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Lesson 27: Solving Percent Problems

**Student Outcomes**

* Students find the percent of a quantity. Given a part and the percent, students solve problems involving finding the whole.

Classwork

**Example (10 minutes)**

Example

Solve the following three problems.

Write the words PERCENT, WHOLE, PART under each problem to show which piece you were solving for.

of =  of  = out of = %

PART WHOLE PERCENT

How did your solving method differ with each problem?

Solutions will vary. A possible answer may include: When solving for the part, I need to find the missing number in the numerator. When solving for the whole, I solve for the denominator. When I solve for the percent, I need to find the numerator when the denominator is .

* What are you trying to find in each example?
  + *Part, whole, percent*
* How are the problems different from each other?
  + *Answers will vary.*
* How are the problems alike?
  + *Answers will vary.*

Take time to discuss the clues in each problem including the placement of the word “of.” The word “of” will let students know which piece of information is the whole amount compared to the part. In the first example, of tells us that we are looking for part of . Therefore, is the whole. In the second example where of is , is the part and is the whole. In the third example, out of tells us that now, is the part, and is the whole. Structure the conversation around the part-whole relationship.

* In the first question, what is of ?
* *Students should understand that is the same ratio as . .*
* In this case, is the part or the whole?
* *is the part. It is part of .*
* In the second questionwe are given of some value equals . What is that value?
* In this case, is the part or the whole? What about ? Is that a part or the whole?
* *is the whole, and is the part.*
* In the third question, we are asked out of equals what percent . What percent is that?
* *The percent is .*
* In this case, is the part or the whole?
* *is the whole.*

Exercise (20 minutes)

At this time, the students break out into pairs or small thinking groups to solve the problem.

Exercise

Use models, such as grids, ratio tables, tape diagrams, or double number line diagrams, to solve the following situation.

Priya is doing her back-to-school shopping. Calculate all of the missing values in the table below, rounding to the nearest penny, and calculate the total amount Priya will spend on her outfit after she received the indicated discounts.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Shirt  ( discount) | Pants  ( discount) | Shoes  ( discount) | Necklace  ( discount) | Sweater  ( discount) |
| Original Price |  |  |  |  |  |
| Amount of Discount |  |  |  |  |  |

What is the total cost of Priya’s outfit?

Shirt The discount is . The cost of the shirt is because .

Pants The original price is . The price of the pants is because .

Shoes The original price is . The cost of the shoes is because .

Necklace The discount is . The cost of the necklace is because .

Sweater The original price is . The cost of the sweater is because .

The total outfit would cost:

Closing (10 minutes)

Give time for students to share samples of how they solved the problem and describe the methods they chose to use when solving.

Lesson Summary

Percent problems include the part, whole, and percent. When one of these values is missing, we can use tables, diagrams, and models to solve for the missing number.

Exit Ticket (5 minutes)

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lesson 27: Solving Percent Problems

Exit Ticket

Jane paid for an item after she received a discount. Jane’s friend says this means that the original price of the item was

* 1. How do you think Jane’s friend arrived at this amount?
  2. Is her friend correct? Why or why not?

Exit Ticket Sample Solutions

Jane paid for an item after she received a discount. Jane’s friend says this means that the original price of the item was .

* 1. How do you think Jane’s friend arrived at this amount?

Jane’s friend found that of is . Then she added to the sale price: . Then she determined that the original amount was .

* 1. Is her friend correct? Why or why not?

Jane’s friend was incorrect. Because Jane saved , she paid of the original amount, so that means that is of the original amount.

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***The original amount of the item was .***

Problem Set Sample Solutions

1. Mr. Yoshi has papers. He graded papers, and he had a student teacher grade the rest. What percent of the papers did each person grade?

Mr. Yoshi graded of the papers, and the student teacher graded .

1. Mrs. Bennett has graded of her students’ papers. How many papers does she still need to finish grading?

Mrs. Bennett has graded papers. . Mrs. Bennett has papers left to grade*.*