

$$\frac{dT}{dt} = k(T-25)$$

$$\frac{dT}{T-25} = k dt$$

$$\ln(T-25) = kt + C$$

$$e^{\ln(T-25)} = e^{(kt+C)}$$

$$T-25 = e^{kt} T_0$$

$$T = T_0 e^{kt} + 25$$

$$t(0) = 10^\circ\text{C}$$

$$10 = T_0 e^{k(0)} + 25$$

$$10 = T_0 + 25$$

$$T_0 = 10 - 15 = -5$$

$$\therefore T = -15e^{kt} + 25$$

to find  $k$

$$t(5) = 20^\circ\text{C}$$

$$20 = -15e^{k(5)} + 25$$

$$-15 = -15e^{5k}$$

$$1 = e^{5k}$$

$$k = e^{5k}$$

$$\ln\left(\frac{1}{2}\right) = 5k$$

$$k = \frac{\ln\left(\frac{1}{2}\right)}{5}$$

$$k = -0.219$$

$$T = -15e^{-0.219t} + 25$$

$$\text{For } T = 24.9^\circ\text{C}$$

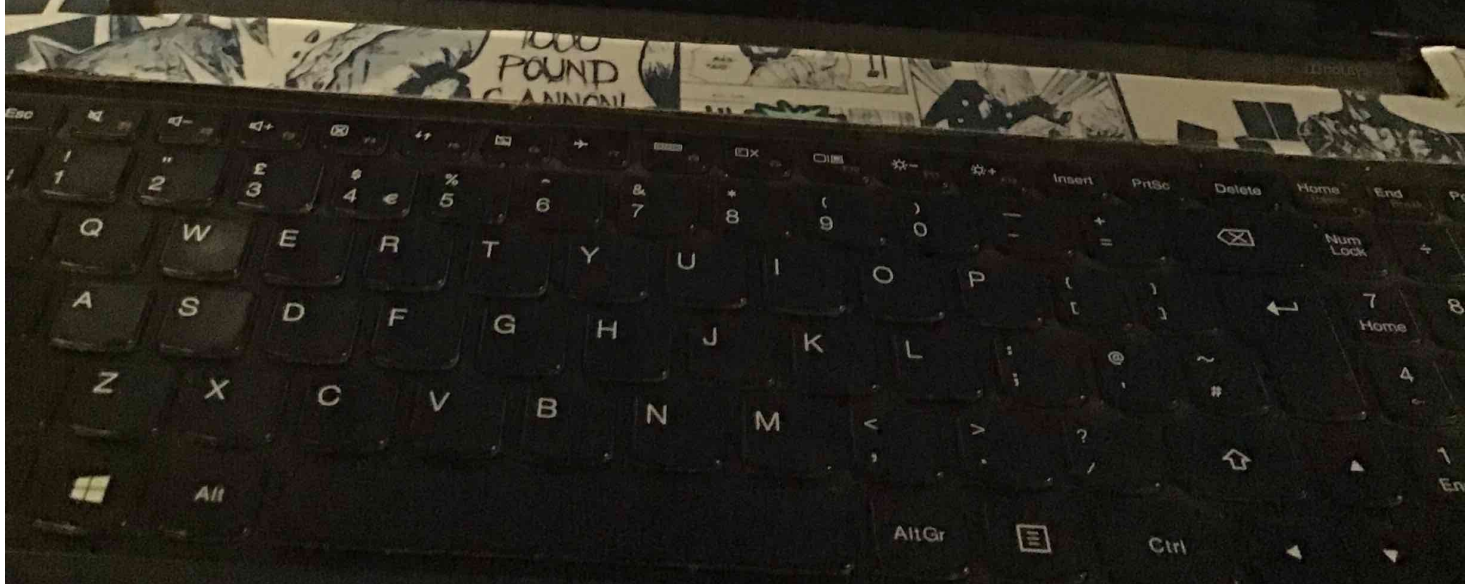
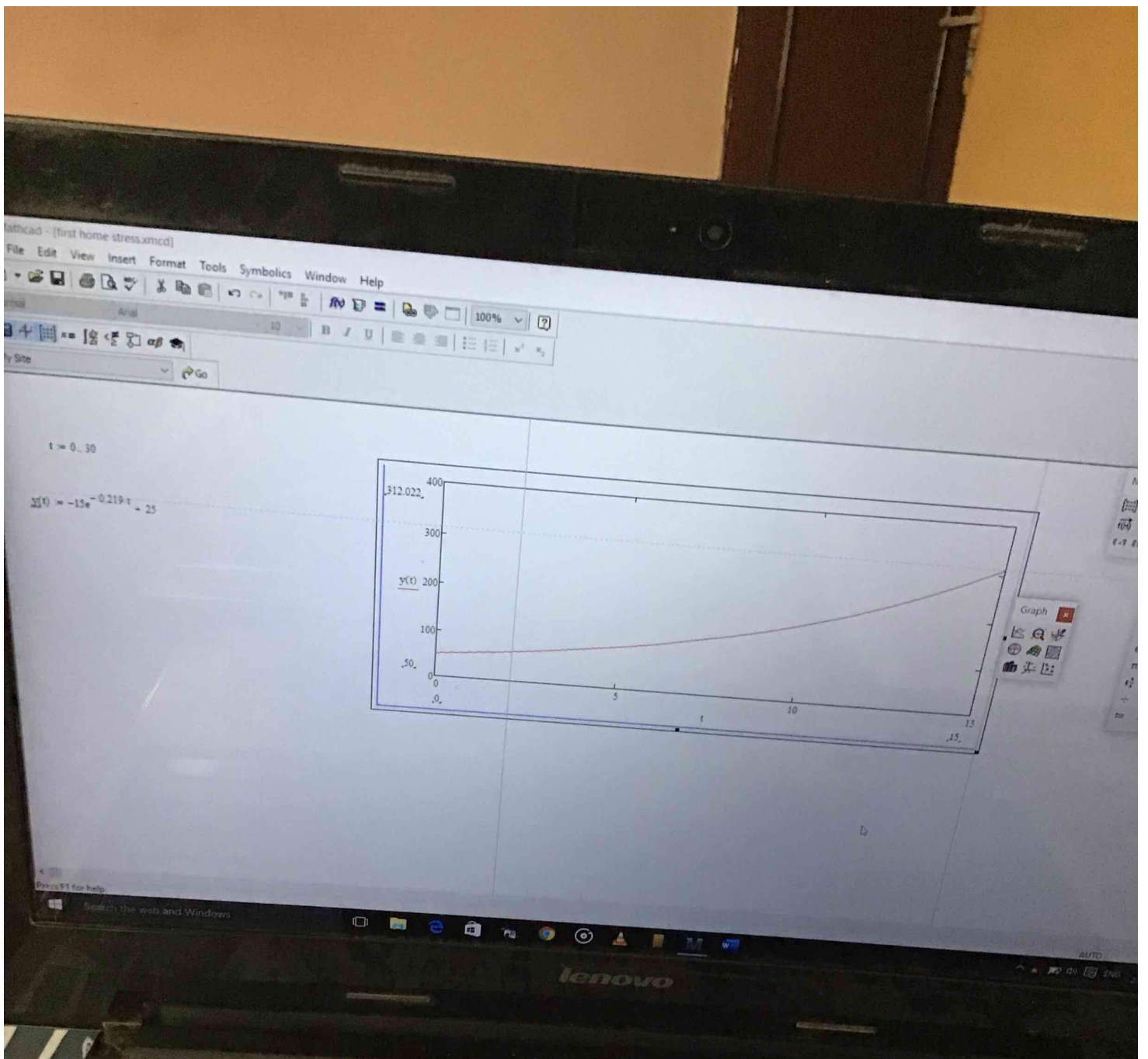
$$24.9 = -15e^{-0.219t} + 25$$

