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Matt: 18/ENG04/044

Dept: Electrical

$$y = \text{final}$$

$$y_0 = \text{final}$$

$$\text{Formula} = y - y_0 e^{-kt}$$

$$y/y_0 = e^{kt} = 3 \text{ at } t=9$$

$$y = 3 \times y_0$$

$$y/y_0 = e^{kt} = 9 \text{ at } t=18$$

$$y_0 = 50 \quad (1) \quad \therefore y = 50e^{kt}$$

$$y_0 = 150 \quad (2) \quad y = 150e^{kt}$$

$$e^{kt} = \text{exponential} \quad [\text{Konstant} \times t]$$

$$\text{at } e^{kt} = 3$$

$$\ln 3 = kt$$

$$\ln 3 = 9k$$

$$k = \frac{\ln 3}{9} = 0.1221$$

$$e^{kt} = 9$$

$$k = \frac{\ln 9}{9} = 0.1221$$

$$e^{kt} = 9$$

$$\ln 9 = 18k$$

$$k = \frac{\ln 9}{18} = 0.1221$$

18

$$y = 50e^{0.1221t}$$

$$y = 50e^{0.1221t}$$

For Case A -

$$y(t) = 50e^{0.122t}$$

for Case B.

$$g = g_0 e^{kt}$$

The initial number at $t=0$ is 150

$$= 150 = g_0 e^{k(0)}$$

$$150 = g_0$$

$$\therefore g_0 = 150$$

The number of bacteria at $t=9$ hrs

$$\text{is } 150 \times 3 = 450$$

$$450 = 150 e^{k(9)}$$

$$e^{9k} = 450/150$$

$$e^{9k} = 3$$

$$9k = \ln 3$$

$$9k = 1.0986$$

$$9k = \frac{1.0986}{9}$$

$$k = 0.122$$

$$\therefore g = 150e^{0.122t}$$

for Case B -

$$j(t) = 150e^{0.122t}$$

t = 0..15

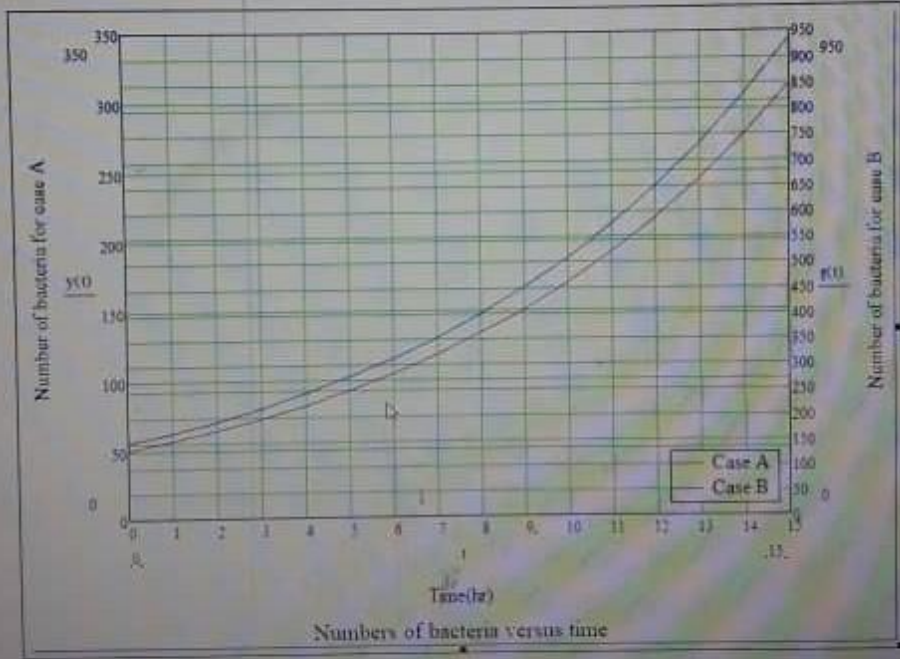
$$y(t) = 50 \cdot e^{0.122(t)}$$

$$g(t) = 150 \cdot e^{0.122(t)}$$

t =
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

y(t) =
50
56.488
63.817
72.098
81.453
92.022
103.962
117.451
132.691
149.908
169.359
191.324
216.161
244.209
275.896
311.694

g(t) =
150
169.463
191.452
216.293
244.358
276.065
311.885
352.354
398.073
449.725
508.078
574.003
648.483
732.626
827.687
935.083



Calculator

sin cos tan ln log
 n! | | | | | |
 e^x $e^{\frac{1}{x}}$ () x^2 $x^{\frac{1}{x}}$
 π 7 8 9 /
 $\frac{1}{x}$ 4 5 6 *
 - 1 2 3 +
 = . 0 - =

Evalua.

= > =
 - < < < f x
 * f * f y * f y

Matrx

$\begin{bmatrix} x & y \\ z & w \end{bmatrix}$
 $\begin{bmatrix} x & y \\ z & w \end{bmatrix}^T$
 $\begin{bmatrix} x & y \\ z & w \end{bmatrix}^{-1}$

Graph

$\frac{d}{dx}$ $\frac{d}{dy}$ $\frac{d}{dz}$
 $\frac{d^2}{dx^2}$ $\frac{d^2}{dy^2}$ $\frac{d^2}{dz^2}$
 $\frac{d^3}{dx^3}$ $\frac{d^3}{dy^3}$ $\frac{d^3}{dz^3}$