

Ms. Barton Grade 9 Math April 29 - May 5

It is incredible that we are on Week 4 of online learning already, isn't it? We are hoping that you have now found a routine that works for you. Many of you are doing really well on the assignments which is great to see. For those of you that are struggling for any reason at all, please reach out to your teacher and share your situation, as it only gives a better understanding of how we can support you through this difficult time for learning.

Please ensure you read all of the information below before starting.

This week Ms. Barton's class will be working on financial literacy. We will continue following a similar format to the previous weeks with a basic assignment, mandatory for all Math 9 students, and the 'extending your learning' opportunities which are provided to those who want to go beyond the minimal requirements, to practice and refine their skills to further prepare themselves for Math 10 and/or raise their grade in Math 9.

Learning Intentions:

- *Students will be able to successfully simplify and solve equations with exponents that require multiple operations*

Assignment Instructions:

General Instructions:

- Students will follow the instructions and examples from Financial Literacy
- Students may supplement their learning from the instruction and examples below
- Students will complete **all exercises** from Financial Literacy-Practice Problems.
- Students will communicate their progress back to their teacher

Supplementary Instruction and Examples:

Below are some great resources that show examples of the concepts covered this week.

1. Watch this video on calculating compound and simple interest
https://www.youtube.com/watch?v=7gla0G0svfM&feature=emb_title
2. Watch this video on calculating simple interest <https://www.thebalance.com/simple-interest-overview-and-calculations-315578>
3. Watch this video on calculating compound interest
https://www.youtube.com/watch?time_continue=126&v=dwb3hGla4qw&feature=emb_title

If you need or want assistance on the assignment provided below, we are offering 'office hours' using the platform 'Zoom' twice per week with one of the four Math teachers: Mr. Kyle Conne, Mr. Bill Crerar, Mrs. Soleil Switzer, and Mrs. Susan Barton. If you wish to speak directly with your Math 9 teacher, please do not hesitate to email them at any time and they will respond in a timely manner. It is highly encouraged that you work on math during office hours if possible that way you can ask questions in real time if needed.

Office Hours: April 29 - May 5 (via ZOOM):

Office hours are an optional, drop-in session that give students a chance to ask questions to a teacher, to interact and work with their peers, or just to stop in and say hi to a friend or teacher. There will be no set lessons for these times, but rather, we will be trying to help students with whatever they need help with.

Zoom is a free, easily accessible platform for conference calling. Access Zoom at <https://zoom.us/join>.

Time - 2:00pm to 3:00pm

- Thursday, April 30 - Mrs. Switzer
Meeting ID: 822 3374 7784
Password: 8npdsR

Time - 11:00am to 12:00pm

- Tuesday, May 5 - Mrs. Susan Barton
Meeting ID:965-5141-6172
Password:8ydUnU

Please note Zoom etiquette:

- You are not required to turn on your video (although it will be nice to see your face again!) but make sure your audio is on. If you are having connection issues turn your own video off.
- Please mute yourself if you are not speaking. If there are a lot of users there can be quite a bit of background noise.
- If you click "participants" under the videos you will get a popup on the right. There is a button there where you can raise your hand if you have a question. Remember to "lower" your hand once you've asked your question.

Submitting your work:

Please submit completed work by **Tuesday, May 5, 2020** via Office 365 or by email to your specific teacher. This may include attaching a word or pdf document, or taking a picture of your completed work. Please save your file in the following format: "**Name_Math 9 #4**" (ex: John Doe_Math 9 #4.docx), if you have more than one file use a letter following the number to distinguish between them (ex: John Doe_Math 9 #4a.docx).

Mr. Crerar's class can continue to submit assignments as has been done previously but send them to bcrerar@sd79.bc.ca.

Criteria / Rubric:

This assignment will be assessed by your teacher using the rubric below. In addition, you should use the rubric to self-evaluate by including a statement such as this "In this assignment, I feel that I am proficient, because _____". Also include how long it took you to complete the assignment.

Proficiency Scale	Extending	Proficient	Developing	Emerging
Description	The students work meets the objective; it is clear, with few or no errors and demonstrates a sophisticated understanding of the concepts and competencies relevant to the learning intentions.	The students work almost meets the objective; it has some errors but demonstrates a good understanding of the concepts and competencies relevant to the learning intentions..	The students work is in progress ; it has some errors and demonstrates a partial understanding of the concepts and competencies relevant to the learning intentions.	The students work does not meet the objectives; it has frequent errors and demonstrates minimal or no understanding of the concepts and competencies relevant to the learning intentions..
Phrase	"I could teach this."	"I have a good understanding."	" I get some of it."	"I don't get it."

