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MATRIC NO: 16/ENG03/033

DEPARTMENT: CIVIL ENGINEERING

COURSE CODE: ENG 281

ENGINEERING MATH 1 TEST.

QUESTION NO.4

A) M-file:

```
commandwindow
```

```
clear
```

```
clc
```

```
A=[0 10 4 -2;-3 -17 1 2;1 1 1 0;8 -34 16 -10]
```

```
B=[-4;2;6;4]
```

```
C=inv(A)
```

```
D=C*B
```

Result:

A =

```
0 10 4 -2
```

```
-3 -17 1 2
```

```
1 1 1 0
```

8 -34 16 -10

B =

-4

2

6

4

C =

-0.1786 -0.1020 0.5714 0.0153

0.0357 -0.0153 0.0357 -0.0102

0.1429 0.1173 0.3929 -0.0051

-0.0357 0.1582 0.9643 -0.0612

D =

4.0000

-0.0000

2.0000

6.0000

B)M-file:

```
commandwindow
```

```
clear
```

```
clc
```

```
syms t
```

```
d=1.5*exp(-0.75*t)*sin(0.85*t)+0.375*t
```

```
t=[0:0.01:0.25]
```

```
V=diff(d)
```

```
Vn=subs(V,t)
```

```
figure(1)
```

```
plot(t,Vn)
```

```
xlabel time(min)
```

```
ylabel velocity(m/min)
```

```
grid on
```

```
grid minor
```

```
axis tight
```

```
A=diff(V)
```

```
An=subs(A,t)
```

```
figure(2)
```

```
plot(t,An)
```

```
xlabel time(min)
```

```
ylabel acceleration
```

```
grid on
```

```
grid minor
```

```
axis tight
figure(3)
plot(t,Vn,t,An)
xlabel time(min)
ylabel variable
grid on
grid minor
axis tight
legend ('velocity(m/min)','acceleration')
```

Result:

d =

$$(3*t)/8 + (3*\sin((17*t)/20)*\exp(-(3*t)/4))/2$$

t =

Columns 1 through 12

0	0.0100	0.0200	0.0300	0.0400	0.0500	0.0600	0.0700	0.0800
0.0900	0.1000	0.1100						

Columns 13 through 24

0.1200 0.1300 0.1400 0.1500 0.1600 0.1700 0.1800 0.1900
0.2000 0.2100 0.2200 0.2300

Columns 25 through 26

0.2400 0.2500

V =

$$(51*\cos((17*t)/20)*\exp(-(3*t)/4))/40 - (9*\sin((17*t)/20)*\exp(-(3*t)/4))/8 + 3/8$$

Vn =

$$\begin{aligned} & [33/20, (51*\cos(17/2000)*\exp(-3/400))/40 - (9*\exp(-3/400)*\sin(17/2000))/8 + \\ & 3/8, (51*\cos(17/1000)*\exp(-3/200))/40 - (9*\exp(-3/200)*\sin(17/1000))/8 + 3/8, \\ & (51*\cos(51/2000)*\exp(-9/400))/40 - (9*\exp(-9/400)*\sin(51/2000))/8 + 3/8, \\ & (51*\cos(17/500)*\exp(-3/100))/40 - (9*\exp(-3/100)*\sin(17/500))/8 + 3/8, \\ & (51*\cos(17/400)*\exp(-3/80))/40 - (9*\exp(-3/80)*\sin(17/400))/8 + 3/8, \\ & (51*\cos(51/1000)*\exp(-9/200))/40 - (9*\exp(-9/200)*\sin(51/1000))/8 + 3/8, \\ & (51*\cos(119/2000)*\exp(-21/400))/40 - (9*\exp(-21/400)*\sin(119/2000))/8 + 3/8, \\ & (51*\cos(17/250)*\exp(-3/50))/40 - (9*\exp(-3/50)*\sin(17/250))/8 + 3/8, \\ & (51*\cos(153/2000)*\exp(-27/400))/40 - (9*\exp(-27/400)*\sin(153/2000))/8 + 3/8, \\ & (51*\cos(17/200)*\exp(-3/40))/40 - (9*\exp(-3/40)*\sin(17/200))/8 + 3/8, \\ & (51*\cos(187/2000)*\exp(-33/400))/40 - (9*\exp(-33/400)*\sin(187/2000))/8 + 3/8, \\ & (51*\cos(51/500)*\exp(-9/100))/40 - (9*\exp(-9/100)*\sin(51/500))/8 + 3/8, \\ & (51*\cos(221/2000)*\exp(-39/400))/40 - (9*\exp(-39/400)*\sin(221/2000))/8 + 3/8, \\ & (51*\cos(119/1000)*\exp(-21/200))/40 - (9*\exp(-21/200)*\sin(119/1000))/8 + 3/8, \\ & (51*\cos(51/400)*\exp(-9/80))/40 - (9*\exp(-9/80)*\sin(51/400))/8 + 3/8, \end{aligned}$$

