Name:	KEY

Topic: 8.1: Exponential Growth

Date: _____ Block: ____

Summary:

Exponential Growth Function

$$y = ab^x$$

$$a > 0$$
 $b > 1$

Why do I need to learn this? When is it used?

- 1. Technology -> Facebook Started Small
- 2. Financial Planning
- 3. Population Studies
- 4. Travel Times
- 5. Business / Customer Senice (Good Service Vs. Bad Service)

General equation

$$y = a(1+r)^t$$

Initial
Amount
*What did
You Start
With?

a

Rate (%)
of Increase
* written as
a decimal.
Ex. 6% = 0.06

Time *number of years

8.1

Example 1:

In 1980 about 2,180,000 U.S. workers worked at home. During the next ten years, the number of workers working at home increased 5% per year. Write a model giving the number w (in millions) or workers working at home t years after 1980.

From this formula, estimate about how many workers worked from home in 1988.

home in 1988.

$$a = 2,180,000$$
 $y = 2,180,000(1+.05)^8$
 $r = 5\% = .05$ $y = 2,180,000(1.05)^8$
 $t = 8$ years (1988-1980) $y = 3,220,852$ people Example 2:

In 1990 the cost of tuition at a state university was \$4,300. During the next 8 years, the tuition rose 4% each year. Write a model that gives the tuition y (in dollars) t years after 1990.

$$a = 4300$$

 $t = 4\% = .04$
 $t = ?$

$$y = 4300(1+.04)^{t}$$

From this formula, estimate what the tuition will be this year.

$$y = 4300 (1+.04)^{20}$$

$$y = 4300 (1.04)^{20}$$

$$y = 4300 (1.04)^{20}$$

$$t = 2010-1990$$

$$t = 209008$$

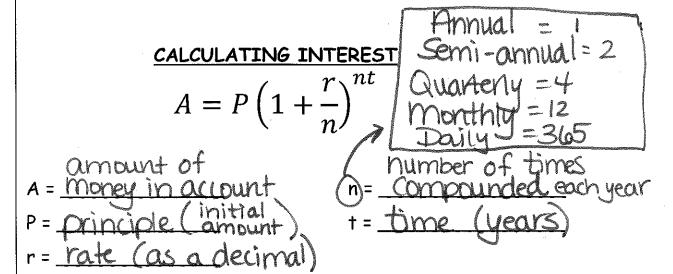
Principle: initial amount (of money)

<u>Compound Interest</u>: Interest that is paid on the <u>principle</u>
AND on <u>interest</u> (<u>previously earned</u>).

Simple Interest: Interest paid on Principle ONLY.

Important note about the %:

- Usually shown as an <u>annual</u> percen
- Interest is usually compounded more than once per year.



Example 3:

You deposit \$1,500 to an account that pays 6% annual interest. Find the balance after 1 year if the interest is compounded

	a) annually	b) semiannually	c) monthly
	P=1500	P=1500	P=1500
	r=,06	r=.06	V=.06
		t	
	n=1	N=2	n=12
	100/11/06/11	A=1500 (1+ :06)2.1	H=1500(1+106)(21)
	H=1500(1TT/	$A = 1500 (1.03)^{2}$	H= 1500(11 12)
í	A=1500 (1.06)	B = & 1 591 257	A=\$1.592.52
	A=\$ 1590	[-41,511,93]	11-411212,00

Example 4:

You deposit \$2,000 to an account that pays 8% annual interest.

a) find the balance after 2 years if the interest is compounded annually.

A=P(1+
$$\frac{r}{h}$$
)

A=2000 (1+ $\frac{.08}{1.2}$)

A=2000 (1.08)²

A=42332.80

b) Find the balance after 2 years if the interest is compounded quarterly.

$$P=2000$$
 $Y=.08$
 $t=2$
 $h=4$

P=2000

Y=.08

+=2

$$A = P(1+x)^{nt}$$
 $A = 2000 (1+x)^{8}$
 $A = 2000 (1+x)^{8}$
 $A = 2000 (1+x)^{8}$
 $A = 2000 (1+x)^{8}$
 $A = 4 2343.32$