Solving Practical Problems Using Proportional Reasoning III

STRAND: Computation and Estimation

STRAND CONCEPT: Practical Applications-Rational Numbers and Proportional Reasoning

SOL 7.3, 8.4

Remediation Plan Summary

Students solve practical problems, using ratio tables and computational procedures for percents, ratios, and proportions.

Common Misconceptions

- Students may mix up the whole and the part when trying to write the proportion for the word problem.
- Students may incorrectly reverse the numerator and denominator in the ratios used to solve proportions. Encourage students to label the units.
- Students may incorrectly list the discount or tax as the price.
- Students may add the discount instead of subtracting it from the original price. Students may subtract sales tax instead of adding it to the original cost.

Materials

- Practical Applications for Proportions recording sheet
- Scientific calculators

Introductory Activity

Check for student understanding about the relationship established in a proportion, Review with the students the need to keep like units in the same positions in a proportion's ratios, i.e., either in the numerators or the denominators (for example miles per hour would need to be in the same order in both ratios). Remind students that they may set up a proportion as they wish provided they keep like units in the same positions in the ratios. Have students identify the units, create a ratio table and then set up proportions for each of the following problems, but do not have them solve the proportions.

- A car travels 50 miles per hour. How many hours will it take to travel 400 miles? Have students create a ratio table to model this situation.

Miles				
Hours				

Once students have completed the table and then set up a proportion to solve the question above. Discuss with students different ways to set up the proportion, for example:

$\frac{miles}{hours} = \frac{miles}{hours}$ or $\frac{hours}{miles} = \frac{hours}{miles}$

- 3 oranges cost $.55. How much will 12 oranges cost? Have students create a ratio table to model this situation.

Cost				
# of oranges				

Once students have completed the table and then set up a proportion to solve the question above. Discuss with students different ways to set up the proportion, for example:

$$\frac{oranges}{cost} = \frac{oranges}{cost} \text{ or } \frac{cost}{oranges} = \frac{cost}{oranges}$$

- Have students make up one problem like this to exchange with a classmate, who will solve it using a ratio table or a proportion.

Plan for Instruction

1. Distribute the Practical Applications for Proportions recording sheet. As a class, work an example together. If there is any confusion about how to set up the proportions, review this process again with students.
2. Have students work on solving the problems with a partner or in groups. After students have finished the problems, have several of the groups to put their solutions on the board and ask students to explain how they set up the proportions to the other groups. Be aware that not every student will approach the problems in the same way and look for this as students are working. Select groups that may have solved the problems differently. Students should soon realize that the final answer to a problem will be the same even when the proportion used was set up differently.
3. Give the class three numbers and ask them to write a word problem to solve using the numbers. For example, the numbers 8, 30 and 96. Sample problem: The cost for 8 ITunes downloads is $96. You only have $30. How many downloads can you purchase?

Pulling It All Together

Exit Ticket: Display the following problem for students to solve.

Suzanne was buying apples at the store. The sign read, “3 pounds for $.1.39”. Suzanne bought apples and the cost was $6.98. Answer the following questions showing all of your work. You may use ratio tables or proportions to solve. What is the cost for 1 pound of apples? How many pounds of apples did Suzanne purchase?

Note: The following pages are intended for classroom use for students as a visual aid to learning.

Virginia Department of Education 2018

Name:

Applications for Proportions

Use ratio tables and proportions to solve each problem.

1. You and two friends are going to the movies and 3 tickets to a movie cost $13.20. Four more of your friends decide to go with you. What is the cost for 7 tickets?

2. How much would you pay for 5 apples if 12 apples cost $.96?

3. A train travels 90 miles in 1½ hours. The trip to New York will take 6 hours. How many miles is the trip on the train when traveling at the same rate?

4. A recipe calls for 1½ cups of sugar for a 3-pound cake. How many cups of sugar would be used for a 5-pound cake?

5. In history class you are using a map to study the westward expansion. The scale on the map is 1 inch = 500 miles. If two cities are 875 miles apart, how far apart are they on this map?

6. In a Virginia high school, the ratio of the number of boys to the number of girls is 5:4. If 375 girls attend the school, what is the number of boys attending the school?

7. Helen bought a coat at a "20%-off" sale and saved \$12. What was the original price of the coat?

8. During a sale at the mall, a dress with a price of \$48 is discounted by \$16. What is the percent of the discount?

9. A store owner is required to collect a 5% sales tax. One day he collected \$281 in taxes. What is the total amount of sales he made that day?

10. At a local airport, there are 120 planes on the airfield. If 75% of the planes take off, how many planes take off? How many are left?