NAME: SULE MUBARAK ADEDEJI
MAT. NO. : 18/ENG03/055
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QUIZ 1

QUESTION 1

1.) $\theta_1 = 10^\circ C$

$\theta_2 = 20^\circ C$ after 5 seconds $T_1 = 5$ seconds

θ_s, Temperature of the system $= 25^\circ C$

Time it takes for the thermometer to reach $24.9^\circ C$

"T_F" "T_0"

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

$\frac{dT}{T-25} = Kdt$

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

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

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

$T - 25 = e^{Kt} e^{C}$

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

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

At the initial time "0"

$10 = T_0 e^{0} + 25$

$T_0 = 10 - 25 = -15^\circ$

hence

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

At 5 minutes

$T = 20$, $K = ?$

$20 = -15e^{kt} + 25$

$20 - 25 = -15e^{kt}$

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

$0.33 = e^{5k}$

$-1.108 = e^{5k}$

$K = -0.219$

hence

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

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

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

$6.67 \times 10^{-3} = e^{-0.219t}$

$\ln(6.67 \times 10^{-3}) = -0.219t$

$-5.0101 = -0.219t$

$t = 22.9$

∴ It takes 22.9 minutes

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Editor - C:\Users\Sule Mubarak\Documents\MATLAB\Mathquiz.m

Mathquiz.m

```
commandwindow
clear
clc
close all
t = "time"
mdata = xlsread('onlinequizdata','fluiddata')
t = mdata(1:2:end,1)
plot (t)
```

Command Window

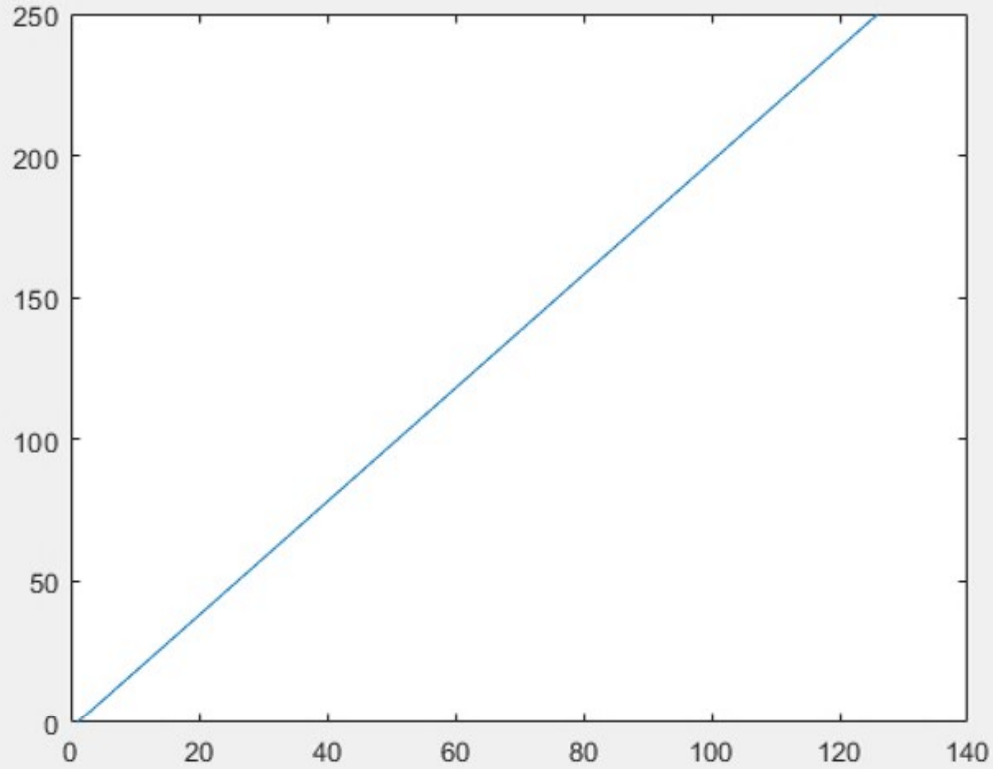
w to MATLAB? See resources for Getting Started.

```
240
242
244
246
248
250

>>
```

Figure 1

File Edit View Insert Tools Desktop Window Help



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