

Exponential Growth and Decay



There are four people in our school that have been infected by a disease that turns them into zombies. Every day, the amount of people infected in our class increases at a rate of 50%. Create a table to record the results of the number of zombies in our school.

Day	Number of People Infected
0	4
1	6
2	9
3	13.5
4	20.25
5	30.375
6	45.56
7	68.34
8	102.515625
9	153.77

Answer the following questions:

- 1) How many times did you multiply by 50% (.50)? **10 times**
- 2) How many times would you have multiplied if you wanted to know how many zombies there would be in 20 days?
20 times

Exponential Growth Model:

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

Principle = **C (start)** Interest = **r (percent)** Time Interval = **t (time)**

↓
Convert to a decimal

- 3) Use the model to predict how many zombies there would be in 30 days?

$$y = 4(1+.5)^t$$

$$4(1.5)^t$$

$$4(1.5)^{30}$$

767.004

TRY IT WITH YOUR PARTNERS!

- 4) Lori ate half a banana in her room and forgot to throw the rest away. During the night, two fruit flies came and hung out on and around the banana. Each night after, there were about 60% more fruit flies hanging around the banana.

a) Write an equation to model the situation.

$$y = 2(1 + .60)^t$$

b) How many fruit flies will there be after six nights?

$$y = 2(1.60)^6$$

$$y = 33.55$$

c) Lori's mom said she would be grounded for the weekend if the number of fruit flies reached more than 170 (yes, she'd count them all...). After how many nights does Lori have to get the problem under control?

over 9 days



BRING IT BACK AS A CLASS...

You buy a new car for \$20,000. Sadly, you know your car will depreciate at a rate of 12% each year. You would like to know how much your car will be worth after 5 years.

Exponential Decay Model

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

Principle = C

Interest = r

Time Interval = t

Show your work here:

$$y = 20,000(1 - .12)^5$$

$$\$ 10,554.64$$

- 5) You work at Hinsdale Video. With the rise of Netflix and Hulu, DVD sales are decreasing at a rate of 13% each year. This year the video store sold 502,211 DVDs.

a. Write an equation to model the situation.

$$y = 502,211(1 - .13)^t$$

b. How many DVDs will be sold in 7 years?

$$y = 502,211(.87)^7$$
$$189,461.5$$