$$\begin{aligned}
& (51*\cos(17/125)*\exp(-3/25))/40 - (9*\exp(-3/25)*\sin(17/125))/8 + 3/8, \\
& (51*\cos(289/2000)*\exp(-51/400))/40 - (9*\exp(-51/400)*\sin(289/2000))/8 + 3/8, \\
& (51*\cos(153/1000)*\exp(-27/200))/40 - (9*\exp(-27/200)*\sin(153/1000))/8 + 3/8, \\
& (51*\cos(323/2000)*\exp(-57/400))/40 - (9*\exp(-57/400)*\sin(323/2000))/8 + 3/8, \\
& (51*\cos(17/100)*\exp(-3/20))/40 - (9*\exp(-3/20)*\sin(17/100))/8 + 3/8, \\
& (51*\cos(357/2000)*\exp(-63/400))/40 - (9*\exp(-63/400)*\sin(357/2000))/8 + 3/8, \\
& (51*\cos(187/1000)*\exp(-33/200))/40 - (9*\exp(-33/200)*\sin(187/1000))/8 + 3/8, \\
& (51*\cos(391/2000)*\exp(-69/400))/40 - (9*\exp(-69/400)*\sin(391/2000))/8 + 3/8, \\
& (51*\cos(51/250)*\exp(-9/50))/40 - (9*\exp(-9/50)*\sin(51/250))/8 + 3/8, \\
& (51*\cos(17/80)*\exp(-3/16))/40 - (9*\exp(-3/16)*\sin(17/80))/8 + 3/8]
\end{aligned}$$

A =

$$- (153*\cos((17*t)/20)*\exp(-(3*t)/4))/80 - (6*\sin((17*t)/20)*\exp(-(3*t)/4))/25$$

An =

$$\begin{aligned}
& [-153/80, - (153*\cos(17/2000)*\exp(-3/400))/80 - (6*\exp(- \\
& 3/400)*\sin(17/2000))/25, - (153*\cos(17/1000)*\exp(-3/200))/80 - (6*\exp(- \\
& 3/200)*\sin(17/1000))/25, - (153*\cos(51/2000)*\exp(-9/400))/80 - (6*\exp(- \\
& 9/400)*\sin(51/2000))/25, - (153*\cos(17/500)*\exp(-3/100))/80 - (6*\exp(- \\
& 3/100)*\sin(17/500))/25, - (153*\cos(17/400)*\exp(-3/80))/80 - (6*\exp(- \\
& 3/80)*\sin(17/400))/25, - (153*\cos(51/1000)*\exp(-9/200))/80 - (6*\exp(- \\
& 9/200)*\sin(51/1000))/25, - (153*\cos(119/2000)*\exp(-21/400))/80 - (6*\exp(- \\
& 21/400)*\sin(119/2000))/25, - (153*\cos(17/250)*\exp(-3/50))/80 - (6*\exp(- \\
& 3/50)*\sin(17/250))/25, - (153*\cos(153/2000)*\exp(-27/400))/80 - (6*\exp(- \\
& 27/400)*\sin(153/2000))/25, - (153*\cos(17/200)*\exp(-3/40))/80 - (6*\exp(- \\
& 3/40)*\sin(17/200))/25, - (153*\cos(187/2000)*\exp(-33/400))/80 - (6*\exp(- \\
& 33/400)*\sin(187/2000))/25, - (153*\cos(51/500)*\exp(-9/100))/80 - (6*\exp(- \\
& 9/100)*\sin(51/500))/25, - (153*\cos(221/2000)*\exp(-39/400))/80 - (6*\exp(-
\end{aligned}$$

