@ Mathcad

```
Command window
clear
clc
close all
format short g
mdata = xlsread('online quiz data', 'Flu data')
x = mdata(1:250,1)
y = mdata(1:250,2)
Plot(x,y)
grid(on)
grid minor
```

Qtn - Amuda Qurrate
Petroleum Engineering
18/ENG07/011
BNGR. MATH → BNG 282

Solution

$T_{out} = 10^{\circ}C$ $T = 20^{\circ}C$ @ = 5mins

$T_{actual} = 25^{\circ}C$

$\frac{dT}{dt} \propto (T - T_A)$ $T_A$ = Actual temperature

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

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

Collecting like Terms

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

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

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

$T - 25 = e^{kt} \cdot e^{C}$ where $e^{C} = A$

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

$T = Ae^{kt} - 25$

at initial $t = 0$, $T = 10^{\circ}$

$10 = Ae^{c} - 25$

$A = 35$

$T = 35e^{tk} - 25$

at $T = 20^{\circ}C$, $t = 5$ mins

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

$45 = 35e^{5k}$

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

$5k = \ln\left(\frac{45}{35}\right)$

$k = 0.05$

$T = 35e^{k-0.5t} - 25$

$T = 2W \cdot 9$

$24.9 = 35e^{k-0.5t} - 25$

$49.9 = 35e^{k-0.5t}$

$e^{k-0.5t} = \ln(1.426)$

$0.15t = 0.3555$

$t = 7.1$ mins

Figure 1

File Edit View Insert Tools Desktop Window Help