GRADE 11 ESSENTIAL
UNIT B – INTEREST AND CREDIT
EXERCISE
COMPOUND INTEREST

Name: _____

Date: _____

Formula for Compound Interest	
$A = P\left(1+\frac{r}{s}\right)^{n*s}$	○ **A** is the total accumulated compounded amount [$] ○ **P** is the Principal investment of loan [$] ○ **r** is the annual percentage *rate* (APR) ○ **s** is the number of times per year the interest is calculated (ie: compounded) ○ **n** is the number of years

1. **$5,000** is to be invested at **10%** for **4** years. Find the compound amount of the **$5,000** if interest is calculated:

Make sure you know how to use your exponent button on your calculator: $\boldsymbol{y^x}$

a. annually

b. quarterly; and

c. daily

d. compare your answers for *a.* through *c.* What can you say about the effect of the frequency of compounding (s) and the interest earned.

2. Lisa would like to deposit her income tax refund in an account earning **5.4%** annual interest compounded **monthly**. She will withdraw her money at the end of **5 months**. If her income tax return was **$389.00**, what will her balance be in the account at that time? (*Hint*: 5 months = 5/12ths of a year)

3. A depositor had **$10,000** on deposit in a bank that pays interest at a rate of **5%** APR compounded semi-annually. **How much more interest** would the depositor have earned during the first year if the bank had compounded the interest quarterly rather than semi-annually?

4. A grand-parent of a new born child decided to invest **$5,000** in a GIC for the child that pays interest at the rate of **6%** APR compounded semi-annually. The GIC was bought the day the child was born. What total amount ('*Future Value*') will the child have at age 21 on his 21st birthday?

5. A person borrowed **$2,000** from a friend at an interest rate of **1.5%** ***per month***, the interest being calculated on the amount outstanding monthly. **How much** will he need to pay back his friend **after two years**? (notice this is about the same interest rate that a 'reasonable' credit card will charge on a cash advance)

Ans: 1) $7,320.50; $7,422.53; $7,458.71 2) $397.83
3) $10,506.25 Semi-annually ; $10,509.45 quarterly. Difference = $3.20
4) $17,303.48 5) $2,859.00

7. Complete the blanks in the following table for Compound Interest **only if** you want extra practice. Answers are below.

	A **Total Amount Accumulated** **[$]**	**P** **Principal** **[$]**	**R** **Interest Rate APR** **[%]**	**S** **# times Interest Calculated per year**	**Frequency Of Interest Calculation**	**N** **Term of investment or loan** **[Years]**
A		2,400	5%	1		10 years
B		2,400	5%		Monthly	10 years
C		2,400	5%		Daily	10 years
D		2,400	5%	4		10 years
E	10,000		10%	12		45 years
F	10,000		5%		Quarterly	45 years
G		10,000	10%		Daily	90 days
H		20,000	10%		Daily	90 days
I		3,400	5%	1		10 years
J		7,400	5.25%		Monthly	10 years
K		9,700	4¾ %		Daily	10 years
L		2,400	5½ %	4		10 years
M	4,567	4,000		1	Annual	1 year
N	7,200	4,000		2		10 years
O	10,000		7½ %		Daily	10 years
P	20,000		7½ %		Daily	10 years
Q	30,000		7½ %		Daily	10 years
R		1,000	¾ %		Daily	5 years
S		10,000	¾ %	12	Monthly	5 years
T	1 Million		4.5%	12		45 years

Questions like n will require EXCEL or a computer app or Grade 12 logarithms

ANSWERS

	A **Total Amount Accumulated [$]**	**P** **Principal** **[$]**	**R** **Interest Rate APR [%]**	**S** **# times Interest Calculated per year**	**Frequency Of Interest Calculation**	**N** **Term of investment or loan [Years]**
A	***3909.34***	2,400	5%	1	***Annually (per annum)***	10 years
B	***3952.82***	2,400	5%	***12***	Monthly	10 years
C	***3956.79***	2,400	5%	***365***	Daily	10 years
D	***3944.68***	2,400	5%	4	***Quarterly***	10 years
E	10,000	***113.18***	10%	12	***Monthly***	45 years
F	10,000	***1068.80***	5%	***4***	Quarterly	45 years
G	***10,249.60***	10,000	10%	***365***	Daily	90days
H	***20,499.21***	20,000	10%	***365***	Daily	90 days
I	***5,538.24***	3,400	5%	1	***Annual***	10 years
J	***12,495.07***	7,400	5.25%	***12***	Monthly	10 years
K	***15,597.25***	9,700	4¾ %	***365***	Daily	10 years
L	***4,144.24***	2,400	5½ %	4	***Quarterly***	10 years
M	4,567	4,000	***14.175%***	1	***Annually***	1 year
N	7,200	4,000	***5.96%***	2	***Semi-Annually***	10 years
O	10,000	***4,724.02***	7½ %	***365***	Daily	10 years
P	20,000	***9,448.06***	7½ %	***365***	Daily	10 years
Q	30,000	***14,172.08***	7½ %	***365***	Daily	10 years
R	***$1,038.21***	1,000	¾ %	***365***	Daily	5 years
S	***10,381.99***	10,000	¾ %	12	Monthly	5 years
T	1 Million	*132494.70*	4.5%	12	***Monthly***	45 years