

Thanks for coming

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Computer Edg

Question 1

$$T_1 = 10^\circ\text{C} \quad T_2 = 20^\circ\text{C} \quad \text{@ } 5\text{mins}$$

$$T_{\text{air}} = -25^\circ\text{C}$$

$$\Delta T / \Delta t \propto (T - T_a)$$

$$\Delta T / \Delta t = k (T - T_a)$$

$$\Delta T / \Delta t = k (T - 25)$$

Collecting like terms

$$\frac{\Delta T}{(T - 25)} = k \Delta t$$

Integrating both sides

$$\ln(T - 25) = t k / C$$

$$\therefore T - 25 = e^{t k / C}$$

$$T - 25 = e^{t k / C}$$

$$T - 25 = A e^{t k / C}$$

$$T = A e^{t k / C} + 25$$

at Initial Conditions



$$10 = 10e^0 - 25$$

$$11 = 35$$

$$\therefore T = 35e^{kt} - 25$$

$$\text{at } T = 20^\circ\text{C} (= 50^\circ\text{F})$$

$$20 = 35e^{5k} - 25$$

$$45 = 35e^{5k}$$

$$e^{5k} = 45/35$$

$$5k = \ln(45/35)$$

$$k = \frac{0.251}{5} \quad k = 0.0511$$

$$T = 35e^{0.051t} - 25.11$$

$$T = 20 \text{ at } t = ?$$

$$20 - 9 = 35e^{0.051t} - 25$$

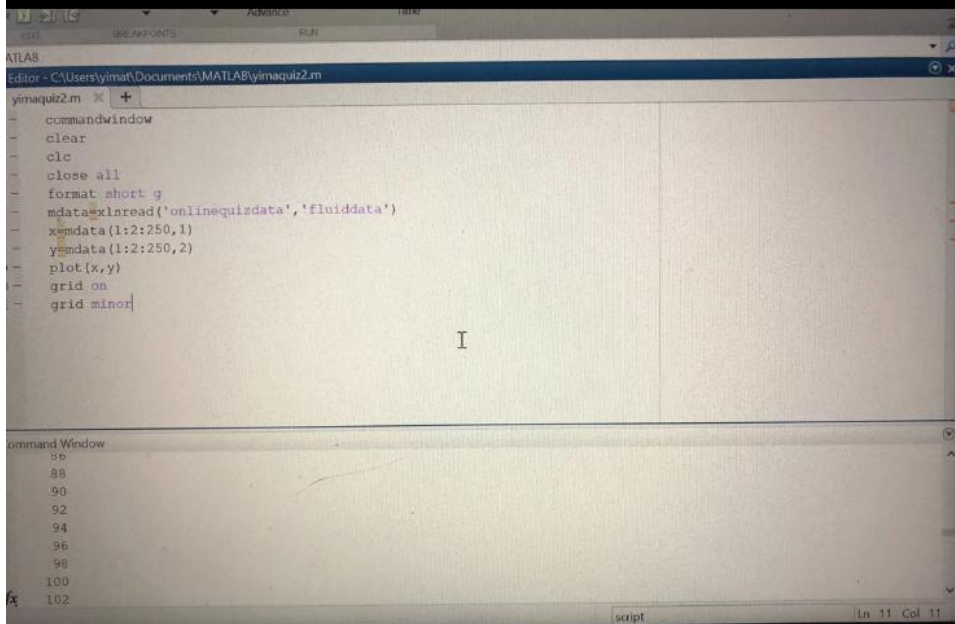
$$49.9 = 35e^{0.051t}$$

$$e^{0.051t} = 49.9/35$$

$$0.051t = \ln(1.426)$$

$$0.051t = 0.355$$

$$t = 7.1 \text{ minutes}$$

A screenshot of the MATLAB software interface. The top portion shows the Editor window with a script named 'yimaquiz2.m'. The script contains the following MATLAB code: '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', and 'grid minor'. The cursor is positioned at the end of the last line. The bottom portion shows the Command Window, which is currently empty. The status bar at the bottom right indicates 'Ln 11 Col 11'.

```
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
```

Command Window

Ln 11 Col 11

