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18/ENG05/042
MCT

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

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

$$dT = kdt$$

$T - 25$

~~$T - 25 =$~~

$$\frac{dT}{T - 25} = kdt + C$$

$T - 25$

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

$$T - 25 = T_0 e^{kT}$$

$$T = T_0 e^{kT} + 25$$

At time $t = 0$ min

$$T_0 + 25 = 10$$

$$T_0 = -15$$

$$T = -15e^{kT} + 25$$

At time $t = 5$ mins

$$20 = -15e^{5k} + 25$$

$$-5 = -15e^{5k}$$

$$\ln\left(\frac{-5}{-15}\right) = 5k$$

$$\ln\left(\frac{1}{3}\right) = 5k$$

$$-1.09 = 5k$$

$$k = -0.219$$

$$T = -15e^{-0.219t} + 25$$

When $T = 24.9$

$$24.9 = -15e^{-0.219t} + 25$$

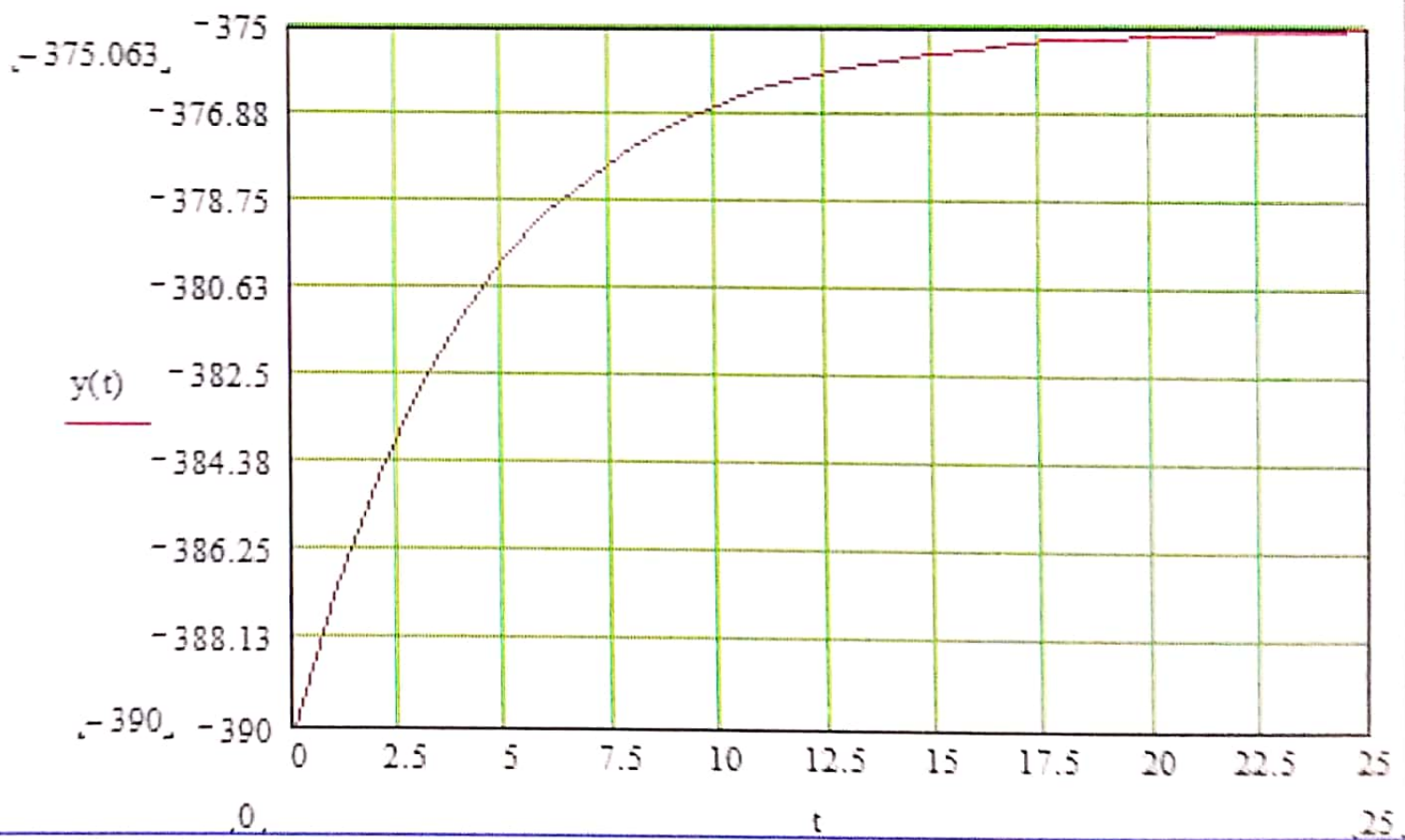
$$-0.1 = -15e^{-0.219t}$$

$$6.67 \times 10^{-3} = e^{-0.219t}$$

$$\ln(6.67 \times 10^{-3}) = -0.219t$$

$$-5.0106 = t$$

$$t = 22.88 \text{ mins}$$



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

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Insert fx Comment % Indent Breakpoints Run Run and Advance Run Section Advance Run and Time

Files > MATLAB > R2017a > bin >

Editor - C:\Users\hp\SADIKU.m

```
SADIKU.m
1 - commandwindow
2 - clc
3 - close all
4 - format short g
5 - mdata=xlsread('onlinequizdata','fluiddata')
6 - x=mdata(1:2:250,1)
7 - y=mdata(1:2:250,2)
8 - plot(x,y)
9 - grid on
10 - grid minor
```

Command Window

```
999.99
999.99
999.99
999.99
999.99
999.99
999.99
999.99
999.99
1000
1000
1000
1000
1000
```

Figure 1

x	y
0	200
10	500
20	700
30	800
40	880
50	920
60	950
70	970
80	980
90	990
100	995
150	1000
200	1000
250	1000

to search

ENG