

Exponential Growth

Example 1: Given that $\frac{dy}{dt} = 3y$ and $y(0) = 90$, find $y(t)$.

Exponential Growth Model

If $\frac{dy}{dt} = ky$, then $y = Ce^{kt}$, where C is the *initial amount* (when $t = 0$) and k is the *growth rate* (*proportionality constant*).

Example 2: The rate of change of the population of a town is $\frac{dP}{dt} = kP$, where P is the population after t years and k is the growth rate. If $P = 4000$ when $t = 3$ and $P = 5000$ when $t = 4$, what is the population when $t = 8$?

DIY

1. I deposited \$1000 in a savings account in which interest is compounded continuously. It takes 20 years for my deposit to double.

(a) What is the annual interest rate?

(b) How much money is in the account after 10 years?