

You will need your notebook, calculator, and clicker today.

Simple and Compound Interest

What You'll Learn

To find simple interest and compound interest

🔊 **New Vocabulary** principal, simple interest, compound interest, balance

Recently, we worked with simple interest and this was the formula we used.

KEY CONCEPTS Simple Interest Formula

$$I = prt$$

I is the interest earned, p is the principal, r is the interest rate per year, and t is the time in years.

Today, we will learn compound interest. Please copy the vocabulary in your notes. Also, copy the compound interest formula into your notes.

Compound interest is interest that is paid on the original principal and on any interest that has been left in the account. The **balance** of an account is the principal plus the interest earned.

KEY CONCEPTS Compound Interest Formula

$$B = p(1 + r)^t$$

B is the balance, p is the principal, r is the annual interest rate, and t is the time in years.

Compound Interest

To find compound interest, use this formula.

$$\text{Balance} = \text{principal} \cdot (1 + \text{rate})^{\text{time in years}}$$

$$B = p \cdot (1 + r)^t$$

You put \$1,800 in the bank. The interest rate is 5% compounded annually. How much will be in the account after 3 years?

$$\begin{aligned} B &= p \cdot (1 + r)^t \\ &= 1,800(1 + 0.05)^3 \quad \leftarrow \text{Use } 0.05 \text{ for } 5\%. \\ &= 1,800 \cdot (1.05)^3 \\ &\approx 2,083.73 \end{aligned}$$

The balance is \$2,083.73.

EXAMPLE Finding Compound Interest

- 3 **Banking** You deposit \$5,000 in a bank account that pays 3.75% compound interest. What is your balance after 9 years?

$$\begin{aligned} B &= p(1 + r)^t && \leftarrow \text{Write the formula.} \\ &= 5,000(1 + 0.0375)^9 && \leftarrow \text{Substitute. Use 0.0375 for 3.75\%.} \\ &\approx 5,000(1.392813439) && \leftarrow \text{Use a calculator to simplify the power.} \\ &= 6,964.07 && \leftarrow \text{Round to the nearest cent.} \end{aligned}$$

The balance after 9 years is \$6,964.07.

- 3 **EXAMPLE** You deposit \$500 in a bank account that pays 3% interest compounded annually. What is your balance after 4 years?

$$\begin{aligned} B &= p(1 + r)^t && \leftarrow \text{Write the formula.} \\ &= 500(1 + 0.03)^4 && \leftarrow \text{Substitute. Use 0.03 for 3\%.} \\ &= 500(1.12550881) && \leftarrow \text{Use a calculator to simplify the power.} \\ &\approx 562.75 && \leftarrow \text{Round to the nearest cent.} \end{aligned}$$

The balance after 4 years is \$562.75

Check for Reasonableness The compound interest is \$562.75 – \$500, or about \$62.75. Simple interest would be $I = (\$500)(0.03)(4)$, or \$60. Since compound interest is greater, the answer is reasonable.

Table talk to complete this problem. Use your calculators.

Find the balance of each account earning compound interest.

5. \$600 principal, 6% interest rate,
3 years

$$B = p(1 + r)^t$$

$$= \underline{\hspace{2cm}} (1 + \underline{\hspace{2cm}})^3$$

$$= \underline{\hspace{2cm}}$$

.....

Table talk to complete this problem - use your calculators.

6. \$9,000 principal, 5% interest rate,
4 years

$$B = p(1 + r)^t$$

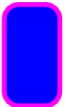
$$= \underline{\hspace{2cm}} (1 + \underline{\hspace{2cm}})^{\underline{\hspace{1cm}}}$$

$$= \underline{\hspace{2cm}}$$

On your own (with your calculator).



1. You deposit \$3,000 in a bank account that pays 4.25% interest compounded annually. What is your balance after 12 years?
 - A. \$3127.50
 - B. \$153,000
 - C. \$12,750
 - D. \$4,943.49



1. Simple interest and compound interest are calculated only on the principal.
 - A. true
 - B. false



2. Find the simple interest earned on \$2000 at 10% for 6 years.
- A. \$12,000
 - B. \$120,000
 - C. \$1,200
 - D. \$600



3. Find the compound interest earned on \$2000 at 10% for 6 years.
- A. \$1,346.16
 - B. \$1, 200
 - C. \$2,526.21
 - D. \$1,543.12

**power down your clickers and move to your computers
where your assignment is Repeated Percentage Change.
Play it until you receive a medal.**