

Lesson 6.5:

Percents of Increase and Decrease

Essential Question

What is a percent of decrease? What is a percent of increase?



A **percent of change** is the percent that a quantity changes from the original amount.

$$\text{percent of change} = \frac{\text{amount of change}}{\text{original amount}}$$



Key Idea

ORIGINAL IS ALWAYS THE DENOMINATOR

Percents of Increase and Decrease

When the original amount increases, the percent of change is called a **percent of increase**.

$$\text{percent of increase} = \frac{\text{new amount} - \text{original amount}}{\text{original amount}}$$

*LARGER amount goes first

When the original amount decreases, the percent of change is called a **percent of decrease**.

$$\text{percent of decrease} = \frac{\text{original amount} - \text{new amount}}{\text{original amount}}$$

Example 2:

The table shows the numbers of hours you spent online last weekend. What is the percent of change in your online time from Saturday to Sunday?

Day	Hours Online
Saturday	2
Sunday	4.5

$$\frac{\text{Change}}{\text{Original}} = \frac{4.5 - 2}{2}$$

$$\frac{2.5}{2} = 1.25 \rightarrow \boxed{125\% \text{ increase}}$$

Find the percent of change. Round to the nearest tenth of a percent if necessary.

2. 10 inches to 25 inches

$$\frac{25-10}{10} = \frac{15}{10} = 1.5 \rightarrow \boxed{150\% \text{ increase}}$$

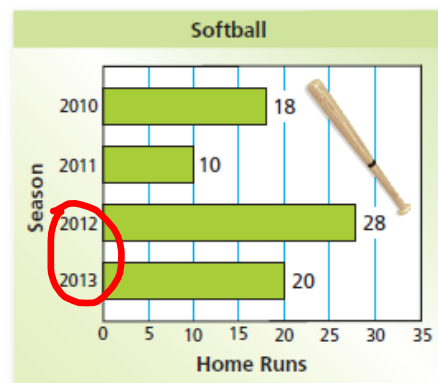
3. 57 people to 65 people

A tenth of a percent would mean rounding to the thousandth (3 places)

$$\frac{65-57}{57} = \frac{8}{57} \approx 0.140 \rightarrow \boxed{14\% \text{ increase}}$$

Example 3:

The bar graph shows a softball player's home run totals. What was the percent of change from 2012 to 2013?



$$\frac{28-20}{28} = \frac{8}{28} \approx 0.286$$

28.6% decrease

Example 1: Find the new amount.

a.) 50 points decreased by 26%.

$$\frac{50-x}{50} = 0.26$$

$$\cdot 50 \quad \cdot 50$$

$$50-x = 13$$

$$-50 \quad -50$$

$$-x = -37$$

$$\cdot (-1) \quad \cdot (-1)$$

$$x = 37$$

The greater number goes first. Because we have a decrease, 50 is greater, so we have "50 - x" not "x - 50."

b.) 8 meters increased by 25%.

$$\frac{x-8}{8} = 0.25$$

$$\cdot 8 \quad \cdot 8$$

$$x-8 = 2$$

$$+8 \quad +8$$

$$x = 10$$

Because we have an increase, 8 is the lesser number and we have "x - 8," not "8 - x."

Find the new amount.

1. 50 pounds decreased by 30%.

$$\frac{50-x}{50} = 0.3$$

$$\cdot 50 \quad \cdot 50$$

$$50-x = 15$$

$$-50 \quad -50$$

$$-x = -35$$

$$\cdot (-1) \quad \cdot (-1)$$

$$x = 35$$

 **Key Idea****Percent Error**

A **percent error** is the percent that an estimated quantity differs from the actual amount.

$$\text{percent error} = \frac{\text{amount of error}}{\text{actual amount}}$$

Example 4:

You estimate that the length of your classroom is 16 feet. The actual length is 21 feet. Find the percent error.

$$\frac{\text{error}}{\text{actual}} = \frac{21-16}{21} = \frac{5}{21} \approx \underline{0.238}$$

$$\boxed{23.8\%}$$

4. In Example 3, your friend estimates that the length of the classroom is 23 feet (actual is 21 feet). Who has the greater percent error? Explain.

$$\frac{\text{error}}{\text{actual}} = \frac{23-21}{21} = \frac{2}{21} = 0.095 = 9.5\%$$

$$23.8\% \text{ vs. } 9.5\%$$

You have a greater percent error. Whether the error is greater than or less than the original does not matter.