

Sample essay on exponential growth

[Sociology](#), [Population](#)



We consider some fictional data – the initial population of germs in the bottle of water (1500000 units).

1. Calculate what the future size of the population will be, given a specific initial population, rate of growth, and time interval.

Use the exponential equation: Future value = Present value * exp(rt)

◦ exp is the base " e"

◦ r = annual rate of growth expressed as a percent

◦ t = years

For t= 10 and rate 1 we have:

$$FV= PV*\exp(rt)= 1500000*e^{0.01*10} \approx 1657756$$

2. Repeat the calculation for at least two other values of t; make sure they are at least two years apart from one another. Use the same values you input into the spreadsheet and compare the answers you obtain to those that appear in the spreadsheet.

For t= 20 and Rate 1 we have:

$$FV= PV*\exp(rt)= 1500000*e^{0.01*20} \approx 1832104$$

For t= 30 and Rate 1 we have:

$$FV= PV*\exp(rt)= 1500000*e^{0.01*30} \approx 2024788$$

The results are exactly the same like in Excel spreadsheet.

3. Repeat the calculations using two more selections of population growth rate; ensure that each population growth rate is at least two percent different than the others. Use the same values you input into the spreadsheet and compare the answers you obtain to those that appear in the spreadsheet.

For t= 10 and rate 2 we have:

$$FV = PV \cdot e^{rt} = 1500000 \cdot e^{0.03 \cdot 10} \approx 2024788$$

For $t = 10$ and rate 3 we have:

$$FV = PV \cdot e^{rt} = 1500000 \cdot e^{0.05 \cdot 10} \approx 2473081$$

4. Examine the graph that your spreadsheet produced based upon the calculations. Did this graph consist of straight lines or curved lines? Describe the shape of these lines for each growth rate. How did they differ? Why?

This graph consists of curved lines. The most significant growth is for the biggest rate of change (rate 3). This line has the largest curvature in comparison with other.

5. Explain the implications of growth rate for your population. What do you think will happen over a long period of time if a given population of organisms is allowed to increase without limits? Are there environmental factors that keep populations from growing exponentially unchecked? What would be the impact on environmental resources?

Of course, some factors may have a significant impact on population growth – for example temperature, the amount of water in the bottle, etc. This population will not increase without limits.

6. Explain the likelihood of your results. Would it be expected that the percent growth rate would stay constant over long periods? Is exponential growth an appropriate assumption for long periods? If not, what other changes in population size might be expected?

The exponential growth is one of the most significant growths in mathematics. 1500000 germs is a very little amount as for initial population for a bottle of water, that's why we can expect that the percent growth rate would stay constant over long periods.