Name: _____ Date: _____

Amount	A	The full amount after the loan or investment is complete
Interest	I	The amount of money owed at the end of term
Principle	P	Initial amount of the loan or investment
Rate	r	Annual interest rate (used as a decimal)
Term	t	Length of the loan or investment (in years)
Compounding Period	n	How many times a year interest is calculated and added

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

- $\frac{r}{n}$: add the interest
- nt: # of times over the term interest is calculated and added
- 1: maintains the principle

$$A = P + I$$
$$-P \quad -P$$
$$I = A - P$$

1. If Greg invested $500 for 5 years, compounded monthly, at a rate of 6%, how much interest would he earn on his investment?

A	
I	?
P	500
r	6%
t	5
n	12

$6\% = \frac{6}{100} = 0.06$

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$
$$= 500\left(1 + \frac{0.06}{12}\right)^{12 \times 5}$$
$$= 500\left(1 + 0.005\right)^{60}$$
$$= 500\left(1.005\right)^{60}$$
$$= 500\left(1.34885\right)$$
$$= \$674.43$$

$$A = P + I$$
$$674.43 = 500 + I$$
$$-500 \quad -500$$
$$I = \$174.43$$

2. Sam charges $4000.00 to a credit card that charges 20.00% interest per annum, compounded monthly.
   a. How much will he owe after 3 years?

A	?
I	
P	4000
r	20% = $\frac{20}{100}$ = 0.2
t	3
n	12

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

$= 4000\left(1+\frac{0.2}{12}\right)^{12\times 3}$

$= 4000(1+0.01667)^{36}$

$= 4000(1.01667)^{36}$

$= 4000(1.81313)$

$= \$7252.52$ 100% + 81.312

   b. How much will he owe after 10 years?

A	?
I	
P	4000
r	20% = $\frac{20}{100}$ = 0.2
t	10
n	12

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

$= 4000\left(1+\frac{0.2}{12}\right)^{12\times 10}$

$= 4000(1+0.01667)^{120}$

$= 4000(1.01667)^{120}$

$= 4000(7.26825)$ ← 100% + 626.832

$= \$29073.02$

2. Find the total value of the a $7 300 investment at 7% compounded semiannually for 3 years.

A	?
I	
P	7300
r	7% = $\frac{7}{100}$ = 0.07
t	3
n	2

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

$= 7300\left(1+\frac{0.07}{2}\right)^{2\times 3}$

$= 7300(1+0.035)^{6}$

$= 7300(1.035)^{6}$

$= 7300(1.22926)$

$= \$8973.56$

3. Find the interest owed on a $21 000 if the annual interest rate is 13.6% compounded quarterly for 4 years.

A	
I	?
P	21000
r	13.6 = $\frac{13.6}{100}$ = 0.136
t	4
n	4

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

$= 21000(1+\frac{0.136}{4})^{4\times4}$

$= 21000(1+0.034)^{16}$

$= 21000(1.034)^{16}$

$= 21000(1.70737)$

$= \$35854.85$

$A = P + I$

$35854.85 = 21000 + I$

$-21000 \quad -21000$

$I = \$14854.85$

4. Find the interest earned on a $12,700, invested at 8.8% compounded daily for 1 year.

A	
I	?
P	12700
r	8.8 = $\frac{8.8}{100}$ = 0.088
t	1
n	365

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

$= 12700(1+\frac{0.088}{365})^{365\times1}$

$= 12700(1+0.000241)^{365}$

$= 12700(1.000241)^{365}$

$= 12700(1.09197765)$

$= \$13868.10$

$A = P + I$

$13868.10 = 12700 + I$

$-12700 \quad -12700$

$I = \$1168.10$

5. Find the interest you would owe on a line of credit debt of $55,000 at 6% compounded monthly for 2 years.

A	
I	?
P	55000
r	6% = $\frac{6}{100}$ = 0.06
t	2
n	12

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

$= 55000(1+\frac{0.06}{12})^{12\times2}$

$= 55000(1+0.005)^{24}$

$= 55000(1.005)^{24}$

$= 55000(1.12716)$

$= 61993.79$

$A = P + I$

$61993.79 = 55000 + I$

$-55000 \quad -55000$

$I = \$6993.79$

6. Find the total value of $1,500 invested at 7%, compounded annually for 3 years.

A	?
I	
P	1500
r	7% = $\frac{7}{100}$ = 0.07
t	3
n	1

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$
$$= 1500\left(1+\frac{0.07}{1}\right)^{1\times 3}$$
$$= 1500(1+0.07)^3$$
$$= 1500(1.07)^3$$
$$= 1500(1.22504)$$
$$= \$1837.56$$

7. What is the total value of a $130 debt at loaned out at 9.4%, compounded quarterly for 2 years?

A	?
I	
P	130
r	9.4% = $\frac{9.4}{100}$ = 0.094
t	2
n	4

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$
$$= 130\left(1+\frac{0.094}{4}\right)^{4\times 2}$$
$$= 130(1+0.0235)^8$$
$$= 130(1.0235)^8$$
$$= 130(1.20421)$$
$$= \$156.55$$