

GMF 10

Lesson 3.2 (1), & (2)

3.2

Simple and Compound Interest**Mental Math and Estimation**

Jenna has a Value Account with the Bank of Atlantic Canada. This account offers 10 free self-service transactions a month, and then charges \$0.50 for each transaction after that. Jenna makes 17 cash withdrawals and 4 deposits at her bank's ATM. Her account maintains the minimum monthly balance. What is her total service charge for that month?

Oct 7-11:24 PM

When you deposit money into a savings or investment account, you earn interest from your financial institution because you are lending them your money.



When you borrow money, you must pay interest to the financial institution. The interest you pay is compensation to the lender for the use of their money.

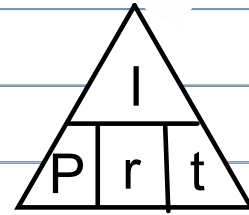
Feb 13-4:41 PM

What if we are looking for other parts of the simple interest formula?

$I = Prt$

$\frac{784}{(7000 \cdot 0.056)}$

0.039



	interest	principal	rate	time
a.	784	7000	5.6%	2
b.	210.6	900	3.9%	6
c.	6375	15,000	4.25%	10

years

Feb 13-4:41 PM

*** Handout 3.2 Simple & Compound Interest

Terms:

- **Simple Interest**
 - interest calculated as a percentage of the principal
- **Compound interest**
 - the interest paid on the principal plus interest
- **Principal**
 - the original amount borrowed or invested.
- **Term**
 - the time in years for an investment or loan.
- **Compounding period**
 - the number of times interest is calculated in a year.
 - › Semi- annually - 2 times a year
 - › Quarterly - 4 times a year
 - › Monthly - 12 times a year
 - › Daily - 365 times a year

Mar 14-6:49 PM

***on handout

Simple Interest

Gordon wants to invest \$2000.00. His bank offers an investment option that earns simple interest at a rate of 1.75% per year.

a) Complete the calculations table showing simple interest over 5 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35$	2035
2	\$2000.00	= 35	2070
3			
4			
5			

Total value at end of 5 years: _____

b) Is there a shortcut or formula?????

I
P
r
t
A

Mar 14-6:51 PM

Simple Interest

Gordon wants to invest \$2000.00. His bank offers an investment option that earns simple interest at a rate of 1.75% per year.

a) Complete the calculations table showing simple interest over 5 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2035.00
2	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2070.00
3	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2105.00
4	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2140.00
5	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2175.00

Total value at end of 5 years: \$2175.00

b) Is there a shortcut or formula?????

I = PRT
I=interest
P=principal
R=rate
T=time

$I = 2000.00 \times 0.0175 \times 5 = 175.00$
Total investment = $2000 + 175 = 2175.00$

Mar 14-6:51 PM

The investment would be worth \$5109.38 at the end of the investment term.

BUILD YOUR SKILLS

Pg 292

1. Calculate the amount of simple interest earned on each of the following principal amounts at the rate and term given. $I = Prt$

a) Principal: \$1000.00 Rate: 2.50% per annum Term: 1 year

$$I = 1000 \cdot 2.5\% \times 1 = \$25.00$$

b) Principal: \$1000.00 Rate: 5.00% per annum Term: 1 year

$$1000 \times 0.05 \times 1 = \$50$$

c) Principal: \$1000.00 Rate: 2.50% per annum Term: 2 years

$$1000 \times 0.025 \times 2 = \$50$$

d) Principal: \$2000.00 Rate: 2.50% per annum Term: 1 year

$$2000 \times 0.025 \times 1 = \$50$$

- e) What happens to the amount of interest earned when the principal and the term stay the same but the rate doubles?
- f) What happens to the amount of interest earned if the principal and the rate stay the same but the term doubles?

Practice

2. Solve the following problems using the simple interest formula.
- If the interest earned on a deposit is \$50.00 and the interest rate is 3.00% per annum invested for 2 years, what is the principal?
 - How many months does it take to earn \$180.00 interest on an investment if the principal is \$5000.00 and the interest rate is 2.00% per annum?
 - Calculate the annual interest rate on an investment if the principal is \$4000.00 and the interest is \$120.00 earned over three years. Answer as a percent and a decimal.

