

Advanced Math

3-1

(Day 2)

Compound Interest and Exponential Growth/Decay

Simple Interest Formula - $I = Prt$
 \hookrightarrow Principal - starting money

Compound Interest Formula - $A = P\left(1 + \frac{r}{n}\right)^{nt}$
 \rightarrow number of compounds/year

Continuously Compounded Interest Formula - $A = Pe^{rt}$

Exponential Growth/Decay - $y = ae^{kx}$ $y = ae^{bx-c} + d$
 \uparrow start amount \uparrow constant

47) Completed the table to determine the balance A for P dollars invested at rate r for t years compounded n times per year.

$P = \$2500, r = 12\%$
 $t = 10 \text{ yrs}$

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

$$A = 2500 \left(1 + \frac{.12}{n}\right)^{n \cdot 10}$$

$$2500e^{(.12 \cdot 10)}$$

$$2500e^{.12 \cdot 10}$$

n	1	2	4	12	365	Continuous
A	7764.6	8017.8	8155.1	8251	8298.7	8300.29

L1	L2	L3	L4	L5	2
1	7764.6	-----	-----	-----	
2	8017.8				
4	8155.1				
12	8251				
365	8298.7				
-----	-----				

L2(1)=7764.6205208605

$$\left)^{(L_1 + 10)}\right.$$

51) Completed the table to determine the amount of money P that should be invested at rate r to produce a final balance of \$100,000 in t years.

t	1	10	20	30	40	50
P						

$r = 12\%$, compounded continuously

$$A = Pe^{rt}$$

$$100000 = Pe^{.12t}$$

$$\frac{100000}{e^{.12t}} = P$$

L1	L2	L3	L4	L5	2
1	88692	-----	-----	-----	
10	30119				
20	9071.8				
30	2732.4				
40	822.97				
50	247.88				
-----	-----				

L2(1)=88692.043671714

59) A certain type of bacteria increases according to the model

$$P(t) = \underbrace{100}_{\text{starting amount}} e^{0.2197t}$$

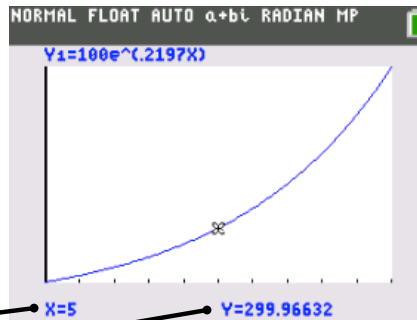
where t is the time in hours. Find $P(0)$, $P(5)$, and $P(10)$.

Using the stat editor with a formula.

L1	L2	L3	L4	L5	4
1	88692	0	100		
10	30119	5	299.97		
20	9071.8	10	899.8		
30	2732.4				
40	822.97				
50	247.88				

L4(1)=100

Or graph and trace using $[0,10]$ as the domain.



$$\begin{aligned} P(0) &= 100 \\ P(5) &= 299.97 \\ P(10) &= 899.8 \end{aligned}$$

Assignment:

pg. 307

50, 52,

53-64 all