

Law of Exponential Growth & Decay

$\frac{dy}{dt} = ky$
 rate of change of y with respect to time t directly proportional to y (* k is a constant)
 *solve the DE with separation of variables

$$\nearrow \frac{dy}{dt} = ky \nwarrow$$

directly proportional to y (* k is a constant)

This does not need to be repeated every time. We have proven a general formula to deal with growth & decay questions which match the given parameters (the rate of change of y with respect to time t is directly proportional to y).

* k = constant of growth/decay: $k > 0$ - growth
 $k < 0$ - decay

*use given conditions to determine C & k :

ex. The rate of decay of plutonium is proportional to the amount present at time t . If it has a half-life of 24,360 years, how long will it take for 10 g to decay to 1 g?

ex. The rate of growth of a population of fruit flies is directly proportional to the population at time t . There were 100 flies after 2 days and 300 after 4 days. How many flies in the original population?



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