Name:_____ Period:_____

Lesson 7: Notes

Example 1: National Forest Deer Population in Danger?

Wildlife conservationists are concerned that the deer population might not be constant across the National Forest. The scientists found that there were 144 deer in a 16 square mile area of the forest. In another part of the forest, conservationists counted 117 deer in a 13 square mile area. Yet a third conservationist counted 216 deer in a 24 square mile plot of the forest. Do conservationists need to be worried?

a. Why does it matter if the deer population is not constant in a certain area of the national forest?

b. What is the population density of deer per square mile?

Table:

The Unit Rate of deer per 1 square mile is _____.

Constant of Proportionality:

Meaning of Constant of Proportionality in this problem:

c. Use the unit rate of deer per square mile to determine how many deer are there for every 207 square miles.

d. Use the unit rate to determine the number of square miles in which you would find 486 deer?

Vocabulary:

A _____ specifies a unique number.

A _____ is a letter that represents a number.

If a proportional relationship is described by the set of ordered pairs that satisfies the equation $y = kx$, where k is a positive constant, then k is called the **constant of proportionality**. It is the value that describes the multiplicative relationship between two quantities, x and y. The (x, y) pairs represent all the pairs of values that make the equation true.

Note: In a given situation, it would be reasonable to assign any variable as a placeholder for the given quantities. For example, a set of ordered pairs (t, d) would be all the points that satisfy the equation $d = rt$, where r is the positive constant, or the constant of proportionality. This value for r specifies a unique number for the given situation.

Example 2: You Need WHAT???

Brandon came home from school and informed his mother that he had volunteered to make cookies for his entire grade level. He needed 3 cookies for each of the 96 students in 7th grade. Unfortunately, he needed the cookies for an event at school on the very next day! Brandon and his mother determined that they can fit 36 cookies on two cookie sheets.

a. Is the number of cookies proportional to the number of sheets used in baking? **Create a table** that shows data for the number of sheets needed for the total number of cookies needed.

Table:

The Unit Rate is _____.

Constant of Proportionality:_____.

Meaning of Constant of Proportionality in this problem:

b. It took 2 hours to bake 8 sheets of cookies. If Brandon and his mother begin baking at 4:00 pm, when will they finish baking the cookies?

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Example 3: French Class Cooking

Suzette and Margo want to prepare crepes for all of the students in their French class. A recipe makes 20 crepes with a certain amount of flour, milk, and 2 eggs. The girls know that they already have plenty of flour and milk but need to determine the number of eggs needed to make 50 crepes because they are not sure they have enough eggs for the recipe.

a. Considering the amount of eggs necessary to make the crepes, what is the constant of proportionality?

b. What does the constant or proportionality mean in the context of this problem?

c. How many eggs will be needed for 50 crepes?

Name:_____ Period:_____

Lesson Summary:

If a proportional relationship is described by the set of ordered pairs that satisfies the equation $y = kx$, where k is a positive constant, then k is called the *constant of proportionality*.

Practice Lesson #7

For each of the following problems, define the constant of proportionality to answer the follow-up question.

1. Bananas are $0.59/pound.
   a. What is the constant of proportionality?
   b. How much does 25 pounds of bananas cost?

2. The dry cleaning fee for 3 pairs of pants is $18.
   a. What is the constant of proportionality?
   b. How much will the dry cleaner charge for 11 pairs of pants?

3. For every $5 that Micah saves, his parents give him $10.
   a. What is the constant of proportionality?
   b. If Micah saves $150, how much money will his parents give him?

4. Each school year, the 7th graders who study Life Science participate in a special field trip to the city zoo. In 2010, the school paid $1260 for 84 students to enter the zoo. In 2011, the school paid $1050 for 70 students to enter the zoo. In 2012, the school paid $1395 for 93 students to enter the zoo.
   a. Is the price the school pays each year in entrance fees proportional to the number of students entering the zoo?
   b. Explain why or why not.
   c. Identify the constant of proportionality and explain what it means in the context of this situation.
   d. What would the school pay if 120 students entered the zoo?
   e. How many students would enter the zoo if the school paid $1,425?