

6.7/6.8 Notes

Simple Interest	Compound Interest	Continuously Compounded Interest
$I = Prt$	$A = P\left(1 + \frac{r}{n}\right)^{nt}$	$A = Pe^{rt}$
I=	P=	P=
r=	r=	r=
t=	n=	t=
	t=	

1. Find the amount that results from each investment after 10 years:

a. \$5,000 invested at 4.2% compounded **annually**.

b. \$5,000 invested at 4.2% compounded **monthly**.

c. \$5,000 invested at 4.2% compounded **daily**.

d. \$5,000 invested at 4.2% compounded **continuously**.

2. Find the present value needed to get \$2,000 after 4 years at 5% compounded monthly.

3. Find the present value needed to get \$2,000 after 4 years at 5% compounded continuously.

4. Austin will be buying a used car for \$12,000 in 3 years. How much money should he ask his parents for now so that, if he invests it at 4.5% compounded continuously, he will have enough to buy the car?

5. How many years will it take for an initial investment of \$20,000 to grow to \$50,000? Assume a rate of interest of 6% compounded continuously.

6. How long will it take for an investment to **double** if it earns 5% compounded continuously?

7. How long will it take for an investment to **triple** if it earns 5% compounded continuously?

Law of Uninhibited Growth	Newton's Law of Cooling	
$A(t) = A_0 e^{kt}$	$u(t) = T + (u_0 - T)e^{kt}$	
$A_0 =$	$u(t) =$	
$k =$	$T =$	$k =$
$t =$	$u_0 =$	$t =$

8. The size N of an ant population at time t (in days) obeys the function: $N(t) = 800e^{0.034t}$

- Determine the number of ants at $t = 0$.
- What is the growth rate of the ants population?
- What is the population after 15 days?
- When will the ant population reach 2,000?
- When will the ant population triple?

9. The population of Portland, Oregon follows the exponential law.

- If N is the population of the city and t is the time in years, express N as a function of t .
- From the years 2000 to 2010, the population of Portland increased from 529,000 to 584,000, respectively. Write an equation assuming uninhibited growth.
- What will the population be in 2020?

10. An object is heated to 100°C and is then allowed to cool in a room whose air temperature is 30°C .

- If the temperature of the object is 80°C after 5 minutes, write an equation using Newton's Law of Cooling.
- When will its temperature be 50°C ?