GRADE 12 APPLIED
UNIT B – INTEREST AND CREDIT
EXERCISE
SIMPLE INTEREST (When Technology Sucks)

Name: _____

Date: _____

Simple Interest Formula: **I = P*r*t**   where :
  - o **I** is the amount of **i**nterest earned [$],
  - o **P** is the amount of **P**rincipal invested (or borrowed) [$],
  - o **r** is the **r**ate of interest (expressed as a decimal eg: 5% = 0.05 or 5/100) based on an Annual Percentage Rate (**APR**); and
  - o **t** is **t**ime measured in years [years]. | *By law, all interest rates have to be shown as APR* |
      - o (note for example that **7** months is really just **7/12** years)
    - o The Total Amount (balance) is A = P + I ;
      or more simply A = P*(1+rt)

For the following questions, calculate them both manually (pencil and paper and formulae) **and** using some technology. Simple interest is however so simple that there is seldom a technology App necessary to calculate it. Simple graphing techniques might be useful however.

1. Jasmine's **Canada Savings Bond** (CSB) pays her **5%** simple interest.

a.   How much interest will she earn on a **$2,000** CSB after **five years**?
b.   What will be the total value of this **CSB** investment at the end of **the five years**?

Manual Calculation(s):

Tables and/or Graphs

X	Y$_1$
0	
1	
2	
3	
4	
5	
6	

TEXAS INSTRUMENTS

Y1=2000+2000*5/100*X

X=5   .Y=2500 . .

2.   The account in which Erick deposits his money pays **8%** simple interest annually (APR). **How much interest** will he earn on a deposit of **$3,000.00** left in the account for:
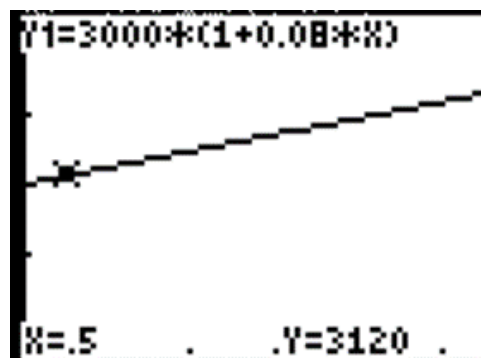
    a. 5 years   b.   2 years   c. 6 months.

Manual Calculations:

Technology Tables/ Graphs / Apps…

TEXAS INSTRUMENTS

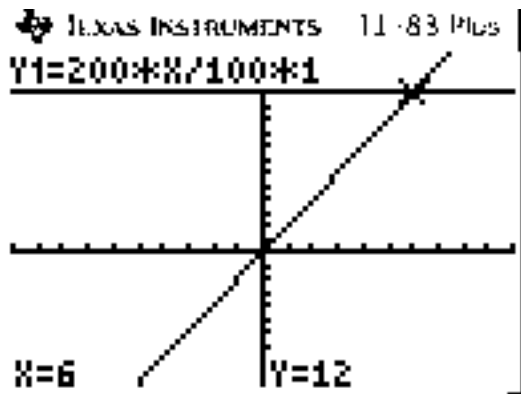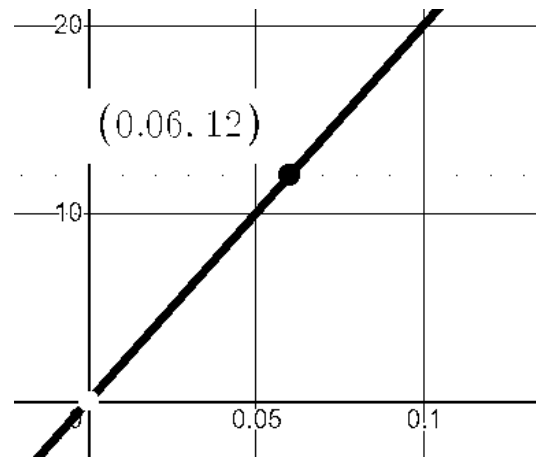| X	Y$_1$
0	3000
1	3240
2	
3	
4	
5	
6	

X=5

Y1=3000*(1+0.08*X)

X=.5   .Y=3120 .

3.   Fred has earned **$12.00** in interest on **$200.00** that he had deposited in his account one year ago. What **rate of interest, r,** (APR) was the account earning?

Manual Calculation (ie: Algebra?; Guess and Check?)

TI-83 Graphical Solution?   Desmos?

Can you see where sometimes calculations are so trivial that technology will just be more work than necessary!!??

This **Simple Interest** is so *simple* it is hard to do on many Applications!

4.   Larry was thinking of purchasing a big screen TV for **$4,000** one morning. The salesperson said that if Larry just paid for it fully with cash today that he could '*knock off*' **$100** from the price of the TV. Larry knows that he will get his income tax rebate of about **$5,000** in **30** days. Larry thinks he may just quick a quick loan for the **$3900** to take advantage of the special deal.

a.   How much will it cost Larry to borrow the **$3900** he needs over a period of one month at **20%** interest APR?

b.   Would Larry be better off to take the **$3900** loan and buy today *or* wait for his Income Tax Rebate?

Manual Calculation(s):

Using Technology: (way too much work for such a simple problem!)

Plus there are too many Apps out there! Some of which are wrong or confusing.

