

# Review: Simple Interest | MEL4E

For the next several units, spanning several weeks, we will be focusing on financial math.

- Investing and Borrowing
- Budgeting and Spreadsheet Skills
- Income Tax

} should take us up to the break.

To start, we will be spending the next 3 weeks or so on **investing and borrowing**. The main focus will be on **interest** and how that can work for or against you.

Interest - the cost of borrowing money. You can also **EARN** interest if you invest money.

Simple Interest	Compound Interest
<p>Definition: The interest charged depends only on what was borrowed.</p>	<p>Definition: The interest charged depends on what is currently owed.</p>
<p>Visual:</p>	<p>Visual:</p>

Each of these visuals are based on 500\$ invested at 10% per year. Because compound interest gives you "interest on top of interest" you can see that over long periods of time, interest can accumulate very quickly.

Positive: Compound interest is good if you are investing  
 Negative: " " " bad " " " borrowing

We will look at both cases in various applications: Saving, Mortgages, Pensions, etc.

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Today we will focus on simple interest.

When people invest/borrow money, there are several factors that affect how much interest they will owe:

Factor	Symbol	Definition
Principal	P	The amount that is borrowed
Interest Rate	r	The rate of interest <u>as a decimal</u>
Time	t	Time taken to pay back <u>in years</u>

Putting these together gives a formula to calculate the simple interest earned on an object:

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

Most savings accounts, mutual funds, etc. use compound interest. But simple interest is still used in the following situations:

- On investments called "certificates of deposits" for one year or less
- Car loans and other short term loans

Let's get some practice using the formula:

Example 1: Bort purchases a new couch for \$1,500. He agrees to pay it back in full 2 years later, at a simple interest rate of 4% per year. Calculate the interest that he owes, and how much he must pay back.

Variables	Calculations:
Principal (P) = 1500	$  \begin{aligned}  I &= P \times r \times t \\  &= \cancel{1500} \times \cancel{2} \times 0 \\  &= 1500 \times 0.04 \times 2 \\  &= \$120  \end{aligned}  $
Time (t) = 2	
Rate (r) = 0.04	
<p>Conclusion: Bort will be charged \$120 in interest and pays back \$1500 + \$120 = \$1,620.</p>	

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Example 2: Bryden invests \$50,000 into a "certificate of deposit" investment that pays 2% per year simple interest. He plans to take the money out after 6 months. Calculate the interest that he earns, and how much he will take out.

Variables	Calculations:
Principal (P) = 50,000	$I = P \times r \times t$ $= 50,000 \times 0.02 \times 0.5$ $= \$500$
Time (t) = $\frac{6}{12} = 0.5$	
Rate (r) = 0.02	
Conclusion: Bert earns \$500 interest, and takes out \$50,000 + \$500 = \$50,500.	

Sometimes, you may wish to calculate the principal, rate, or time frame. In this case we can use a visual trick to arrive at the relevant formula. Mr. Smith will draw it with you in the space below:

$$I = P \times r \times t \quad \rightarrow \quad \begin{array}{c} \triangle \\ \hline I \\ \hline P | r | t \end{array}$$

Example 3: Asher had invested \$10,000 into a "certificate of deposit" investment that pays 4% per year simple interest. He made 100\$ in interest. How long did he invest the money for?

Variables	Calculations:
Principal (P) = 10,000	$t = \frac{I}{P \times r}$ $= \frac{100}{10,000 \times 0.04}$ $= 100 / 400$
Interest (I) = 100	
Rate (r) = 0.04	
Conclusion: Asher <del>investing</del> invested the money for 0.25 years (3 months). <span style="float: right;">= 0.25</span>	

## Simple Interest Practice | MEL4E

1) Janelle borrows \$5,000 from a friend, who agrees to loan the money to her at 6% interest. How much interest will Janelle owe in 1.5 years, and how much will she have to pay back?

Variables	Calculations:
Principal (P) = 5000	$I = P \times r \times t$ $= 5000 \times 0.06 \times 1.5$ $= 450$
Time (t) = 1.5	
Rate (r) = 0.06	
Conclusion: She owes \$450 in interest, and pays back \$5,450.	

2) Amber invests \$5,000 into a "certificate of deposit" investment that pays 3% per year simple interest. If she takes out the money in 9 months (0.75 years) how much interest will she have made, and how much did she take out?

Variables	Calculations:
Principal (P) = 5,000	$I = P \times r \times t$ $= 5000 \times 0.03 \times 0.75$ $= \$112.50$
Time (t) = 0.75	
Rate (r) = 0.03	
Conclusion: She makes \$112.50 in interest, and takes out \$5,112.50.	

3) Kaylynn invested \$1,000 for 10 years. After those 10 years she now had \$2,000. How much interest did she make? What interest rate did she get?

Variables	Calculations:
Principal (P) = \$1000	$r = \frac{I}{P \times t}$ $= \frac{1000}{1000 \times 10}$ $= \frac{1000}{10,000}$ $= 0.1$
Interest (I) = \$1,000 (2000 - 1000)	
Time (t) = 10	
Conclusion: She got a rate of 10%.	