

1. A house that costs \$200,000 will appreciate in value by 3% each year.

Write a function that models the cost of the house over time. Use  $x$  for years, and  $y$  for the value of the house, in dollars.

$$y = 200,000 (1.03)^x$$

Find the value of the house at the end of ten years.

$$y = 200,000 (1.03)^{10}$$
$$y = \$268,783.28$$

2. The most recent virus that is making people ill is a fast multiplying one. On the first day of the illness, only 2 virus "bugs" are present. Each day after, the amount of "bugs" triples.

Write a function that models the "bug's" growth over time. Use  $x$  for days, and  $y$  for the amount of "bugs".

$$y = 2(3)^x$$

Find the amount of "bugs" present by the 5<sup>th</sup> day.

$$y = 2(3)^5$$
$$y = 486 \text{ "bugs"}$$

3. Tobias ate half a banana in his room and forgot to throw the rest away. That night, two gnats came to visit the banana. Each night after, there were four times as many gnats hanging around the banana.

Write a function that models the gnats' growth over time. Use  $x$  for nights, and  $y$  for the number of gnats.

$$y = 2(4)^x$$

Tobias' mom said that he will be grounded if the gnats number more than 120. On what night will Tobias be in trouble, if he doesn't step in and solve his gnat problem?

x	y
1	8
2	32
3	128
4	-

Tobias will be in trouble on the 3rd night.

4. You have a bad cough and have to attend your little sister's choir concert. You take cough drops that contain 100 mg of menthol in each drop. Every minute, the amount of menthol in your body is cut in half.

Write a function that models the amount of menthol in your body over time. Use  $x$  for minutes and  $y$  for the amount of menthol, in mg, remaining in your body

$$y = 100(.5)^x$$

It is safe to take a new cough drop after the level of menthol in your body is less than 5 mg. How long will it be before you can take another cough drop?

5 hours.

x	y
1	50
2	25
3	12.5
4	6.25
5	3.125

6. JaCorren is 60 inches and going through a growth spurt. For the next year, his growth will increase by 1% each month.

Write a function that models JaCorren's growth spurt over the next year. Use  $x$  for months and  $y$  for the height of JaCorren, in inches.

$$y = 60(1.01)^x$$

Find JaCorren's height at the end of the year.

$$y = 60(1.01)^{12}$$

$$y = 67.61 \text{ inches}$$

7. Ian's new Mercedes cost him \$75,000. From the moment he drives it off the lot, it will depreciate by 20% each year for the first five years.

Write a function that models the car's depreciation. Use  $x$  for years and  $y$  for the car's value, in dollars.

$$y = 75,000(.80)^x$$

What will the car's value be at the end of five years?

$$y = 75,000(.80)^5$$

$$y = \$24,576.00$$