

## Exponential Growth/Decay

$$y = ab^x$$

$$a =$$

$$b =$$

$$x =$$

**Example** : We buy a car for \$20,000. The annual rate of decrease is about 15%.

a. Find the decay factor for the car.

b. Suppose the rate of decrease continues to be 15%. Write a function to model the value of the car.

c. Find the value of the car after ten years.

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The population of people admitting they attend science fiction conventions (like ComicCon) has grown exponentially by 40% since 2005. In 2005 there were 5,000 people who admitted attending the convention.

Write an equation to model this relationship.

How many people admitted attending in 2015?

A collection of 20 Star Wars figures were bought in 1978 for \$2.50 each. Seeing as these figures were kept in their original packaging, the value of the figures has increased by 4.5% per year since they were bought.

Write a formula to model the value of the collection.

What will the collection be worth in the year 1999?

**Example** : Tell whether each function represents exponential growth or exponential decay. Also, state the rate of growth or decay.

a.  $y = 5(3)^x$

b.  $y = 5\left(\frac{1}{3}\right)^x$

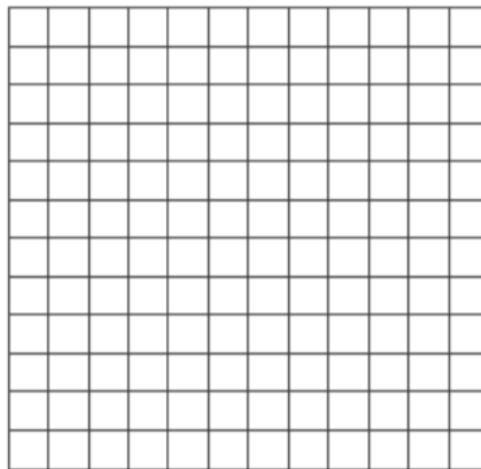
c.  $y = 6\left(\frac{5}{3}\right)^x$

d.  $y = 3\left(\frac{3}{5}\right)^x$

e.  $y = -3(1.02)^x$

**Example 4:** Graph each.

a.  $y = 3 \cdot 2^x$



The bacteria on your desk doubles every thirty minutes. Determine an equation to model this.

Then find the amount of bacterium on your counter after 8 hours, if you started with 1 bacteria.

### Half Life Formula:

Potassium has a half-life of 5 years. If you start with a 250 mg. sample, how much will you have after 12 years?

Carbon has a half-life of 3 years. How much carbon did you start with, if after 9 years you have 30 mg. left?