

# Simple Interest

Finite Math

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# Simple Interest

Suppose you make a deposit or investment of  $P$  dollars or you take out a loan of  $P$  dollars. The amount  $P$  is called the *principal*. All of these things have an *interest rate* attached to them, essentially rent on the money, which is paid as *interest*.

# Simple Interest

Simple interest is computed as

$$I = Prt$$

where  $I$  = interest,  $P$  = principal,  $r$  = annual simple interest rate (written as a decimal), and  $t$  = time in years.

# Example

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*Suppose you deposit \$2,000 into a savings account with an annual simple interest rate of 6%. How much interest will accrue after 6 months?*

# Future Value

Often, we might be more curious about how much will be in the account or how much will be owed on the loan after a certain period. This amount is called the *future value*. Another name for principal is *present value*. It is found by simply adding the original investment/loan amount to the interest accrued.

## Definition (Future Value)

$$A = P + I = P + Prt$$

and in a simplified form

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

where  $A$  = future value,  $P$  = principal/present value,  $r$  = annual simple interest rate,  $t$  = time in years.

# Example

## Example

*Suppose you take out a \$10,000 loan at a simple annual interest rate of 3.2%. How much would be due on the loan after 10 months?*

# Now You Try It!

## Example

*You make an investment of \$3,000 at an annual rate of 4.5%. What will be the value of your investment after 30 days? (Assume there are 360 days in a year.)*

## Solution

\$3,011.25

# Solving for Other Details

We can use this formula to predict what interest rate we need or how much principal to take out/deposit.

## Example

*You're looking to invest \$5,000 and make \$100 in interest after 10 weeks. What annual rate on your investment will you need to accomplish this?*



# Now You Try It!

## Example

*You invest \$4,000 at an annual rate of 3.9%. How long will it take for the investment to be worth \$5,000? Give your answer in years, correct to 2 decimal places.*

## Solution

*6.41 years*

# Commission Schedules

One often uses a brokerage firm when making investments, many of which charge you a fee based on the transaction amount (principle) when both buying AND selling stocks.

## Example

*Suppose a brokerage firm uses the following commission schedule*

<i>Principal</i>	<i>Commission</i>
<i>Under \$3,000</i>	<i>\$25+1.8% of principal</i>
<i>\$3,000 - \$10,000</i>	<i>\$37+1.4% of principal</i>
<i>Over \$10,000</i>	<i>\$107+0.7% of principal</i>

*An investor purchases 450 shares of a stock at \$21.40 per share, keeps the stock for 26 weeks, then sells the stock for \$24.60 per share. What was the annual interest rate earned on the investment?*