Homework

Workbook: Pg. 293 Q 2 & 3

Aug 14-4:07 PM

Oct. 17th

Compound Interest

Allison wants to invest \$2000.00. Her bank offers an investment option that earns compound interest at a rate of 1.75% per year.

a) Complete the calculations table showing simple interest over 5 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35$	2035.00
2	2035.00	$2035.00 \times 0.0175 \times 1 = 35.61$	2070.61
3	2070.61		
4			
5			

Total value at end of 5 years: _____

b) Is there a shortcut or formula?????

- A-
- P-
- r-
- n-
- t-

Mar 14-6:52 PM

Compound Interest

Allison wants to invest \$2000.00. Her bank offers an investment option that earns compound interest at a rate of 1.75% per year.

a) Complete the calculations table showing simple interest over 5 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	\$2000.00	$2000.00 \times 0.0175 \times 1 = 35.00$	2035.00
2	2035.00	$2035.00 \times 0.0175 \times 1 = 35.61$	2070.61
3	2070.61	$2070.61 \times 0.0175 \times 1 = 36.24$	2106.85
4	2106.85	$2106.85 \times 0.0175 \times 1 = 36.87$	2143.72
5	2143.72	$2143.72 \times 0.0175 \times 1 = 37.52$	2181.24

Total value at end of 5 years: 2181.24

b) Is there a shortcut or formula?????

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

A is the final value of the investment (principal plus interest).

P is the principal.

r is the annual interest rate expressed as a decimal.

n is the number of compounding periods in a year.

t is the term of the investment or loan in years.

Why is there a one cent difference? Rounding!!!!

$$\begin{aligned}
 A &= P \left(1 + \frac{r}{n} \right)^{nt} \\
 &= 2000 \left(1 + \frac{0.0175}{1} \right)^{(1 \times 5)} \\
 &= 2000(1.0175)^5 \\
 &= \$ 2181.23
 \end{aligned}$$

Mar 14-6:53 PM

Practice

Murray deposits \$6700 into an investment which earns 3.2% per annum, compounded semi-annually over 2 years. Complete both the table and the formula to find the value of the investment after 2 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	6700	$6700 \times 0.032 \times 0.5 = 107.20$	6807.2
2	6807.20	108.92	6916.12
3	6916.12	110.66	7026.78
4	7026.78	112.43	7139.21

$$A = 6700 \left(1 + \frac{0.032}{2} \right)^{2 \times 2}$$

Mar 14-6:54 PM

Practice

Murray deposits \$6700 into an investment which earns 3.2% per annum, compounded semi-annually over 2 years. Complete both the table and the formula to find the value of the investment after 2 years.

Interest Period	Investment value at beginning of period	Interest Earned	Investment value at end of period
1	6700.00	$6700 \times 0.032 \times 0.5 = 107.20$	6807.20
2	6807.20	$6807.20 \times 0.032 \times 0.5 = 108.12$	6916.12
3	6916.12	$6916.78 \times 0.032 \times 0.5 = 110.66$	7026.78
4	7026.78	$7026.78 \times 0.032 \times 0.5 = 112.43$	7139.21

$$A = P \left(1 + \frac{r}{n}\right)^{nt} = 6700 \left(1 + \frac{0.032}{2}\right)^{(2 \times 2)} = 6700(1.016)^4 = \$7139.20$$

Mar 14-6:56 PM

pg. 296

BUILD YOUR SKILLS

4. Calculate the final value of a deposit of \$5000.00 invested at 3.00% per annum, compounded annually, for 2 years.

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 5000 \left(1 + \frac{0.03}{1}\right)^{(1 \times 2)}$$

$$A = 5000(1.03)^2$$

$$A = \$5304.50$$

$$\begin{aligned} P &= 5000 \\ r &= 3.00\% \\ n &= 1 \text{ (once per year)} \\ t &= 2 \end{aligned}$$