

Lecture Slides: Exponential Growth and Decay

Ben Logsdon
Math 3, Fall 2024

October 14, 2024

math.dartmouth.edu/~blogsdon/slides_2024-10-14.pdf

For each of the following situations, write down the exponential growth or decay formula and find the relative growth rate. Find the indicated value.

The world population was 2.56 billion in 1950 and 7.84 billion in 2000. Assuming exponential growth, predict the world population in 2050.

math.dartmouth.edu/~blogsdon/slides_2024-10-14.pdf

For each of the following situations, write down the exponential growth or decay formula and find the relative growth rate. Find the indicated value.

Suppose that the half-life of caffeine in a person's body is 6 hours. A person drinks a cup of coffee with 120 mg of caffeine at 8 AM. How much caffeine will remain in their body at 8 PM?

math.dartmouth.edu/~blogsdon/slides_2024-10-14.pdf

For each of the following situations, write down the exponential growth or decay formula and find the relative growth rate. Find the indicated value.

A savings account offers 4% interest compounded quarterly (i.e. every three months). If someone deposits \$100, how much will they have in the account after 3 years?

math.dartmouth.edu/~blogsdon/slides_2024-10-14.pdf

For each of the following situations, write down the exponential growth or decay formula and find the relative growth rate. Find the indicated value.

After baking cookies at 250 degrees Fahrenheit, you set them out on the kitchen table. After 10 minutes, they are 150 degrees Fahrenheit. The temperature of the room is 70 degrees. What will the temperature be once they have been sitting out for 30 minutes? (Note: Newton's Law of Cooling says that $\frac{dT}{dt} = k(T - T_0)$, where T_0 is the ambient temperature.)