$$-0.1 = -15e^{-0.219t}$$

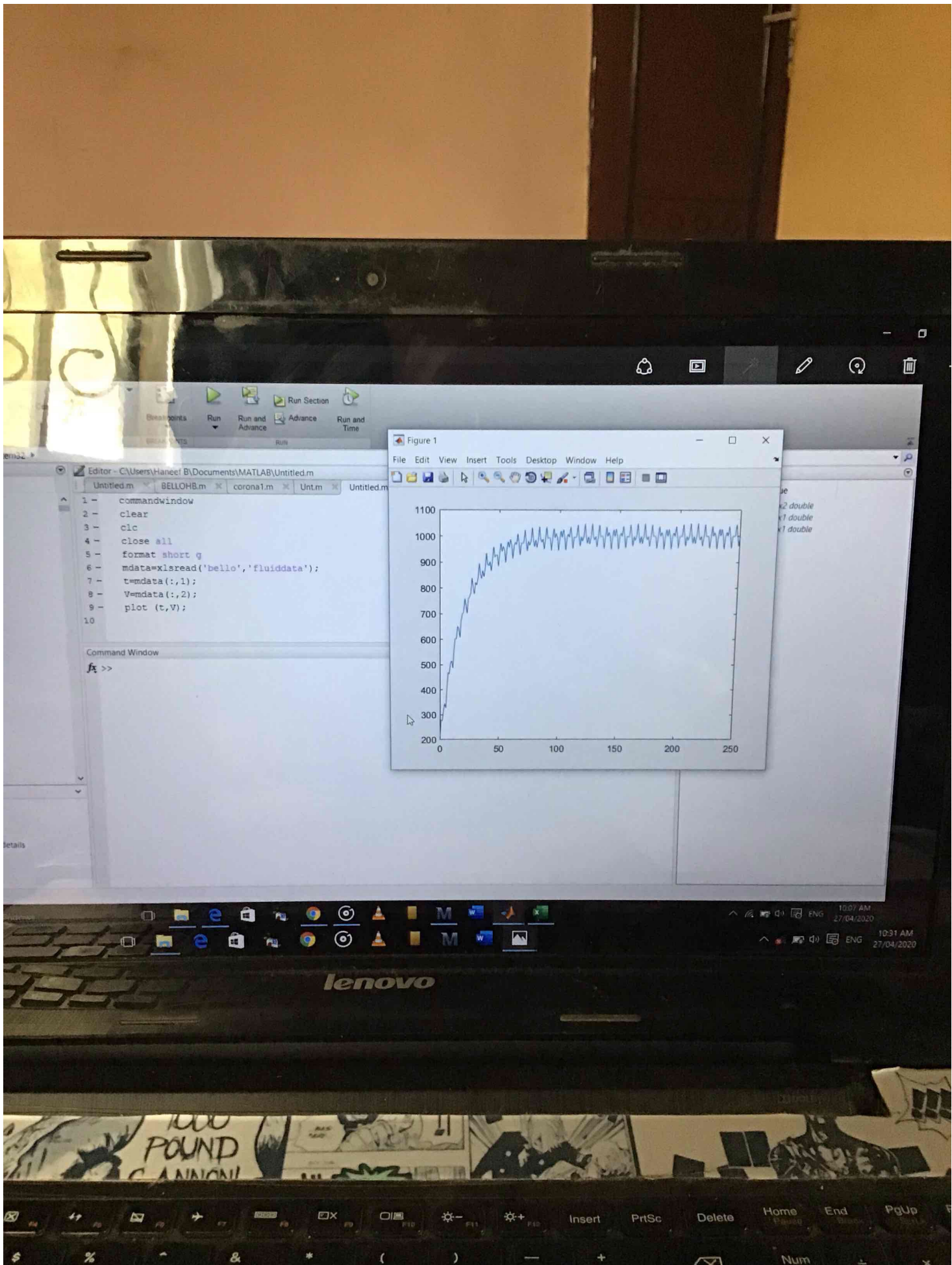
$$\frac{1}{150} = e^{-0.219t}$$

$$\ln\left(\frac{1}{150}\right) = -0.219t$$

$$\therefore t = 22.87 \text{ mins}$$

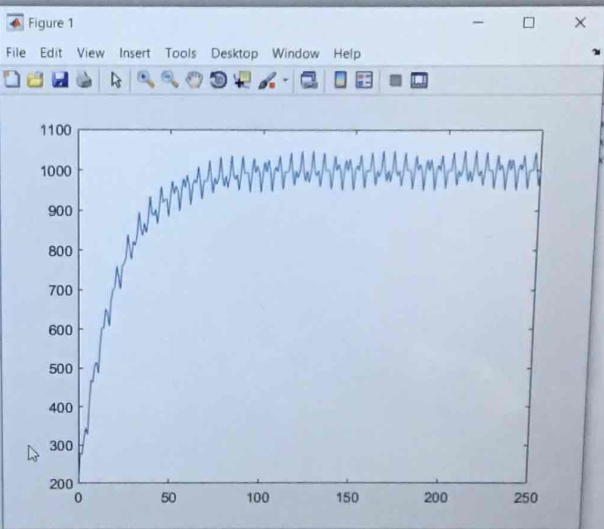






```
1 - commandwindow
2 - clear
3 - clc
4 - close all
5 - format short g
6 - mdata=xlsread('bello','fluiddata');
7 - t=mdata(:,1);
8 - V=mdata(:,2);
9 - plot(t,V);
10
```

Command Window  
fx >>



2 double  
1 double  
1 double

lenovo

10:07 AM 27/04/2020  
10:31 AM 27/04/2020

1000 POUND CANNON!