MBF 3C1 *see → Excel spreadsheet*   Name: _____

Compound Interest

INVESTIGATE: Comparing Simple and Compound Interest

Simple Interest graph

Compound Interest graph
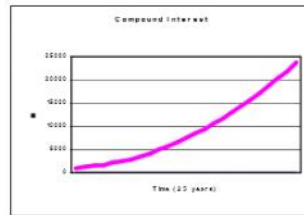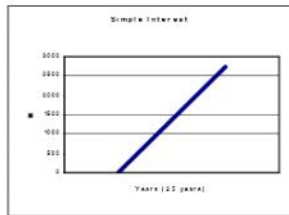
How do the graphs compare:

1. How does compound interest grow relative to simple interest? *compound grows faster*
2. Identify the type of growth for each:
   - simple interest is *linear*
   - compound interest is *exponential*

Compounding means generating earnings from previous earnings.

Compound interest is the amount of money earned on a principal investment/loan PLUS the amount of money made on the interest of the investment/loan.

see Video   *Confused*

http://www.investopedia.com/video/play/what-is-compound-interest/#axzz2AGUGPaa5

Get an explanation @
www.investopedia.com/video/play/what-is-compound-interest/#axzz2AGUGPaa5

A **compounding period** is the length of time over which compound interest is calculated.

Common compounding periods are:

TERM	NUMBER OF TIMES PER YEAR
annually	1
semi-annually	2
quarterly	4
bi-monthly	6
monthly	12
semi-monthly	24
bi-weekly	26
weekly	52
daily	365

"I'd like a no-interest loan, since I have no interest in paying it back."

COMPOUND INTEREST FORMULA: $A = P(1+i)^n$	A = the final amount of investment/loan
	i = the interest rate per compounding period
	$\quad i = \frac{r}{C} \qquad r$ = the annual interest rate
	$\qquad\qquad C$ = # of compounding periods/year
	P = the principal
	n = the number of compounding periods
	$\quad n = Ct \qquad t$ = the # of years
	$\qquad\qquad C$ = # of compounding periods/year

just interest? $\boxed{I = A - P}$

Example 1

Calculate the amount of money a $400 investment would make if it were invested at 5%, compounded quarterly for 2 years.

$A = ?$ P $r = 0.05$ $c = 4$ t

$$i = \frac{r}{c} = \frac{0.05}{4}$$

$$n = ct = 4(2) = 8$$

$$A = P(1+i)^n$$
$$A = 400\left(1 + \frac{0.05}{4}\right)^8$$
$$A = \$441.79$$

Example 2

Determine the amount of money invested at 2.45% for 3 years, compounded monthly if the final amount of the investment is $3500.

$r = 0.0245$ t $P = ?$ $C = 12$ A

$$i = \frac{0.0245}{12}$$
$$n = 3(12) = 36$$

$$A = P(1+i)^n$$
$$3500 = P\left(1 + \frac{0.0245}{12}\right)^{36}$$
$$3500 = P(1.076187\ldots)$$
$$\frac{3500}{1.076187\ldots} = \frac{P(1.076187\ldots)}{1.076187\ldots}$$
$$\$3252.22 = P$$

Example 3

a. A $10 000 loan must be paid back in 5 years. It was borrowed at a rate of 3.9% compounded semi-annually. Find its value at the end of the investment.

P t $r = 0.039$ $C = 2$ $A = ?$

$$i = \frac{0.039}{2}$$
$$n = 2(5) = 10$$

$$A = P(1+i)^n$$
$$A = 10\,000\left(1 + \frac{0.039}{2}\right)^{10}$$
$$A = 12\,130.32$$

b. How much interest must be paid on the loan?

$$I = A - P$$
$$= 12130.32 - 10\,000$$
$$= \$2130.32$$