$$\begin{aligned}
 & 39/400) * \sin(221/2000)) / 25, - (153 * \cos(119/1000) * \exp(-21/200)) / 80 - (6 * \exp(- \\
 & 21/200) * \sin(119/1000)) / 25, - (153 * \cos(51/400) * \exp(-9/80)) / 80 - (6 * \exp(- \\
 & 9/80) * \sin(51/400)) / 25, - (153 * \cos(17/125) * \exp(-3/25)) / 80 - (6 * \exp(- \\
 & 3/25) * \sin(17/125)) / 25, - (153 * \cos(289/2000) * \exp(-51/400)) / 80 - (6 * \exp(- \\
 & 51/400) * \sin(289/2000)) / 25, - (153 * \cos(153/1000) * \exp(-27/200)) / 80 - (6 * \exp(- \\
 & 27/200) * \sin(153/1000)) / 25, - (153 * \cos(323/2000) * \exp(-57/400)) / 80 - (6 * \exp(- \\
 & 57/400) * \sin(323/2000)) / 25, - (153 * \cos(17/100) * \exp(-3/20)) / 80 - (6 * \exp(- \\
 & 3/20) * \sin(17/100)) / 25, - (153 * \cos(357/2000) * \exp(-63/400)) / 80 - (6 * \exp(- \\
 & 63/400) * \sin(357/2000)) / 25, - (153 * \cos(187/1000) * \exp(-33/200)) / 80 - (6 * \exp(- \\
 & 33/200) * \sin(187/1000)) / 25, - (153 * \cos(391/2000) * \exp(-69/400)) / 80 - (6 * \exp(- \\
 & 69/400) * \sin(391/2000)) / 25, - (153 * \cos(51/250) * \exp(-9/50)) / 80 - (6 * \exp(- \\
 & 9/50) * \sin(51/250)) / 25, - (153 * \cos(17/80) * \exp(-3/16)) / 80 - (6 * \exp(- \\
 & 3/16) * \sin(17/80)) / 25]
 \end{aligned}$$

FIGURE 1.

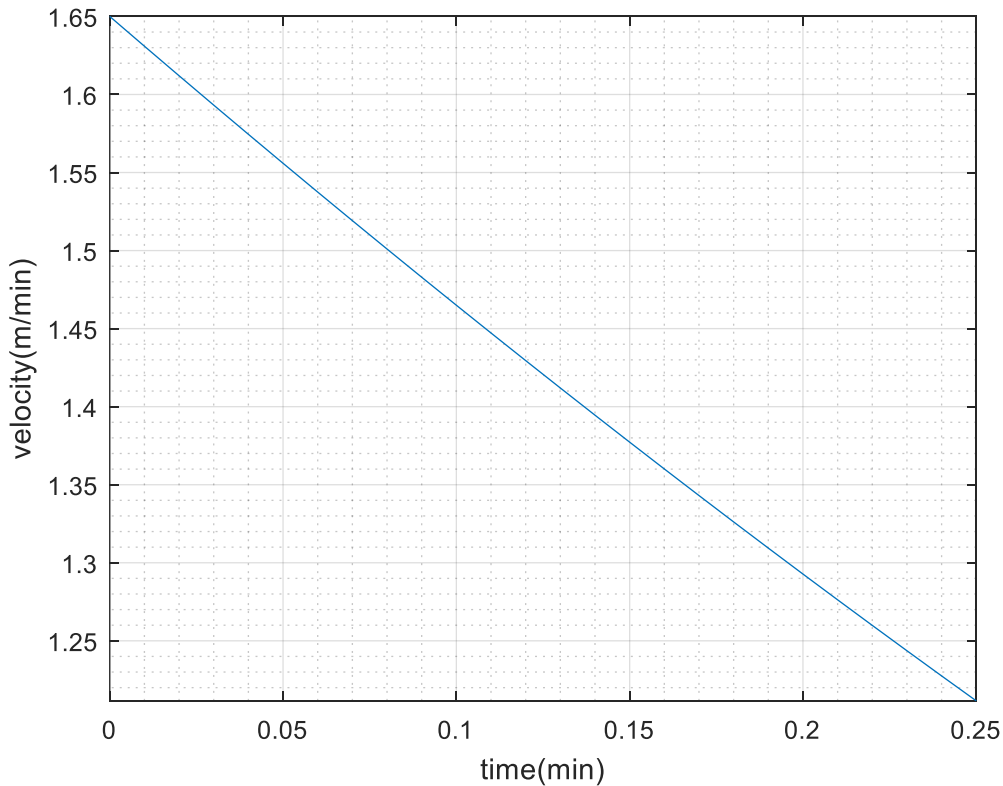


FIGURE 2.

