Lesson 9: Problem Solving When the Percent Changes

Classwork

**Example 1**

The amount of money Tom has is $75\%$ of Sally’s amount of money. After Sally spent $\$120$ and Tom saved all his money, Tom’s amount of money is $50\%$ more than Sally’s. How much money did each have at the beginning? Use a visual model and a percent line to solve the problem.

**Example 2**

Erin and Sasha went to a candy shop. Sasha bought $50\%$ more candies than Erin. After Erin bought$ 8$ more candies, Sasha had $20\%$ more. How many candies did Erin and Sasha have at first?

1. Model the situation using a visual model.
2. How many candies did Erin have at first? Explain.

Example 3

Kimberly and Mike have an equal amount of money. After Kimberly spent $\$50$ and Mike spent $\$25$, Mike’s money is $50\%$ more than Kimberly’s. How much did Kimberly and Mike have at first?

1. Use an equation to solve the problem.
2. Use a visual model to solve the problem.
3. Which method do you prefer and why?

Exercise

Todd has $250\%$ more video games than Jaylon. Todd has $56 $video games in his collection. He gives Jaylon $8 $of his games. How many video games did Todd and Jaylon have in the beginning? How many do they have now?

Lesson Summary

* To solve a changing percent problem, identify the first whole and then the second whole. To relate the part, whole, and percent, use the formula

$$Quantity=Percent×Whole.$$

* Models, such as double number lines, can help visually show the change in quantities and percents.

Problem Set

1. Solve each problem using an equation.
	1. What is $150\%$ of $625$?
	2. $90$ is $40\%$ of what number?
	3. What percent of $520$ is $40$? Round to the nearest hundredth of a percent.
2. The actual length of a machine is $12.25 cm$. The measured length is $12.2 cm$. Round the answer to part (b) to the nearest hundredth of a percent.
	1. Find the absolute error.
	2. Find the percent error.
3. A rowing club has$ 600$ members. $60\%$ of them are women. After $200$ new members joined the club, the percentage of women was reduced to $50\%$. How many of the new members are women?
4. $40\%$ of the marbles in a bag are yellow. The rest are orange and green. The ratio of the number of orange to the number of green is $4:5$. If there are $30$ green marbles, how many yellow marbles are there? Use a visual model to show your answer.
5. Susan has $50\%$ more books than Michael. Michael has $40$ books. If Michael buys $8 $more books, will Susan have more or less books than Michael? What percent more or less will Susan’s books be? Use any method to solve the problem.
6. Harry’s amount of money is $75\%$ of Kayla’s amount of money. After Harry earned $\$30$ and Kayla earned $25\%$ more of her money, Harry’s amount of money is $80\%$ of Kayla’s money. How much money did each have at the beginning? Use a visual model to solve the problem.