

July 2013
2013
Booleum

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

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

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

$$T-25 = e^{kt+C}$$

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

when $t=0$

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

$$10 = T_0 \times 1 + 25$$

$$T_0 = 10 - 25 = -15$$

hence

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

for 5m

$$T = 20, \quad k = 1$$

$$20 = -15e^{k \cdot 5} + 25$$

$$20 - 25 = -15e^{k \cdot 5}$$

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

$$0.33 = e^{k \cdot 5}$$

$$\ln 0.33 = e^{5k}$$

$$k = -0.219$$

hence

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

$$T = 24.9$$

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

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

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

$$e^{-0.219t} = 0.00667$$

$$-0.219t = -5.01$$

$$t = 22.87$$

```
commandwindow
- clear
- clc
- close all
- format short g
- mdata=xlsread('onlinequizdata','fluiddata')
- x=mdata(1:2:250,1)
- y=mdata(1:2:250,2)
- plot(x,y)
- grid on
- grid minor
```

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Command Window

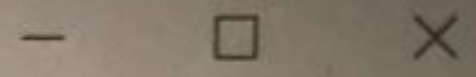
86
88
90
92
94
96
98
100
102

script

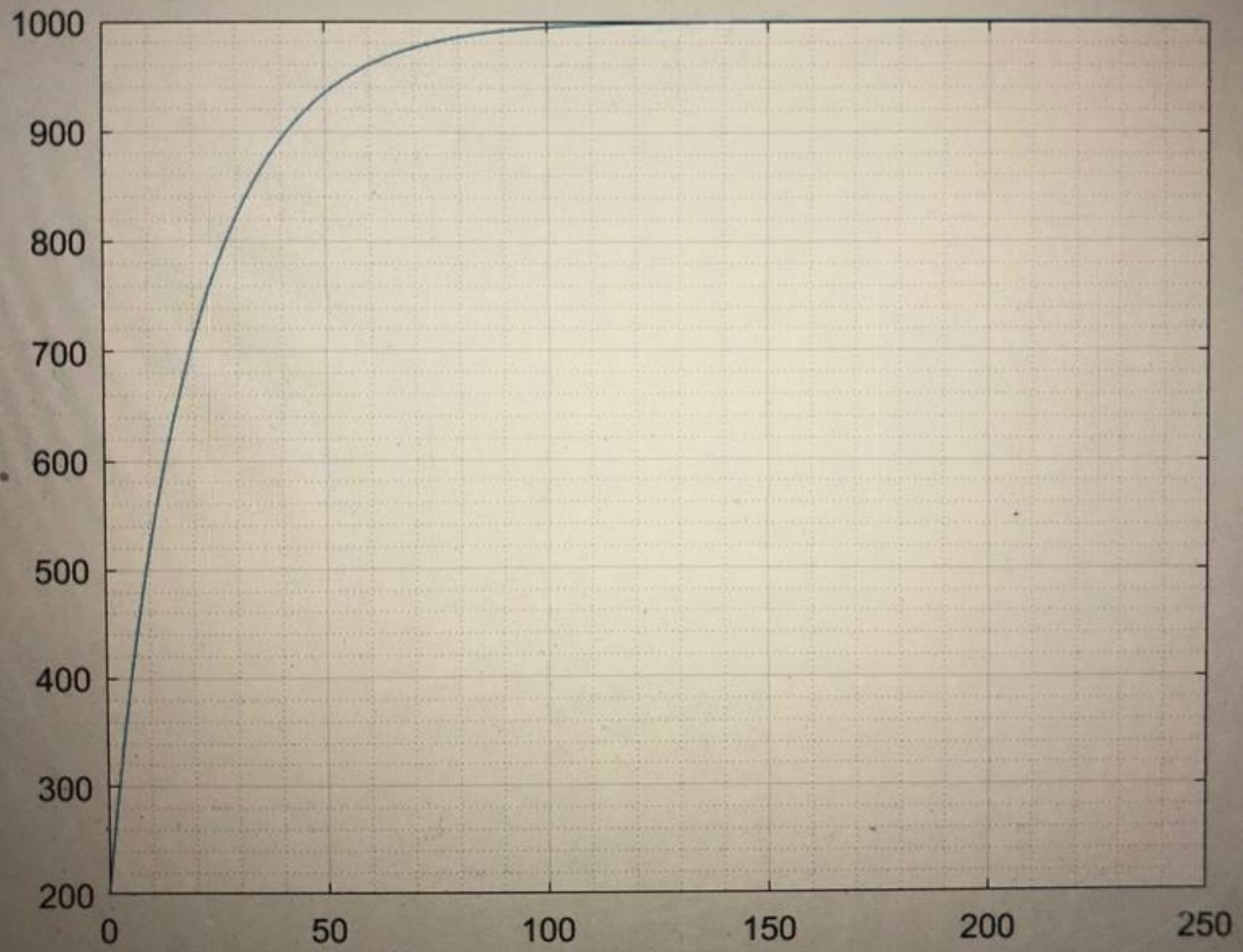
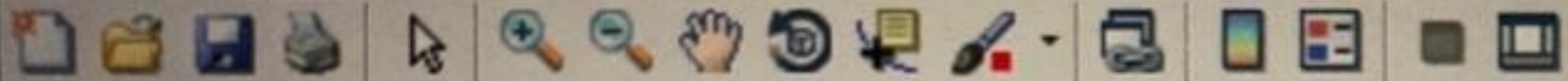
Ln 11 Col 11

EDITOR

Figure 1



File Edit View Insert Tools Desktop Window Help



ts ▶ MATI

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