

What am I learning today?

<p><u>Real Life Applications</u></p> <p>Exponential Growth</p> <p>Exponential Decay</p>	<p>Exponential Growth Models</p> <ul style="list-style-type: none"> Fixed Interest <u>per year</u> (or <u>compounded Annually</u>): $A = P(1 + r)^t$ $(1 + r)$ = growth factor <p>Exponential Decay Models</p> <ul style="list-style-type: none"> Fixed percent of Depreciation or Decline: $A = P(1 - r)^t$ $(1 - r)$ = decay factor <p style="text-align: center;">For BOTH Growth & Decay</p> <p style="text-align: center;">P: initial amount or cost r: interest rate (change to decimal) or percent of decrease t: # of years since start</p>
<p><u>Examples</u></p>	<p>Growth:</p> <ol style="list-style-type: none"> Your teacher gives you the formula for a problem dealing with a car loan as following: $A = 12500(1.035)^t$ <ol style="list-style-type: none"> What is the beginning (initial) value of the loan? What is the interest rate for the loan? If you had the car loan for 5 years, what is the total amount that you paid for the car after this time period? You deposited \$700 now into a bank account that was giving you 3.75% interest annually. If you were not to touch it for 6 years, what would be the new balance? If you deposited \$4000 now into a bank account that was giving you 2.5% interest annually. <ol style="list-style-type: none"> If you were not to touch it for 4 years, what would be the new balance? <p>Decay:</p> <ol style="list-style-type: none"> The following function represents the depreciation of an electronic: $V = 325(0.75)^t$ <ol style="list-style-type: none"> How much did the electronic devise cost to start? What is the percent of depreciation? In 3 years, what is it worth? A population of 200 fish <u>decreases</u> at an annual rate of 15%. How many fish will there be in 3 years?

You Try

1. You invested \$1400 with compound interest rate of 2% per year for 12 years. If you were not to touch it for 15 years, what would be the new balance?

2. If you deposited \$4000 now into a bank account that was giving you 2.5% interest annually.
 - a. If you were not to touch it for 4 years, what would be the new balance?

 - b. How many years would it take you to double your money if the interest was compounded monthly? (**Hint: using logarithms here helps!**)

3. You bought a car for \$32,000 yesterday. The **depreciation** rate for a new car is approximately 20% of its value. If you plan on selling it when you graduate from college (in 8 years) what would be its value?

Compound Interest

Compounded Interest (other than annually):

Abbreviations are still mean the same...

Except “n” stands for the number of times it is compounded during the year

Annually: $n = 1$

Semiannually: $n = 2$

Quarterly: $n = 4$

Monthly: $n = 12$

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

Example

On your 10th birthday your grandparents gave you \$2000. You opened a new savings account and deposited the whole amount. The bank pays only 0.2% annual interest for the savings account in today's economy. On your 15th birthday you remembered you had the account. What would be your balance if your interest is...

a. compounded quarterly?

b. compounded monthly?