Chapter

8

Financial Mathematics: Investing Money

LEARNING GOALS

You will be able to develop your number sense in financial applications by

- Understanding and comparing the effects of simple interest and compound interest
- Determining how changes in the variables of an investment affect the return
- Being aware of a variety of different investment instruments
- Comparing different investment strategies

What do you think it means to be financially literate, and how will being financially literate help you achieve your goals?

Tom Hamza: Financial Literacy 101

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8.1 Simple Interest

term
The contracted dura… investment or loan.

interest
The amount of money earned on an investment or paid on a loan.

fixed interest rate
An interest rate that is guaranteed not to change during the term of an investment or loan.

principal
The original amount of money invested or loaned.

maturity
The contracted end date of an investment or loan, at the end of the term.

future value
The amount, *A*, that an investment will be worth after a specified period of time.

GOAL

Solve problems that involve simple interest

simple interest
The amount of interest earned on an investment or paid on a loan based on the original amount (the principal) and the simple interest rate.

Communication *Tip*

Interest rates are communicated as a percent for a time period. Since most often the time period is per year or **per annum** (abbreviated as **/a**), a given percent is assumed to be annual unless otherwise stated. For example, an interest rate of 4% means 4%/a or 4% interest per year.

SIMPLE Interest

Based on the **principal** (original amount) that is invested/borrowed. Interest is a certain percentage per **annum** (year). Often used for personal loans and short-term investments. The length of time for the investment/loan is called the **term**.

Interest = Principal x rate x time

$$I = Prt$$

&

$$A = P + I$$

OR

$$A = P + Prt$$

$$A = P(1 + rt)$$

- I - interest earned
- P - principal (original investment/loan)
- r - interest rate as a percent **(change to a decimal)**
- t - is ALWAYS time in **years**

(how long the money is invested/borrowed)

- **A - amount of money including interest**

APPLY the Math p. 446

0.025 % or 2.5/100

EXAMPLE 1 Solving a simple interest problem

Marty invested in a $2500 guaranteed investment certificate (GIC) at 2.5% simple interest paid annually with a term of 10 years.

"Paid Annually"

NOTE:

Means that interest is paid only in yearly increments.

a) How much interest will accumulate over the term of Marty's investment?

b) What is the **future value** of his investment at maturity?

Amount

a) $I = Prt$

$I = 2500(0.025)(10)$

$I = \$625$

b) $A = P + I$

$A = 2500 + 625$

$A = \$3125$

EXAMPLE #2:
Betty-Ann's bank offers a simple interst rate of 4% per annum. How much interest would Betty-Ann earn on her investment of $4000 after 8 months.

$I = Prt$

$I = 4000\ (0.04)\ (8/12)$

$I = \$106.67$

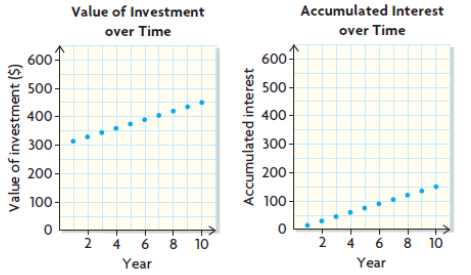
Time in years!!

SIMPLE INTEREST...

In Summary p. 451

Key Ideas

- Simple interest is determined only on the principal of an investment.
- The value of an investment that earns simple interest over time is a linear function. The accumulated simple interest earned over time is also a linear function. Since the interest is paid at the end of each period, the growth is not continuous. For example, the following graphs show principal of $300 invested at 5% interest, paid annually, over a term of 10 years.



Need to Know

- The amount of simple interest earned on an investment can be determined using the formula

$$I = Prt$$

where I is the interest, P is the principal, r is the annual interest rate expressed as a decimal, and t is the time in years.

- The future value or amount, A, of an investment that earns simple interest can be determined using the formula

$$A = P + Prt$$
$$\text{or } A = P(1 + rt)$$

where P is the principal, r is the interest rate expressed as a decimal, and t is the time in years.

- Unless otherwise stated, an interest rate is assumed to be annual, or per annum.
- Even though interest rates are usually annual, interest can be paid out at different intervals, such as annually, semi-annually, monthly, weekly, and daily.

HOMEWORK...

p. 452: #1 - 6, 10, 11

$$I = Prt$$

&

$$A = P + I$$

OR

$$A = P + Prt$$

$$A = P(1 + rt)$$