Lesson 1: An Experience in Relationships as Measuring Rate

Classwork

Example 1: How Fast Is Our Class?

Record the results from the paper-passing exercise in the table below.

Key Terms from Grade 6 Ratios and Unit Rates

A *ratio* is an ordered pair of numbers which are not both zero. A ratio is denoted $A:B$ to indicate the order of the numbers: the number A is first, and the number B is second.

Two ratios $A:B$ and $C:D$ are *equivalent ratios* if there is a nonzero number c such that $C = cA$ and $D = cB$. For example, two ratios are equivalent if they both have values that are equal.

A ratio relationship between two types of quantities, such as 5 miles per 2 hours, can be described as a *rate* (i.e., the quantity 2.5 miles/hour).

The numerical part of the rate is called the *unit rate* and is simply the value of the ratio, in this case 2.5. This means that in 1 hour the car travels 2.5 miles. The *unit* for the rate is miles/hour, read miles per hour.

Trial	Number of Papers Passed	Time (in seconds)	Ratio of Number of Papers Passed to Time	Rate	Unit Rate
1					
2					
3					

Example 2: Our Class by Gender

	Number of Boys	Number of Girls	Ratio of Boys to Girls
Class 1			
Class 2			
Whole 7th Grade			

Create a pair of equivalent ratios by making a comparison of quantities discussed in this Example.

Exercise 1: Which is the Better Buy?

Value-Mart is advertising a Back-to-School sale on pencils. A pack of 30 sells for $7.97, whereas a 12-pack of the same brand costs $4.77. Which is the better buy? How do you know?

> **Lesson Summary**
>
> *Unit rate* is often a useful means for comparing ratios and their associated rates when measured in different units. The unit rate allows us to compare varying sizes of quantities by examining the number of units of one quantity per one unit of the second quantity. This value of the ratio is the unit rate.

Problem Set

1. Find each rate and unit rate.

   a. 420 miles in 7 hours

   b. 360 customers in 30 days

   c. 40 meters in 16 seconds

   d. $7.96 for 5 pounds

2. Write three ratios that are equivalent to the one given: The ratio of right-handed students to left-handed students is $18:4$.

3. Mr. Rowley has 16 homework papers and 14 exit tickets to return. Ms. Rivera has 64 homework papers and 60 exit tickets to return. For each teacher, write a ratio to represent the number of homework papers to number of exit tickets they have to return. Are the ratios equivalent? Explain.

4. Jonathan's parents told him that for every 5 hours of homework or reading he completes, he would be able to play 3 hours of video games. His friend Lucas's parents told their son that he could play 30 minutes for every hour of homework or reading time he completes. If both boys spend the same amount of time on homework and reading this week, which boy gets more time playing video games? How do you know?

5. Of the 30 girls who tried out for the lacrosse team at Euclid Middle School, 12 were selected. Of the 40 boys who tried out, 16 were selected. Are the ratios of the number of students on the team to the number of students trying out the same for both boys and girls? How do you know?

6. Devon is trying to find the unit price on a 6-pack of drinks on sale for $2.99. His sister says that at that price, each drink would cost just over $2.00. Is she correct, and how do you know? If she is not, how would Devon's sister find the correct price?

7. Each year Lizzie's school purchases student agenda books, which are sold in the school store. This year, the school purchased 350 books at a cost of $1,137.50. If the school would like to make a profit of $1,500 to help pay for field trips and school activities, what is the least amount they can charge for each agenda book? Explain how you found your answer.