If you never did Relations and Patterns (Functions) in Grade 11 then this may look foreign to you, no panic!

$$I = 3900 \cdot \frac{20\%}{100} \cdot x$$

$(0.83, 65)$
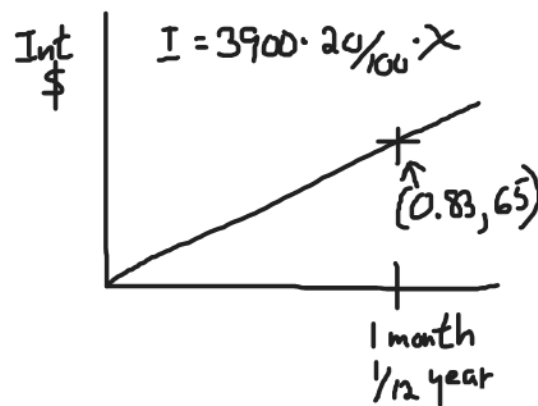
1 month
$\frac{1}{12}$ year

5.   A person borrowed **$9,000** from a business associate. Three months later the loan was fully repaid with a cheque for **$9337.50**. What **rate of interest** (APR) was the person charged?
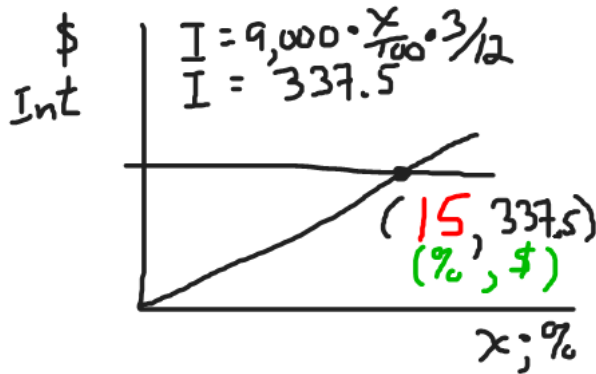
Manual Calculation:

Using Technology (you would likely just send your boss a screen shot of the calculation, but of course on the course you will need to sketch your screen, the inputs and the results)

So now we are just getting silly, trying to take something simple and use high powered apps to solve it!
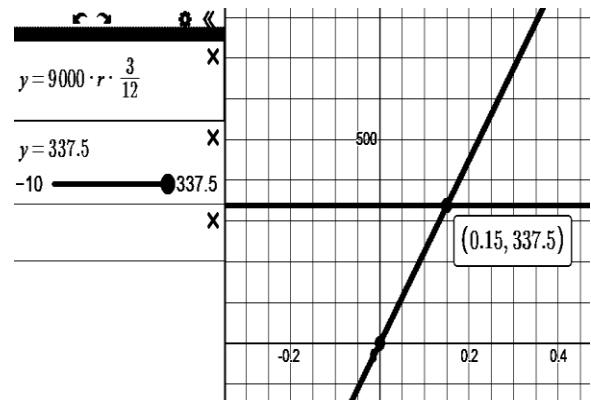
There is a time and place for technology. Simple stuff is not the time nor the place!

Sketch of TI 83 Graph: Way easier on DESMOS

$I = 9,000 \cdot \frac{x}{100} \cdot \frac{3}{12}$

$I = 337.5$

$(15, 337.5)$

$(\%, \$)$

$x ; \%$

$y = 9000 \cdot r \cdot \frac{3}{12}$

$y = 337.5$

$(0.15, 337.5)$

Need to mess about with the **Window** to see the solution.

6.   A student was thinking of buying an '*old beater*'. The student took out a personal loan from his uncle for **ten** months in order to purchase the vehicle. His uncle said he would only charge the student **12%** interest (APR). The student eventually paid **$325** in interest at the end of the loan period. How much was the **principal amount of the loan**?

Your Manual Calculation   Technology Determination:

$$y = x \cdot \frac{12}{100} \cdot \frac{10}{12}$$

$$y = 325$$

(3250, 325)
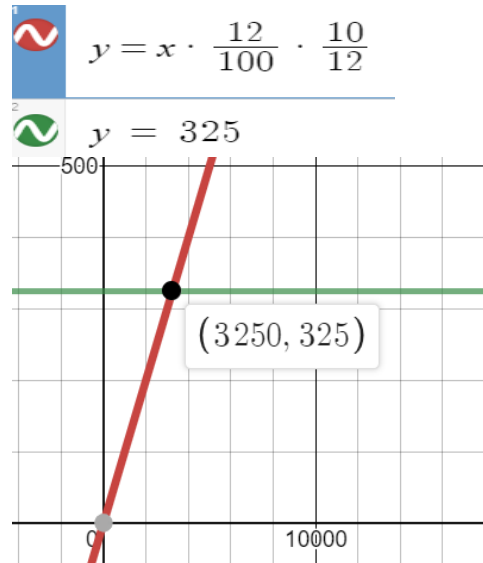
So hopefully you see that technology is not necessarily a saviour. You have to know how to use it! You have to know what it does well, and what it does not do well. You have to know what it is doing!

Ans: 1a) $100; $2,100   2) $1200; $480; $120 3) 6% 4) $65.00 5) 15% 6) $3250

7.   How many months will it take for a $4,000 deposit to earn $160 interest at 16% per annum?

7) 0.25 years (3 months)

COMPLETE THE TABLE

Fill in the blanks for the Simple Interest Calculations below.

Formulae: A = P + I ;   and I = Prt

	A [$]	I [$]	P [$]	r [%]	t [years]
a.			$1,000	10%	3
b.			$1,000	20%	3
c.		$250	$1,000		1
d.		$600	$1,000		2
e.			$2,000	25%	10
f.		$840	$4,200	10%	
g.		$1500	$7,500	20%	
h.		$4500	$10,000		10
i.	$9,000		$7,500	20%	
j.	$12,000		$9,000		5
k.	$1,800		$1,500		6