

# Simple and Compound Interest

## ISG Interactive Study Guide

See pages 139–140 for:

- Getting Started
- Vocabulary Start-Up
- Notes

## EQ Essential Question

How can you use proportional relationships to solve real-world percent problems?

## CCSS Common Core State Standards

Content Standards  
7.RP.3

Mathematical Practices  
1, 3, 4



## Vocabulary

interest  
simple interest  
principal  
compound interest

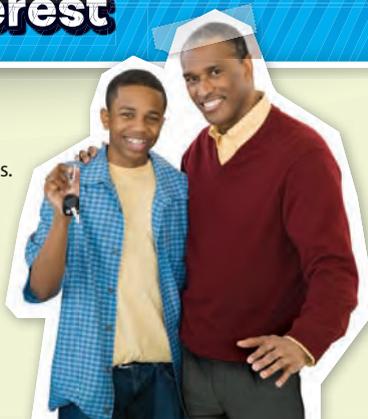
## What You'll Learn

- Solve simple interest problems and apply the simple interest equation to real-world problems.
- Solve compound interest problems.



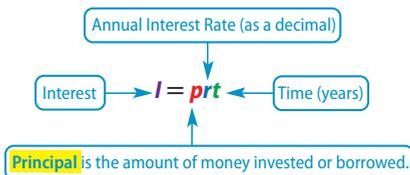
## Real-World Link

**Cars** Have you ever dreamed of buying your first car? Do you already know what color and style you would like to have? Typically when you buy a car, you pay a certain amount up front and get a loan to cover the rest.



## Simple Interest

**Interest** is the amount of money paid or earned for the use of money by a bank or other financial institution. **Simple interest** is paid only on the initial principal of a savings account or a loan. To solve simple interest problems involving an annual interest rate, use the following formula.



## Example 1

Find the simple interest. Round to the nearest cent, if necessary.

- a. \$1000 at 4.5% for 2 years

$$I = prt$$

Write the simple interest formula.

$$I = 1000 \cdot 0.045 \cdot 2$$

Replace  $p$  with 1000,  $r$  with 0.045, and  $t$  with 2.

$$I = 90$$

Simplify.

The simple interest is \$90.

- b. \$2500 at 6.75% for 3 years

$$I = prt$$

Write the simple interest formula.

$$I = 2500 \cdot 0.0675 \cdot 3$$

Replace  $p$  with 2500,  $r$  with 0.0675, and  $t$  with 3.

$$I = 506.25$$

Simplify.

The simple interest is \$506.25.

**Got It?** Do these problems to find out.

1a. \$2250 at 6% for 4 years **\$540**

1b. \$4000 at 4.25% for 1 year **\$170**



## Example 2



### Watch Out!

#### Converting Units

When using the formula  $I = prt$ , remember the time is expressed in years. For example, 6 months is 0.5 year.

**Mr. Gabel borrowed \$1860 to buy a computer. He will pay \$71.30 per month for 30 months. Find the simple interest rate for his loan.**

Use the formula  $I = prt$ . First find the amount of interest he will pay.

$$\$71.30 \cdot 30 = \$2139 \quad \text{Multiply to find total amount.}$$

$$\$2139 - \$1860 = \$279 \quad \text{Subtract to find the interest.}$$

$$\text{So, } I = \$279.$$

The principal is \$1860. So,  $p = 1860$ .

The loan will be for 30 months or 2.5 years. So,  $t = 2.5$ .

$$I = prt \quad \text{Write the simple interest formula.}$$

$$279 = 1860 \cdot r \cdot 2.5 \quad \text{Replace } I \text{ with } 279, p \text{ with } 1860, \text{ and } t \text{ with } 2.5.$$

$$279 = 4650r \quad \text{Simplify.}$$

$$\frac{279}{4650} = \frac{4650r}{4650} \quad \text{Divide each side by } 4650.$$

$$0.06 = r$$

The simple interest rate is 0.06 or 6%.

**Got It?** Do this problem to find out.

2. **Financial Literacy** Suppose Nantai placed \$2400 in the bank for 5 years. He makes \$9.20 in interest each month. Find the annual interest rate. **4.6%**

## Compound Interest

**Compound interest** is paid on the initial principal and on interest earned in the past.



## Example 3

**What is the total amount of money in an account where \$600 is invested at an interest rate of 8.75% compounded annually for 2 years?**

**Step 1** Find the amount of money in the account at the end of the first year.

$$I = prt \quad \text{Write the simple interest formula.}$$

$$I = 600 \cdot 0.0875 \cdot 1 \quad \text{Replace } p \text{ with } 600, r \text{ with } 0.0875, \text{ and } t \text{ with } 1.$$

$$I = 52.5 \quad \text{Simplify.}$$

$$600 + 52.5 = 652.50 \quad \text{Add the amount invested and the interest.}$$

At the end of the first year, there is \$652.50 in the account.

**Step 2** Find the amount of money in the account at the end of the second year.

$$I = prt \quad \text{Write the simple interest formula.}$$

$$I = 652.50 \cdot 0.0875 \cdot 1 \quad \text{Replace } p \text{ with } 652.50, r \text{ with } 0.0875, \text{ and } t \text{ with } 1.$$

$$I = 57.09 \quad \text{Simplify.}$$

So, the amount in the account after 2 years is \$652.50 + \$57.09 or \$709.59.

**Got It?** Do this problem to find out.

3. What is the total amount of money in an account where \$5000 is invested at an interest rate of 5% compounded annually after 3 years? **\$5788.13**

### Compound Interest

Because you are finding the interest after the first year, substitute 1 for  $t$  instead of 2.



## Guided Practice

Find the simple interest. Round to the nearest cent, if necessary. (Example 1)

1. \$1350 at 6% for 7 years **\$567**
2. \$240 at 8% for 9 months **\$14.40**
3. \$725 at 3.25% for 5 years **\$117.81**
4. \$3750 at 5.75% for 42 months **\$754.69**
5. Mateo's sister paid off her student loan of \$5000 in 3 years. If she made a payment of \$152.35 each month, what was the simple interest rate for her loan? Round to the nearest hundredth. (Example 2) **3.23%**

Find the total amount in each account to the nearest cent if the interest is compounded annually. (Example 3) **6–9. Answers may vary due to rounding.**

6. \$480 at 5% for 3 years **\$555.66**
7. \$515 at 11.8% for 2 years **\$643.71**
8. \$6525 at 6.25% for 4 years **\$8315.65**
9. \$2750 at 8.5% for 3 years **\$3512.55**