Teacher comments:

Financial Literacy

Simple Interest

- Interest money that is added to the PRINCIPAL (money invested or borrowed)
- It is decided based on a given percentage rate
- Low Interest Rates
 - Awesome for a borrower, you pay less to the lender
 - Bad if you are trying to grow interest on savings
- High Interest Rates
 - Bad for a borrower, you pay more to the lender
 - Great if it is interest earned in savings

- **Simple Interest** is calculated this way: $I = Prt$
 - *I: is the amount of interest calculated*
 - *P: is the Principal (the amount of money borrowed or saved)*
 - *r: is the Percentage Rate, expressed as a decimal (25% = 0.25)*
 - *t: is Time, in years*

Example: How much interest is paid over a 3 year period on \$5000 at a APR (Annual Percentage Rate) of 3%?

Solution: $I = Prt$

Here: $P = \$5000$ $t = 3$ $r = 3\% = 0.03$

$$I = (5000)(0.03)(3)$$

$$I = 450$$

So in 3 years without touching the money, you earn an extra \$450

- You can simply flip the scenario to borrowing and if you borrowed \$5000 you would owe an extra \$450 back on top of the \$5000

- You can also use algebra to manipulate the equation to solve for P , r , or t

Example: What Principal at 4.75% will earn interest of \$27.15 in 9 months?

Solution: Since $I = Prt$, We need P alone, and doing algebra give us:

$$\frac{I}{rt} = P$$

and since **Time in in years, 9 months means 9 out of 12 months,**

$$\frac{9}{12} \text{ of a year} \quad \text{Or...} \quad \frac{3}{4} \text{ years}$$

So...

$$P = \frac{I}{rt} \rightarrow \frac{27.15}{(0.0475)\left(\frac{3}{4}\right)} \rightarrow \$762.11$$

Compound Interest

❖ **Compound Interest** is much more complicated. You build/owe on the *Principal* + *the Interest* earned in a compounding period

- It can be used to your benefit when savings
- It can drown you when it's used against your debt

• **Compound Interest** is calculated this way: $A = P \left(1 + \frac{r}{n}\right)^{n(t)}$

- A : is the final amount earned
- P : is the Principal (the initial amount of money borrowed or saved)
- r : is the **Yearly** Percentage Rate, expressed as a decimal (25% = 0.25)
- n : is the number of times yearly interest is compounded per year
- t : is time, in years

- Compounding periods means the number times the interest is calculated in a year
 - Yearly: $n = 1$
 - Quarterly: $n = 4$
 - Monthly: $n = 12$
 - Daily: $n = 365$

Example: Find the interest earned if \$6500 is deposited in an account paying 6% compounded monthly for 5 years

Solution: $A = P \left(1 + \frac{r}{n}\right)^{n(t)}$ so we sub in for the information given to find the solution

$$A = 6500 \left(1 + \frac{0.06}{12}\right)^{12(5)} \rightarrow A = 6500(1.005)^{60} \rightarrow A = \$8767.53$$

- The interest is: $I = A - P \rightarrow \$8767.53 - \$6500 = \$2267.53$

Example: What is the initial investment needed to become a millionaire in 25 years if interest is 12% compounded quarterly?

Solution: $A = P \left(1 + \frac{r}{n}\right)^{n(t)}$ so we calculated what we can then use algebra to find the unknown

$$1\,000\,000 = P \left(1 + \frac{0.12}{4}\right)^{4(25)} \rightarrow 1\,000\,000 = P(1.03)^{100} \rightarrow P = \frac{\$1\,000\,000}{(1.03)^{100}}$$

$P = \$52\,032.84$ You only need to invest **\$52 032.84** to be a millionaire in 25 years

Example: What is the difference in earnings on an investment of \$8000 for 10 years at 6% compounded yearly, monthly, and daily?

