



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

I

Command Window

```
86
88
90
92
94
96
98
100
102
```

In: 11 Col: 1

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$$T_1 = 10^\circ\text{C}$$
$$T_2 = 20^\circ\text{C}$$
$$T_2 - T_1 = 10^\circ\text{C at } 5 \text{ minutes}$$

from $20^\circ\text{C to } 24.9^\circ\text{C}$

$$\frac{dT_1}{dt} = -K(T_1 - T_w) + T_c$$

where
 T_i is initial temp
 T_w is water temp
 T_c is thermometer temp
 τ is time constant.

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

gals

ng.

5 min

) + T_c

Integrating both sides

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

T_m = Actual Temp

$$T - 25 = Ae^{kt}$$

$$T = Ae^{kt} + 25$$

at t=0, T=10°C

$$10 = Ae^{-25}$$

$$A = 35$$

$$T = 20^\circ C, t = 5 \text{ min}$$

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

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

$$-5k = \ln\left(\frac{-5}{35}\right)$$

$$k = 0.05$$

$$T = 35e^{0.05t} + 25$$

$$T = 35e^{0.05t} + 25 = 35$$

$$e^{0.05t} = \frac{10}{35}$$

$$0.05t = \ln\left(\frac{10}{35}\right)$$

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

2- Command window

Clear

clc

close all

format shortg

data = xlsread('onlinequizdata',

1, 'maths\math\data2').

X = mdata (1:2, 250, 1)

y = mdata (1:2, 250, 2)

plot (X, y)

grid on

grid minor