

Key Concepts



Percent of Change

Objective Teach students to compute the percent of change of a certain quantity.

Note to the Teacher *When a certain quantity changes, it is often important to know by what percent it changed. For example, the statement “there was annual inflation of 5% in housing prices,” means that the cost of housing went up 5% during the year. In this lesson, students will learn how to find the percent of change. Start with the following example.*

Finding Percent of Change

Example 1 Find the percent of change from 160 to 180.

Solution There are two ways to solve this problem.

Method 1

First, find the amount of change. Then compare the amount of change to the original amount. The amount of change is $180 - 160$ or 20. That is, the quantity increased by 20. Now, compare the amount of change to the original amount. Let x represent the percent of change. The following equation results.

$$20 = x\% \times 160$$

$$20 = \frac{x}{100} \times 160 \quad \text{Rewrite } x\% \text{ as } \frac{x}{100}.$$

$$\frac{20}{160} = \frac{x}{100} \quad \text{Divide each side by 160.}$$

$$2000 = 160x \quad \text{Find the cross products.}$$

$$12.5 = x$$

So, the percent change from 160 to 180 is 12.5%.

Method 2

To find the percent of change from 160 to 180 essentially means to find *What percent is 180 of 160?* Let y represent this percent. The following equation results.

$$\frac{180}{160} = \frac{y}{100}$$

$18,000 = 160y$ Write the cross products.

$$112.5 = y$$

This means that 180 is 112.5% of 160. Since 100% of a number is equal to that number, the percent of increase is $112.5\% - 100\%$ or 12.5%.

A shortcut to Method 2 is to divide the new amount by the original amount, subtract 1, and then express the decimal as a percent.

$$\frac{180}{160} = 1.125 \Rightarrow 1.125 - 1 = 0.125 \Rightarrow 0.125 = 12.5\%$$

Here's another example.

Example 2 The price of a hamburger at Mike's Diner is \$2.50. Last Sunday, they had a special and charged only \$2.00 for a hamburger. What percent of savings does this represent?

Solution Method 1

Step 1:

Subtract: $\$2.50 - \$2.00 = \$0.50$. Notice that the cost has *decreased*.

Step 2:

Use an equation to find what percent the difference is of the original amount. That is, $\$0.50$ is what percent of $\$2.50$?

$$0.5 = x\% \times 2.5$$

$$0.5 = \frac{x}{100} \times 2.5 \quad \text{Rewrite } x\% \text{ as } \frac{x}{100}.$$

$$\frac{0.5}{2.5} = \frac{x}{100} \quad \text{Divide each side by 2.5.}$$

$$50 = 2.5x \quad \text{Find the cross products.}$$

$$20 = x$$

So, there was a 20% decrease in the price.

Method 2

Step 1:

Divide the new amount by the original amount.

$$2.00 \div 2.50 = 0.80$$

Step 2:

Subtract 1 from the result and write the decimal as a percent.

$$0.8 - 1 = -0.20 \text{ or } -20\%$$

The percent is negative. So, there was a 20% decrease in the price.

Do one final example on the board to make sure students understand the procedure.

Example 3 When Susan brought her dog home from the pet store, it weighed 35 pounds. One year later, the dog weighed 45 pounds. Find the percent of weight gained.

Solution Method 1

Step 1:

Subtract: $45 - 35 = 10$.

Step 2:

Use an equation to find what percent the difference is of the original amount. That is, *10 is what percent of 35?*

$$10 = x\% \times 35$$

$$10 = \frac{x}{100} \times 35 \quad \text{Rewrite } x\% \text{ as } \frac{x}{100}.$$

$$\frac{10}{35} = \frac{x}{100} \quad \text{Divide each side by 35.}$$

$$1000 = 35x \quad \text{Find the cross products.}$$

$$28.6 \approx x$$

Notice that we used a calculator to approximate the answer. We conclude that the dog had a weight gain of about 28.6%.

Method 2

Step 1:

Divide the new amount by the original amount.

$$45 \div 35 \approx 1.286$$

Step 2:

Subtract 1 from the result and write the decimal as a percent.

$$1.286 - 1 = 0.286 \text{ or } 28.6\%$$

So the weight gain was about 28.6%.

