

NOTES: Exponential Growth and Decay Functions

$$y = ab^x$$

a: initial amount

b: growth/decay

Growth Words	Decay Words
DOUBLE (2)	half ( $\frac{1}{2}$ )
TRIPLE (3)	

**Example 1:**

A population of mosquitoes doubles every day. There were originally 325 mosquitoes. Write a model for this situation. How many mosquitoes exist after 10 days?

$$y = 325(2)^x \quad || \quad y = 325(2)^{10} = 332,800 \text{ MOSQUITOES}$$

**Example 2:**

In the science lab there are 150 bacteria in petri dish. The bacteria is dying at a rate of  $\frac{1}{2}$  every hour. How many bacteria will be alive after five hours?

$$y = 150\left(\frac{1}{2}\right)^x \quad || \quad y = 150\left(\frac{1}{2}\right)^5 \approx 5 \text{ BACTERIA}$$

? ROUNDED BECAUSE YOU CAN'T HAVE A DECIMAL OF A BACTERIA

**Example 3:**

Jen told 3 friends an interesting secret about someone they all know. They each told 3 people who also told 3 people. How many people will know this secret after 5 days?

$$y = 3(3)^x \quad || \quad y = 3(3)^5 = 729 \text{ PEOPLE}$$

**Example 4:**

A contagious virus affects triple the amount of people every week. If there are five sick people in Week 1, How many weeks will it take for 1215 people to be sick?

$$y = 5(3)^x \quad || \quad \text{WEEK BACKWARDS}$$

$5(3)^1 = 15$   
 $5(3)^2 = 45$   
 $5(3)^3 = 135$   
 $5(3)^4 = 405$   
 $5(3)^5 = 1215$

5 weeks FOR 1,215 PEOPLE TO GET SICK