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QUIZ

1) Original reading of thermometer (T_0) = 10°c
time ⇒ t

$$\frac{dT}{dt} = K(T + T_0)$$

$$\frac{dT}{dt} = K(T + 10)$$

$$\frac{dT}{T+10} = K\,dt$$

$$\int \frac{dT}{T+10} = \int K\,dt$$

$$\ln(T+10) = Kt + C$$

$$T + 10 = e^{Kt} \times e^{C}$$

$$T + 10 = Ae^{Kt}$$

Where $A = e^{C}$

$$T = Ae^{Kt} - 10$$

at $t = 0$, $T = 0°c$

$$0 = Ae^{K\times 0} - 10$$

$$0 = A - 10$$

$$A = 10$$

$$\therefore T = 10e^{Kt} - 10$$

at $t = 5$ mins, $T = 20°c$

$$20 = 10e^{Kt} - 10$$

$$30 = 10e^{Kt}$$

$$3 = e^{K\times 5}$$

$$\ln 3 = 5 \times K$$

$$K = \frac{\ln 3}{5}$$

$$\therefore T = 10e^{\frac{\ln 3}{5}t} - 10$$

At $T = 24.9°c$,

$$24.9 = 10e^{\frac{\ln 3}{5}t} - 10$$

$$34.9 = ke^{\frac{\ln 3}{5}t}$$

$$\ln\left(\frac{34.9}{10}\right) = \frac{\ln 3}{5}t$$

$$t = \frac{\ln\left(\frac{34.9}{10}\right)}{\left(\frac{\ln 3}{5}\right)}$$

$$t = 5.6885 \text{ mins}$$

$$t \approx 5.69 \text{ mins} //$$

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$$f(t) := 10.e^{\frac{\ln(3)}{5}\cdot t} - 10$$

$t := 5.6885$

$f(t) = 24.9$

$t := 0, 1 .. 10$

t =	f(t) =
0	0
1	2.457
2	5.518
3	9.332
4	14.082
5	20
6	27.372
7	36.555
8	47.995
9	62.247
10	80

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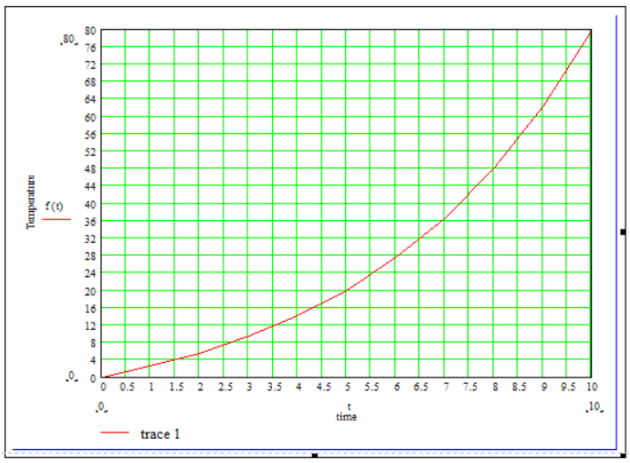

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```
1 -  commandwindow
2 -  clear
3 -  clc
4 -  close all
5 -  format short g
6 -  Mdata=xlsread('onlinequizdata.xlsx','fluiddata')
7 -  time = Mdata(1:2:250,1)
8 -  Volume = Mdata(1:2:250,2)
9 -  plot(time,Volume,'red')
10 -  grid on
11 -  grid minor
```

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Figure 1

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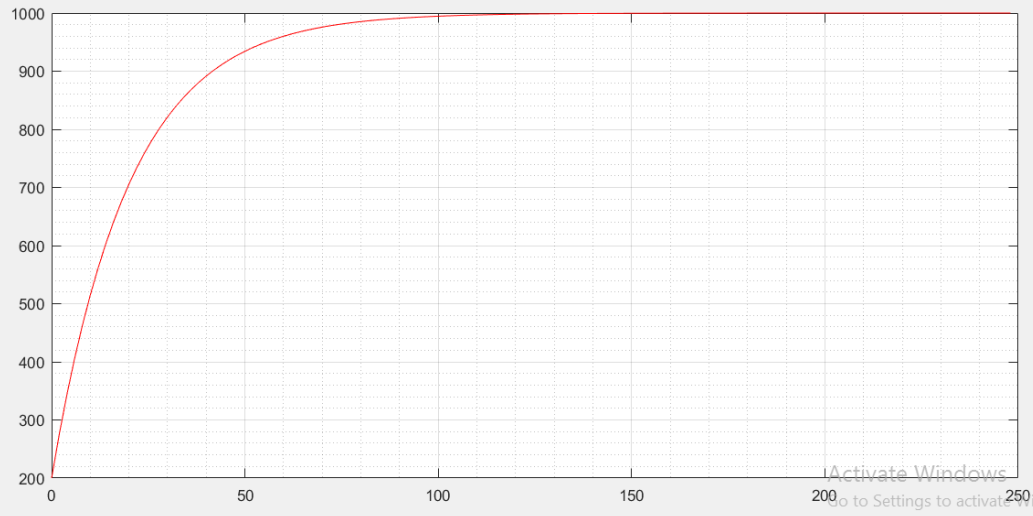

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