

Lesson 10: Simple Interest

Classwork

To find the simple interest, use:

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$I = P \times r \times t$$

$$I = Prt$$

- r is the percent of the principal that is paid over a period of time (usually per year).
- t is the time.
- r and t must be compatible. For example, if r is an annual interest rate, then t must be written in years.

Example 1: Can Money Grow? A Look at Simple Interest

Larry invests \$100 in a savings plan. The plan pays $4\frac{1}{2}\%$ interest each year on his \$100 account balance.

a. How much money will Larry earn in interest after 3 years? After 5 years?

b. How can you find the balance of Larry's account at the end of 5 years?

Exercise 1

Find the balance of a savings account at the end of 10 years if the interest earned each year is 7.5%. The principal is \$500.

Example 2: Time Other Than One Year

A \$1,000 savings bond earns simple interest at the rate of 3% each year. The interest is paid at the end of every month. How much interest will the bond have earned after 3 months?

Example 3: Solving for P , r , or t

Mrs. Williams wants to know how long it will take an investment of \$450 to earn \$200 in interest if the yearly interest rate is 6.5%, paid at the end of each year.

Exercise 2

Write an equation to find the amount of simple interest, A , earned on a \$600 investment after $1\frac{1}{2}$ years, if the semi-annual (6-month) interest rate is 2%.

Exercise 3

A \$1,500 loan has an annual interest rate of $4\frac{1}{4}\%$ on the amount borrowed. How much time has elapsed if the interest is now \$127.50?

Lesson Summary

- Interest earned over time can be represented by a proportional relationship between time, in years, and interest.
- The simple interest formula is

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$I = P \times r \times t$$

$$I = Prt$$

r is the percent of the principal that is paid over a period of time (usually per year)

t is the time

- The rate, r , and time, t , must be compatible. If r is the annual interest rate, then t must be written in years.

Problem Set

- Enrique takes out a student loan to pay for his college tuition this year. Find the interest on the loan if he borrowed \$2,500 at an annual interest rate of 6% for 15 years.
- Your family plans to start a small business in your neighborhood. Your father borrows \$10,000 from the bank at an annual interest rate of 8% rate for 36 months. What is the amount of interest he will pay on this loan?
- Mr. Rodriguez invests \$2,000 in a savings plan. The savings account pays an annual interest rate of 5.75% on the amount he put in at the end of each year.
 - How much will Mr. Rodriguez earn if he leaves his money in the savings plan for 10 years?
 - How much money will be in his savings plan at the end of 10 years?
 - Create (and label) a graph in the coordinate plane to show the relationship between time and the amount of interest earned for 10 years. Is the relationship proportional? Why or why not? If so, what is the constant of proportionality?
 - Explain what the points $(0, 0)$ and $(1, 115)$ mean on the graph.
 - Using the graph, find the balance of the savings plan at the end of seven years.
 - After how many years will Mr. Rodriguez have increased his original investment by more than 50%? Show your work to support your answer.

Challenge Problem

4. George went on a game show and won \$60,000. He wanted to invest it and found two funds that he liked. Fund 250 earns 15% interest annually, and Fund 100 earns 8% interest annually. George does not want to earn more than \$7,500 in interest income this year. He made the table below to show how he could invest the money.

	I	P	r	t
Fund 100		x	0.08	1
Fund 250		$60,000 - x$	0.15	1
Total	7,500	60,000		

- Explain what value x is in this situation.
- Explain what the expression $60,000 - x$ represents in this situation.
- Using the simple interest formula, complete the table for the amount of interest earned.
- Write an equation to show the total amount of interest earned from both funds.
- Use algebraic properties to solve for x and the principal, in dollars, George could invest in Fund 100. Show your work.
- Use your answer from part (e) to determine how much George could invest in Fund 250.
- Using your answers to parts (e) and (f), how much interest would George earn from each fund?