

Simple Interest

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## What is Simple Interest?

Suppose you put an amount of money in the bank. Let's call this initial amount  $P$ . We are told that after  $t$  years your money  $P$  that you deposited into the bank will earn interest each year. That yearly or *annual* amount of interest that your money earns is denoted by  $r$  or  $r$  is the *interest rate*. This value is usually expressed as a decimal value or as a percentage. e.g. 0.06 or 6%. Our goal is to try and figure out how much money you will earn after  $t$  years and what your total amount will be after those  $t$  years. Let's start by defining a few values with variables.

Variable	Name	Description
$P$	Principal	This is the original amount you deposited into the bank or put into the investment
$r$	annual interest rate	This is the rate at which your money will "grow" per year.
$t$	time in years	This is the amount of time that you have invested your money $P$ for.
$I$	interest earned	This is the amount of interest you earned over the time period $t$ .
$A$	total amount	This is the total amount you have, $P + I$ , after the investment period $t$ .

The relationship between these variables is,

$$I = Prt \quad \text{and} \quad (1)$$

$$A = P + I = P + Prt \quad (2)$$

Now we have the interest earned over that time period  $t$ ,

$$I = Prt$$

and the total amount of money you have after  $t$  years is,

$$A = P + I$$

**Exercises**

1. Find the principal when,
  - a)  $I = \$192$ ,  $r = 6\%/year$ ,  $t = 4$  years.
  - b)  $I = \$20$ ,  $r = 2\%/year$ ,  $t = 20$  months.
2. Find the rate when,
  - a)  $P = \$300$ ,  $t = 2.5years$ ,  $I = \$140$
  - b)  $P = \$9600$ ,  $t = 3month$ ,  $Is = \$72$
3. Find the time when,
  - a)  $P = \$500$ ,  $r = 7.5\%$ ,  $I = \$150$
  - b)  $P = \$700$ ,  $r = 18\%$ ,  $I = \$78$
4. Find the interest an total amount given,
  - a)  $P = \$640$ ,  $r = 12.5\%/year$ ,  $t = 6months$
  - b)  $P = \$10000$ ,  $r = 18\%/year$ ,  $t = 7years$
5. What sum of money will earn an interest of \$162 in 3 years at 12 % per annum?
6. At what rate per year will a sum of money double itself in 6 years?