

Name:

Date:

Period:

Exponential Appreciation (Growth)

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


**p = Principal**  
(Initial Amount/y-intercept)

Exponential Depreciation (Decay)

$$y = p(1 - r)^t$$

**r = Rate**  
(% to be changed to a decimal)

**t = Time \*\***  
(Usually in years, but depends on the context of the question)

\*\*Problems compounded in amounts **other than yearly**, require an altered equation. For **compound interest**, use the equation to the right, where n is the number of times the interest is compounded within a year (ie. *Monthly = 12, weekly = 52, quarterly = 4, etc.*).   $y = P(1 + \frac{r}{n})^{nt}$

1. Identify whether it is appreciation or depreciation (tells you which formula to use).
2. List out your variables because it makes it much easier to substitute.
3. Substitute and solve.
4. Follow proper order of operations and make sure your final answer makes sense in the context of the problem.

**Example 1:** Find a bank account balance to the *nearest dollar*, if the account starts with \$100, has an annual rate of 4%, and the money is left in the account for 12 years.

	<b>Appreciation or Depreciation</b>					
y =		p =		r =		t =

**Substitute and solve:**

**Example 2:** Each year the local country club sponsors a tennis tournament. Play starts with 128 players. During each round, half the players are eliminated. How many players remain after 5 rounds?

	<b>Appreciation or Depreciation</b>					
y =		p =		r =		t =

**Substitute and solve:**

**Example 3:** If a population of a 100 grows by 6% a year, how large will the population be in 20 years?

	<b>Appreciation or Depreciation</b>					
y =		p =		r =		t =

**Substitute and solve:**

Solve the following problems. Please do all your work on a separate piece of paper.

1. In 1995, there were 85 rabbits in Central Park. The population increased by 12% each year. How many rabbits were in Central Park in 2005?
2. Mrs. Smith has a trust fund from which she withdraws 5% each year. If the fund has a value of \$50,000 this year, what will be the value of the fund after 10 years?
3. Alberto invested \$5,000 at 6% interest compounded annually. What will the value of Alberto's investment after 8 years?
4. A bank is advertising a rate of 5% interest compounded annually. If \$2,000 is invested in an account at that rate, find the amount of money in the account after ten years.
5. In 1985, there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985. How many cell phone subscribers were in Centerville in 1994?