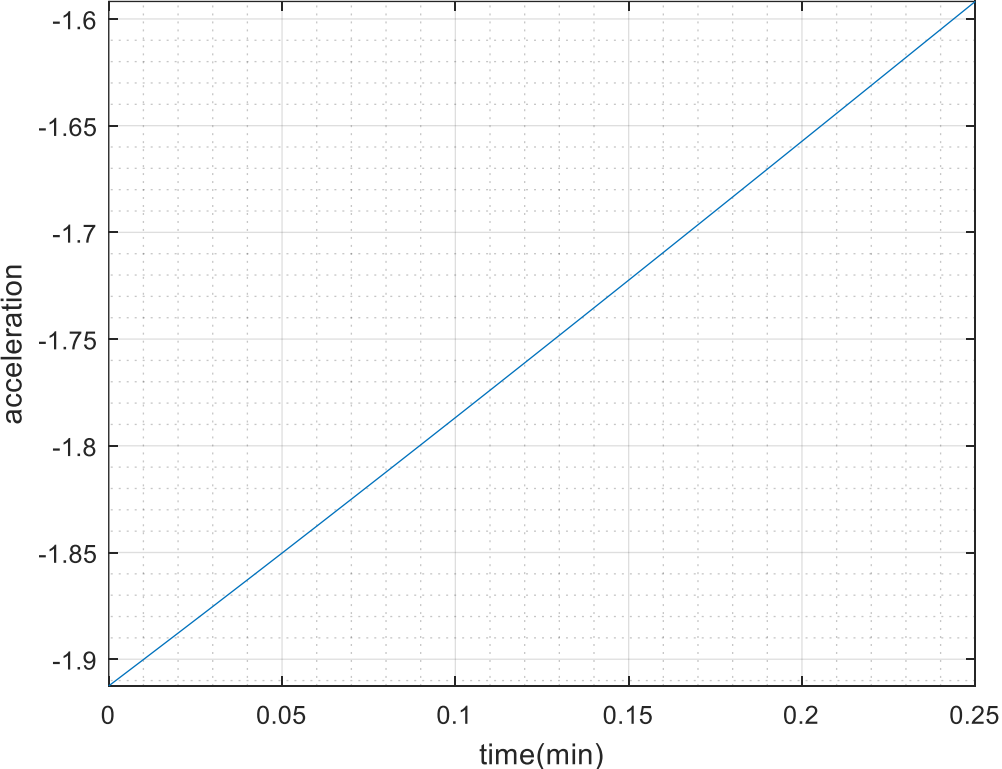
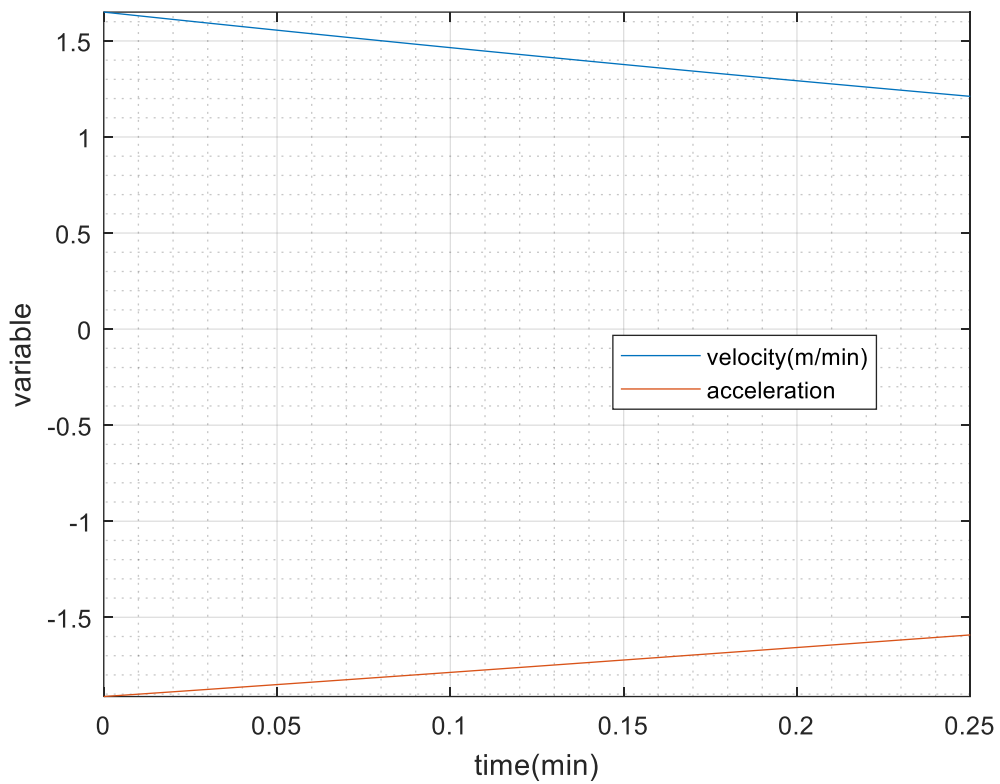


FIGURE 3.



C)M-file

commandwindow

clear

clc

syms x

format short

$y=5*(\sin(5*x))^5$

X=0

x=pi

Victory=pi*y^2

V=int(Victory,X,x)

Vd=double(V)

Result:

y =

5*sin(5*x)^5

X =

0

x=

3.1416

Victory =

$$25\pi \sin(5x)^{10}$$

$$V =$$

$$(1575\pi^2)/256$$

$$Vd =$$

$$60.7212$$