

$T = 10^\circ\text{C}$      $T = 20^\circ\text{C}$  @ 5 mins  
 $\frac{dT}{dt} = k(T - T_a)$   
 $\frac{dT}{dt} = k(T - 25)$   
 collecting like terms  
 $\frac{dT}{T-25} = k dt$   
 Integrate both sides  
 $\ln(T-25) = k t + C$   
 $T-25 = e^{kt+C}$   
 $T-25 = e^{kt} \cdot e^C$   
 $T = A e^{kt} + 25$   
 At initial condition  $t=0$   $T=10^\circ\text{C}$   
 $10 = A e^0 + 25$   
 $A = 10 - 25 = -15$   
 $T = -15 e^{kt} + 25$   
 at  $T = 20^\circ\text{C}$  to 5 min  
 $20 = -15 e^{5k} + 25$   
 $-5 = -15 e^{5k}$   
 $e^{5k} = \frac{1}{3}$   
 $5k = \ln(1/3)$   
 $k = \frac{\ln(1/3)}{5} = -0.22$   
 $T = -15 e^{-0.22t} + 25$

$24.7 = -15 e^{-0.22t} + 25$   
 $24.7 - 25 = -15 e^{-0.22t}$   
 $-0.3 = -15 e^{-0.22t}$   
 $e^{-0.22t} = \frac{0.3}{15}$

```

clear
clc
close all
format short g
mdata=load('onlinequizdata','fluiddata')
x=1:250;
y=mdata(1:250,1);
plot(x,y)
grid on
grid minor
    
```