Solution:

Yearly	Monthly	Daily
$A = P \left(1 + \frac{r}{n}\right)^{n(t)}$	$A = P \left(1 + \frac{r}{n}\right)^{n(t)}$	$A = P \left(1 + \frac{r}{n}\right)^{n(t)}$
$A = 8000 \left(1 + \frac{0.06}{1}\right)^{1(10)}$	$A = 8000 \left(1 + \frac{0.06}{12}\right)^{12(10)}$	$A = 8000 \left(1 + \frac{0.06}{365}\right)^{365(10)}$
$A = \$14\,326.78$	$A = \$14\,555.17$	$A = \$14\,576.23$

Different types of accounts

- There are a few more types of accounts, generally when things get more complicated
- We will only focus on these this year.
- Every account feature changes depending on bank/credit union, do your research

Chequing Account – The most common type of account, it is one linked to direct deposit from your employer, your ATM card, and cheques.

- Some chequing accounts have fees associated with them:
 - Paper statement fees: generally you can opt out and receive e-bills
 - Minimum Balance: If you maintain a certain balance they waive the monthly fees
 - ATM fees: Your own bank and different banks
 - Overdraft fees: When you spend more than you have in the account, can be steep
 - Money transfer fees: e-transfer generally

Savings Account – A account that people use to save money, generates interest. It can be attached to an ATM card, but Chequing accounts are used more for the day-to-day

- Savings accounts also have added features
 - Interests rates can change depending on the introductory offer
 - You may require a minimum deposit to start the account
 - There may be service or transaction fees depending on your institution
 - You have to pay taxes on the interest earned in Savings accounts

Tax Free Savings Account – An account that people use to save money over a long period of time, not connected to an ATM. Money put in, interest earned, and even money withdrawn is not taxed (some exceptions).

- There is a yearly contribution limit of \$5500 starting in 2017
- The contribution total builds, so you can continue to grow the account
- Interest Rate is higher than the basic Savings Account
- Withdrawals can occur, but require communication with your provider and there may be some added rules and regulations

Types of Cards

Debit Card – Your classic bank card, connect to your chequing and/or savings account

- Has withdrawal fees at your own institution and other (do your research)
- Extra fees at standalone ATM's
- Can work in a multitude of countries (research)
- Can be connected to your phone/watch

Credit Cards – Credit Cards are two-faced, they can be beneficial, but they can be crushing. There are many different varieties with different features (research everything).

- Some benefits:
 - Bonus Points
 - Air Miles
 - Bonus Dollar reward Programs
 - Cash Back
 - Travel Programs
 - Insurance Coverage

- Some detriments
 - High-Interest Rates
 - Hidden Fees
 - It's NOT money you necessarily have

Making Purchases

Planned Purchases – It is always good form to make planned and smart money decisions. Buying things on a whim or impulse is how people get themselves into debt troubles.

On average Canadians owe \$1.71 for every \$1 of disposable income! That is not good...

Savings vs Borrowing – these can both be beneficial, savings allows you to pay without going into debt, but it isn't always possible to save the quantity you need. Borrowing works if they offer you a low/no interest rate

Good Debt – Mortgages, Car loans (Low-Interest), University/College Loans, (Life Investments)

Bad Debt – Payday Loans, credit card, high interest rate borrowing (don't buy it if you can't afford it)

Practice Problems

Given the information provided, solve for Interest

1. $P = \$2500$ $r = 12\%$ $t = 2 \text{ yrs}$ $I = ?$

2. $P = \$12\,250$ $r = 5\%$ $t = 6 \text{ mnths}$ $I = ?$

3. $P = \$4200$ $r = 3\%$ $t = 5 \text{ yrs}$ $I = ?$

4. $P = \$20$ $r = 28\%$ $t = 6 \text{ yrs}$ $I = ?$

Given the information provided, solve for the missing value

5. $P = ?$ $r = 4.5\%$ $t = 4 \text{ yrs}$ $I = \$150.30$

6. $P = \$1800$ $r = ?$ $t = 4 \text{ mnths}$ $I = \$12$

7. $P = \$2500$ $r = ?$ $t = 5 \text{ yrs}$ $I = \$375$

8. $P = \$1\,250\,000$ $r = 8\%$ $I = \$300\,000$ $t = ?$

Extensions (not required)

13. Do some research.

- a. Pick a financial institution in Victoria (Bank or Credit Union)
- b. Find out as much information as you can about:
 - Fees
 - Types of accounts
 - Debit Card Procedures
 - Pertinent Need to Know Info

14. Do some research.

- a. Pick a credit card (Company and Type of Card)
- b. Find out as much information as you can about:
 - Interest Rates
 - Introductory Limits
 - Bonus Programs