Tue 7 May 2019

Example (page 427)

The #cells grows a a RATE of 25% per day

5000 yeast cells

The function that models the growth

$$N(d) = N_0(1+r)^d$$

$$N(0) = N_0 = 5000$$

$N \equiv$ current # of yeast cells

$d \equiv$ # days passed

$r \equiv$ rate of growth

$N_0 \equiv$ initial amount

a) plot in Geogebra

b) How many cells after a week?

$$N(7) = 5000\ \underbrace{(1.25)}_{n}{}^{7} = 5000\left(\frac{5}{4}\right)^{7} \simeq \underline{\underline{23.841}}$$

$$1.25 = 4.76$$

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A cup of coffee cools down following the equation

$$T(t) = 68\left(\frac{1}{2}\right)^{\frac{t}{22}} + 18$$

$T \equiv$ temperature °C

$t \equiv$ time (minutes)

a) Is this exponential func? Why? Yes, cause t shows up in the exponent

b) What t makes the exponent = 1? $t = 22$

c) What is initial temperature? $T(0) = 68 \cdot 1 + 18 = 86\,^{\circ}C$

d) $T(t=22) = 68 \cdot \frac{1}{2} + 18 = 34 + 18 = \underline{52°C}$

e) What does $t=22$ represent? Plot in geogebra first.
Then locate the point $T(22)$.

$t=22$ is analogous to the half-life
that we saw for carbon-14 decay

$T(22)$ is Midpoint between $T(0)$ & asymtote
86 ($y=18$)

Problem 12 : Population in 2000 13700. Each year it decreases by 5%

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a) Write function

$$P(yr) = 13700\left(1 - 0.05\right)^{yr}$$