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**MATRIC NUMBER: 16/ENG05/016.**

**COURSE: ENG 281-ENGINEERING MATHEMATICS.**

**MID-SEMESTER TEST QUESTION NO. 4**

**NO. 4(a)**

**Input:**

```
commandwindow
clear
clc
close all
A=[0,10,4,-2;-3,-17,1,2;1,1,1,0;8,-34,16,-10]
b=[-4;2;6;4]
x=A^-1*b
```

**Output:**

A =

```
0 10 4 -2
-3 -17 1 2
1 1 1 0
8 -34 16 -10
```

b =

-4

2

6

4

x =

4.0000

-0.0000

2.0000

6.0000

### NO. 4(b)

#### Input:

```
commandwindow
clear
clc
close all
syms t
d=1.5*exp(-0.75*t)*sin(0.85*t)+0.375*t
tn=[0:0.01:2.5]
v=diff(d)
a=diff(v)
vn=subs(v,tn);
an=subs(a,tn);
plot(tn,vn,tn,an)
grid on
grid minor
axis tight
xlabel('time (min)')
ylabel('variable')
```

```
legend('velocity(km/min)', 'acceleration(km/min^2)')
```

**Output:**

d =

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

tn =

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 36

0.2400 0.2500 0.2600 0.2700 0.2800 0.2900 0.3000 0.3100 0.3200 0.3300  
0.3400 0.3500

Columns 37 through 48

0.3600 0.3700 0.3800 0.3900 0.4000 0.4100 0.4200 0.4300 0.4400 0.4500  
0.4600 0.4700

Columns 49 through 60

0.4800 0.4900 0.5000 0.5100 0.5200 0.5300 0.5400 0.5500 0.5600 0.5700  
0.5800 0.5900

Columns 61 through 72

0.6000 0.6100 0.6200 0.6300 0.6400 0.6500 0.6600 0.6700 0.6800 0.6900  
0.7000 0.7100

Columns 73 through 84

0.7200 0.7300 0.7400 0.7500 0.7600 0.7700 0.7800 0.7900 0.8000 0.8100  
0.8200 0.8300

Columns 85 through 96

0.8400 0.8500 0.8600 0.8700 0.8800 0.8900 0.9000 0.9100 0.9200 0.9300  
0.9400 0.9500

Columns 97 through 108

0.9600 0.9700 0.9800 0.9900 1.0000 1.0100 1.0200 1.0300 1.0400 1.0500  
1.0600 1.0700

Columns 109 through 120

1.0800 1.0900 1.1000 1.1100 1.1200 1.1300 1.1400 1.1500 1.1600 1.1700  
1.1800 1.1900

Columns 121 through 132

1.2000 1.2100 1.2200 1.2300 1.2400 1.2500 1.2600 1.2700 1.2800 1.2900  
1.3000 1.3100

Columns 133 through 144

1.3200 1.3300 1.3400 1.3500 1.3600 1.3700 1.3800 1.3900 1.4000 1.4100  
1.4200 1.4300

Columns 145 through 156

1.4400 1.4500 1.4600 1.4700 1.4800 1.4900 1.5000 1.5100 1.5200 1.5300  
1.5400 1.5500

Columns 157 through 168

1.5600 1.5700 1.5800 1.5900 1.6000 1.6100 1.6200 1.6300 1.6400 1.6500  
1.6600 1.6700

Columns 169 through 180

1.6800 1.6900 1.7000 1.7100 1.7200 1.7300 1.7400 1.7500 1.7600 1.7700  
1.7800 1.7900

Columns 181 through 192

1.8000 1.8100 1.8200 1.8300 1.8400 1.8500 1.8600 1.8700 1.8800 1.8900  
1.9000 1.9100

Columns 193 through 204

1.9200 1.9300 1.9400 1.9500 1.9600 1.9700 1.9800 1.9900 2.0000 2.0100  
2.0200 2.0300

Columns 205 through 216

2.0400 2.0500 2.0600 2.0700 2.0800 2.0900 2.1000 2.1100 2.1200 2.1300  
2.1400 2.1500

Columns 217 through 228

2.1600 2.1700 2.1800 2.1900 2.2000 2.2100 2.2200 2.2300 2.2400 2.2500  
2.2600 2.2700

Columns 229 through 240

2.2800 2.2900 2.3000 2.3100 2.3200 2.3300 2.3400 2.3500 2.3600 2.3700  
2.3800 2.3900

Columns 241 through 251

2.4000 2.4100 2.4200 2.4300 2.4400 2.4500 2.4600 2.4700 2.4800 2.4900  
2.5000

v =

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

a =

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

### NO. 4(c)

**Input:**

```
commandwindow
clear
clc
close all
syms x
y=5*sin(5*x)^(5)
v=(y^2)*pi
vintd=int(v,0,pi)
vintd=double(vintd)
syms e
```

**Output:**

y =

$$\underline{5*\sin(5*x)^5}$$

v =

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

vintd =

$$\underline{(1575\pi^2)/256}$$

vintd =

$$\underline{60.7212}$$