

Study Guide and Intervention

7NSI.3, 7NSI.7

Algebra: The Percent Equation

A **percent equation** is an equivalent form of a percent proportion in which the percent is written as a decimal.

$$\text{part} = \text{percent} \cdot \text{whole}$$

Example 1 Find 22% of 245.

The percent is 22%, and the whole is 245. Let n represent the part.

$$n = 0.22(245) \quad \text{Write 22\% as the decimal 0.22.}$$

$$n = 53.9 \quad \text{Simplify.}$$

So, 22% of 245 is 53.9.

Example 2 600 is what percent of 750?

The part is 600, and the whole is 750. Let n represent the percent.

$$600 = n(750) \quad \text{Write the equation.}$$

$$\frac{600}{750} = \frac{750n}{750} \quad \text{Divide each side by 750.}$$

$$0.8 = n \quad \text{Simplify.}$$

Since $0.8 = 80\%$, 600 is 80% of 750.

Example 3 45 is 90% of what number?

The part is 45, and the percent is 90%. Let n represent the whole.

$$45 = 0.90 \cdot n \quad \text{Write 90\% as the decimal 0.90.}$$

$$\frac{45}{0.90} = \frac{0.90n}{0.90} \quad \text{Divide each side by 0.90.}$$

$$50 = n \quad \text{Simplify.}$$

So, 45 is 90% of 50.

Exercises

Solve each problem using the percent equation.

- Find 30% of 70.
- What is 80% of 65?
- What percent of 56 is 14?
- 36 is what percent of 40?
- 80 is 40% of what number?
- 65% of what number is 78?
- What percent of 2,000 is 8?
- 12 is what percent of 4,000?
- What percent of 3,000 is 18?
- What is 110% of 80?
- Find 180% of 160.
- 4% of what number is 11?

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Percent of Change

To find the percent of change, first find the amount of change. Then find the ratio of that amount to the original amount, and write the ratio as a percent.

Example

Two months ago, the bicycle shop sold 50 bicycles. Last month, 55 bicycles were sold. Find the percent of change. State whether the percent of change is an *increase* or a *decrease*.

Step 1 Subtract to find the amount of change.

$$55 - 50 = 5$$

Step 2 Write a ratio that compares the amount of change to the original number of bicycles.

Step 3 Write the ratio as a percent.

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

Definition of percent of change

$$= \frac{5}{50}$$

The amount of change is 5. The original amount is 50.

$$= 0.1 \text{ or } 10\%$$

Divide. Write as a percent.

The percent of change is 10%. Since the new amount is greater than the original, it is a percent of increase.

Exercises

Find each percent of change. Round to the nearest tenth of a percent if necessary. State whether the percent of change is an *increase* or a *decrease*.

1. original: 4
new: 5

2. original: 10
new: 13

3. original: 15
new: 12

4. original: 30
new: 18

5. original: 60
new: 63

6. original: 160
new: 136

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7NS1.7

Simple Interest

To find simple interest, use the formula $I = prt$. Interest I is the amount of money paid or earned. Principal p is the amount of money invested or borrowed. Rate r is the annual interest rate. Time t is the time in years.

Example 1 Find the simple interest for \$600 invested at 8.5% for 6 months.

Notice the time is given in months. Six months is $\frac{6}{12}$ or $\frac{1}{2}$ year.

$I = prt$ Write the simple interest formula.

$I = 600 \cdot 0.085 \cdot \frac{1}{2}$ Replace p with 600, r with 0.085, and t with $\frac{1}{2}$.

$I = 25.50$ Simplify.

The simple interest is \$25.50.

Example 2 Find the total amount in an account where \$136 is invested at 7.5% for 2 years.

$I = prt$ Write the simple interest formula.

$I = 136 \cdot 0.075 \cdot 2$ Replace p with 136, r with 0.075, and t with 2.

$I = 20.40$ Simplify.

The simple interest is \$20.40. The amount in the account is $\$136 + \$20.40 = \$156.40$.

Exercises

Find the simple interest to the nearest cent.

- | | |
|---------------------------------|--|
| 1. \$300 at 5% for 2 years | 2. \$650 at 8% for 3 years |
| 3. \$575 at 4.5% for 4 years | 4. \$735 at 7% for $2\frac{1}{2}$ years |
| 5. \$1,665 at 6.75% for 3 years | 6. \$2,105 at 11% for $1\frac{3}{4}$ years |

Find the total amount in each account to the nearest cent.

- | | |
|--|--|
| 7. \$250 at 5% for 3 years | 8. \$425 at 6% for 2 years |
| 9. \$945 at 7.25% for 4 years | 10. \$1,250 at 7.4% for $2\frac{1}{4}$ years |
| 11. \$2,680 at 9.1% for $1\frac{3}{4}$ years | 12. \$4,205 at 4.5% for $3\frac{1}{2}$ years |