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Computer Engineering

$T_{initial} = 10^\circ C$ $T = 20^\circ C$ at 5mins
$T_{actual} = 25^\circ C$

$dT/dt \propto (T - T_n)$ T_n = Actual Temperature
$dT/dt = k(T - T_k)$
$dT/dt = K(T - 25)$

Collect like terms

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

Integrating both Sides

$\ln(T-25) = tk + AC$
$T - 25 = e^{kt+c}$ where $e^c = A$
$T - 25 = e^{kt} \cdot e^c$
$T - 25 = Ae^{tk}$
$T = Ae^{tk} - 25$

If initial Conditions $t = 0$, $T = 10^\circ C$
$10 = Ae^0 - 25$
$A = 35$
$T = 35e^{tk} - 25$
at $T = 20^\circ C$ $t = 5$mins
$20^\circ C = 35e^{5k} - 25$
$45 = 35e^{5k}$
$e^{5k} = 45/35$
$5k = \ln(45/35)$
$k = \frac{0.251}{5}$, $k = 0.05$

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

$T = 24.9$ at $t = ?$

$24.9 = 35e^{0.05t} - 25$

$49.4 = 35e^{0.05t}$

$e^{0.05t} = 49.9/35$

$e^{0.05t} = \ln(1.426)$

$0.05t = 0.355$

$t = 7.1$ minutes

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

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