{r} 40 \\ \times 30 \\ \hline 1,200 \end{array}$$

Yes

3. Cross Product Test

$$\frac{24}{30} = \frac{40}{50}$$

$$\begin{array}{r} 30 \\ \times 40 \\ \hline 1200 \end{array} \quad \begin{array}{r} 24 \\ \times 50 \\ \hline 1200 \end{array}$$

Solving Proportions

1. Scaling – Vertical or Horizontal

$$\frac{3 \times 6}{7 \times 6} = \frac{x}{42}$$

$$x = 18$$

2. Cross Products

$$\frac{8}{12} = \frac{n}{33}$$

$$\frac{12n}{12} = \frac{264}{12}$$

$$n = 22$$

Word Problems (including total)

-BE CONSISTENT in setup

A piece of cable 8 cm long weighs 52 grams. What will a 10-cm length of the same cable weigh?

length
weight

$$\frac{8}{52} = \frac{10}{x}$$

$$\frac{8x}{8} = \frac{520}{8}$$

$$x = 65$$

The Avellino family traveled 648 miles in 9 hours on the first day of their cross country trip. What is their unit rate?

$$\frac{648}{9}$$

or

$$\frac{648}{9} = \frac{x}{1}$$

$$\frac{9x}{9} = \frac{648}{9}$$

$$x = 72 \frac{\text{mi}}{\text{hr}}$$

The ratio of girls to boys in a chorus class is 7:5. If there are a total of 60 students in the class, how many boys are there

$$7+5=12$$

boys
total

$$\frac{5}{12} = \frac{x}{60}$$

$$\frac{12x}{12} = \frac{300}{12}$$

$$x = 25$$

25 boys

Proportional Relationships and Constant of Proportionality

Constant of Proportionality – same as unit rate (one) – Use $\frac{y}{x}$

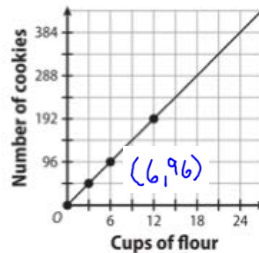
Table of Values
-Use cross product test to see if it is proportional

x	y
3	8
6	16
12	33

proportional

Graph
-Proportional if graph intersects the origin

Equation
-All proportional relationships are of the form $y = kx$, where k is the constant of proportionality



proportional

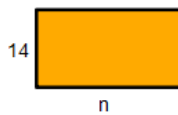
c.o.p. $\frac{y}{x} = \frac{96}{6} = 16$

16 cookies
cup of flour

Similar Figures
-Same shape, but not the same size

Properties:

1. Corresponding angles are congruent
2. Corresponding sides are proportional



$$\frac{8}{14} = \frac{10}{n}$$

$$\frac{8n}{8} = \frac{140}{8}$$

$$n = 17.5$$