

## Unit 10 Ratios and Proportional Relationships

Dear Parents,

Below is information regarding Unit 10, Ratios and Proportional Relationships. Look for additional newsletters for future units.

**By the end of this unit, students will:**

- Compute the unit rate.
- Solve unit rate problems that have fractional quantities.
- Determine if two ratios are in proportion (equivalent).
- Write and solve an equation from a proportional relationship.
- Solve multistep ratio problems using proportions. Focus on simple interest, tax, markups/downs, gratuities and commissions, and fees.
- Compute the actual size of a figure from a scale drawing.

### Vocabulary

**Constant of proportionality:** The constant value of the ratio of two proportional quantities  $x$  and  $y$ ; usually written  $y = kx$ , where  $k$  is the constant of proportionality. In a proportional relationship,  $y = kx$ ,  $k$  is the constant of proportionality, which is the value of the ratio between  $y$  and  $x$ .

**Direct Proportion (Direct Variation):** The relation between two quantities whose ratio remains constant. When one variable increases the other increases proportionally: When one variable doubles the other doubles, when one variable triples the other triples, and so on. When  $A$  changes by some factor, then  $B$  changes by the same factor:  $A = kB$ , where  $k$  is the constant of proportionality.

**Multiplicative inverse:** Two numbers whose product is 1. Example:  $(\frac{3}{4})$  and  $(\frac{4}{3})$  are multiplicative inverses of one another because  $(\frac{3}{4}) \times (\frac{4}{3}) = (\frac{4}{3}) \times (\frac{3}{4}) = 1$ .

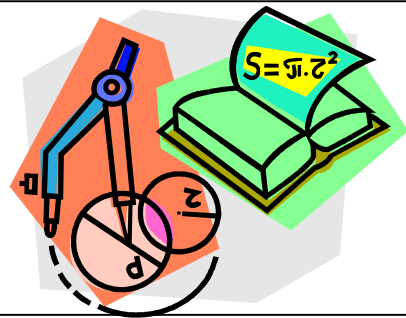
**Proportion:** An equation stating that two ratios are equivalent.

**Ratio:** A comparison of two numbers using division. The ratio of  $a$  to  $b$  (where  $b \neq 0$ ) can be written as  $a$  to  $b$ , as  $(\frac{a}{b})$ , or as  $a:b$ .

**Scale factor:** A ratio between two sets of measurements.

**Unit Rate:** the ratio or comparison of two measurements in which the denominator or 2<sup>nd</sup> measurement is equal to one.

<http://intermath.coe.uga.edu/>



### Textbook Connection

**McGraw Hill Georgia Math Grade 6 Plus:**  
Chapter 12 Lessons 1-5, 7 and Chapter 13  
**McGraw Hill Textbook Online:**  
[connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)

### Web Resources

- [Dividing decimals](#)
- [Ratios](#)
- [Rates](#)
- [Solving Proportions](#)
- [Math Dictionary for Kids](#) (online)
- [Intermath](#) (Interactive Mathematics Dictionary for middle school)
- [Simple Interest](#)
- [Tax](#)

### **Instructional Videos:**

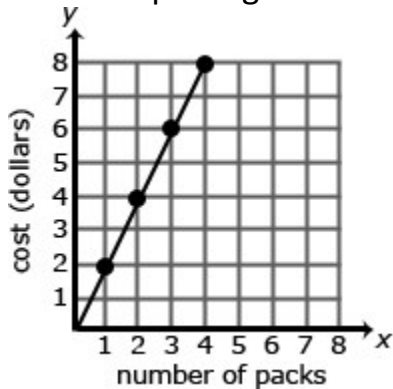
- [Unit Rates and Unit Ratios](#)
- [Fraction Tutorials](#)
- [Similar Figures and Proportions](#)

### **Written Tutorials:**

- [Word Problems - Proportions](#)

## Practice Problems

- 1) Find the unit rate & explain what it represents: 5 gallons of gas cost \$17.50.
- 2) A meal at Applebee's came to \$17.50. How much would a 15% tip be for the server?
- 3) A scale drawing of a room measures 5" x 6". If 1 inch = 2 feet, then what are the actual dimensions of the room?
- 4) The graph below represents the cost of gum packs as a unit rate of \$2 dollars for every pack of gum. The unit rate is represented as \$2 per pack. Represent the relationship using a table and an equation.



A  
S  
N  
W  
E  
R  
S

- 1)  $\frac{5 \text{ gallons}}{\$17.50} = \frac{1 \text{ gallon}}{\$3.50}$ ; 1 gallon of gas costs \$3.50
- 2)  $\$17.50(0.15) \approx \$2.63$
- 3)  $\frac{1 \text{ inch}}{2 \text{ feet}} = \frac{5 \text{ inches}}{x \text{ feet}}$ ,  $x = 10$  feet;  $\frac{1 \text{ inch}}{2 \text{ feet}} = \frac{6 \text{ inches}}{x \text{ feet}}$ ,  $x = 12$  feet; the actual room dimensions are 10' x 12'
- 4)

Number of Packs of Gum	Cost in Dollars
0	0
1	2
2	4
3	6
4	8

**Equation:**  $d = 2g$ , where  $d$  is the cost in dollars and  $g$  is the packs of gum.