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18/ENG04/069
ELCE ELEC

-ASSIGNMENT

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

$$\frac{dy}{y} = k\,dt$$

$$\int \frac{dy}{y} = \int k\,dt$$

$$\ln y = kt + c$$

$$y = e^{kt+c}$$

$$y = e^{kt} \times e^{c}$$

$$y_0 = e^{c}$$

$$\therefore y = y_0 e^{kt}$$ For case A

The initial number of bacteria at $t = 0$ is 50

$$\therefore 50 = y_0 e^{k(0)}$$

$$50 = y_0 \cdot 1$$

$$\therefore y_0 = 50$$

$$\therefore y = 50e^{kt}$$

The number of bacteria at $t = 9$hrs is $50 \times 3 = 150$

$$\therefore y = 50\, e^{k(9)}$$

$$150 = 50\, e^{9k}$$

$$e^{9k} = \frac{150}{50}$$

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

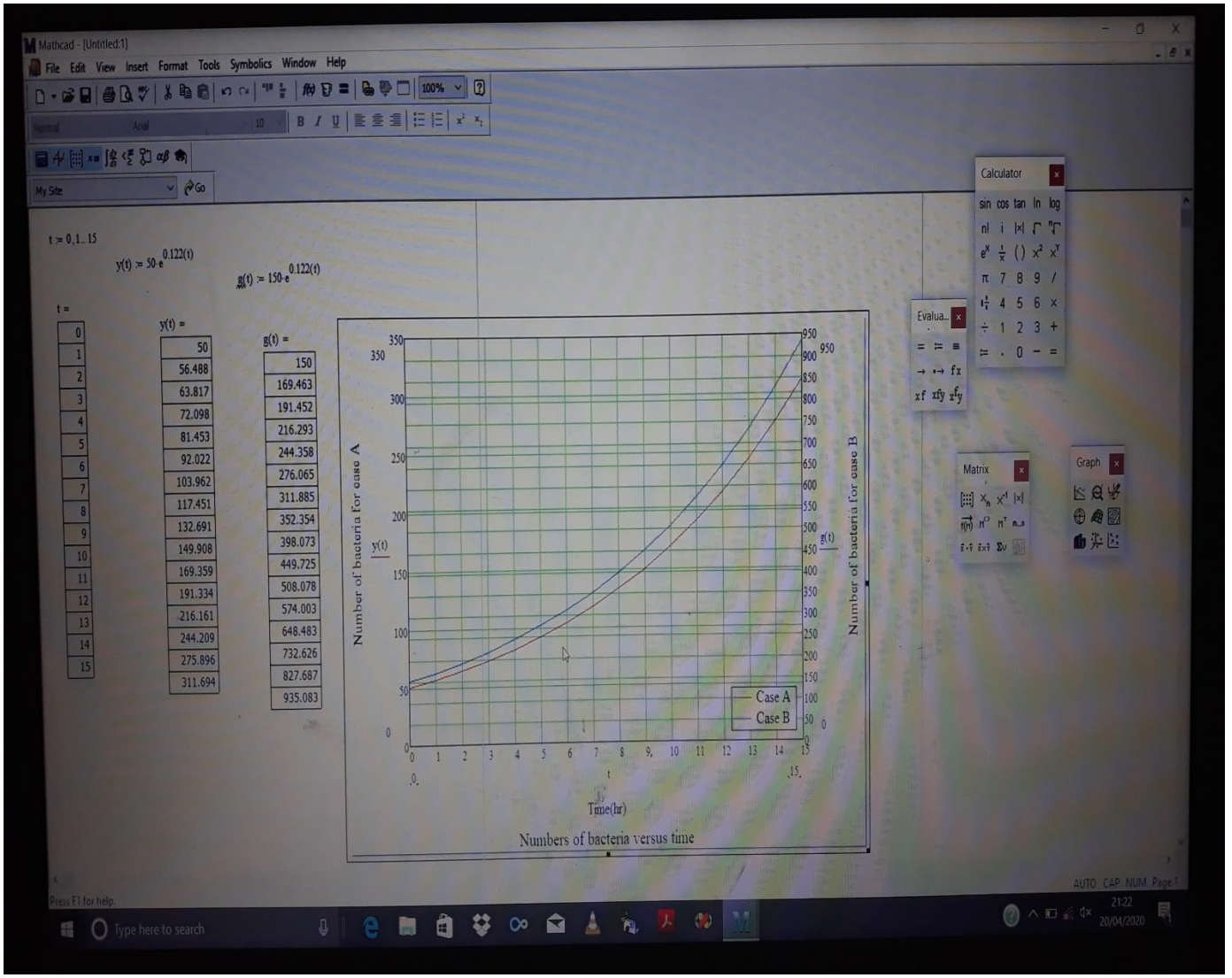
$$9k = \ln 3$$

$$9k = 1.0986$$

$$k = \frac{1.0986}{9} = 0.122$$

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

$$y_t = 50\, e^{0.122(t)}$$


Mathcad - [Untitled:1]
File Edit View Insert Format Tools Symbolics Window Help
t := 0,1.. 15
y(t) := 50·e^0.122(t)
g(t) := 150·e^0.122(t)
t =
y(t) =
g(t) =
Number of bacteria for case A
Number of bacteria for case B
Case A
Case B
Time(hr)
Numbers of bacteria versus time
Calculator
Evalua...
Matrix
Graph
Press F1 for help.
Type here to search
AUTO CAP NUM Page 1
21:22
20/04/2020