Topic _____ Date _____

MEC232

Name : Rohan Kumar Saini
Roll No : RM2041A01
Reg No : 12011878

Q1. Write a Matlab Program to numerically integrate the function $y = 5x + 3$ by Trapezoidal Rule with lower and upper limits as 0 and 5 respectively ?

Solution :

```
clear all
clc

n = input ('Enter number of intervals : ');
a = input ('lower limit : ');
b = input ('upper limit : ');
h = (b-a)/n ;
x = a:h:b
j = 1 ;
for i = a:h:b
    y(j) = 5*i +3;
    j = j+1 ;
end

trap = (0.5*h)*(y(1) + y(end) + 2*(sum(y) - y(1) - y(end)))
```

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Q2. Write a Matlab program to numerically integrate the function $y = 7x^2 - 4x + 1$ by Simpson's 1/3 Rule with lower and upper limits as 1 and 6 respectively ?

Solution =

```
clear all
clc

n = input('Enter number of intervals: ');
a = input('lower limit: ');
b = input('upper limit: ');
h = (b-a)/n;
x = a:h:b
j = 1;
for i = a:h:b
    y(j) = 7*i^2 - 4*i +1;
    j = j+1;
end
for j = 1:(n-1)/2
    yodd(j) = y(2*j+1);
end
for j = 1:(n/2)
    yeven(j) = y(2*j);
end

onebythree = (h/3)*(y(1) + y(end) + 4*(sum(yodd)) + 2*(sum(yeven)))
```

Q3. The following data points are given Determine a function $w = f(t)$ (t is the

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independent variable, w is the dependent variable) with a form discussed in this section that best fits the data.

t	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
w	6.00	4.83	3.70	3.15	2.41	1.83	1.49	1.21	0.96

4.5	5.0
0.73	0.64

Try to fit the function by a polynomial function of degree 4 and write the equation of the curve separately?

Solution =

```
clear all
clc
format short g

t = [0.0  0.5  1  1.5  2  2.5  3  3.5  4  4.5  5];
w = [6  4.83  3.7  3.15  2.41  1.83  1.49  1.21  0.96  0.73  0.64];
p = polyfit(t,w,4)
tp = 0.0:0.1:5;
wp = polyval(p,tp);
plot(t,w,'o',tp,wp)
```

Equation:

$$w = 0.0034499t^4 - 0.063124t^3 + 0.54972t^2 - 2.6755t + 6.0019$$

Teacher's Signature .....

```
%Name: Rohan Kumar Saini
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%Reg no: 12011878
%Question1
clear all
clc

n=input('Enter number of intervals: ');
a=input('lower limit: ');
b=input('upper limit: ');
h=(b-a)/n;
x=a:h:b
j=1;
for i=a:h:b
  y(j)=5*i+3;
  j=j+1;
end

trap=(0.5*h)*(y(1)+y(end)+2*(sum(y)-y(1)-y(end)))
```
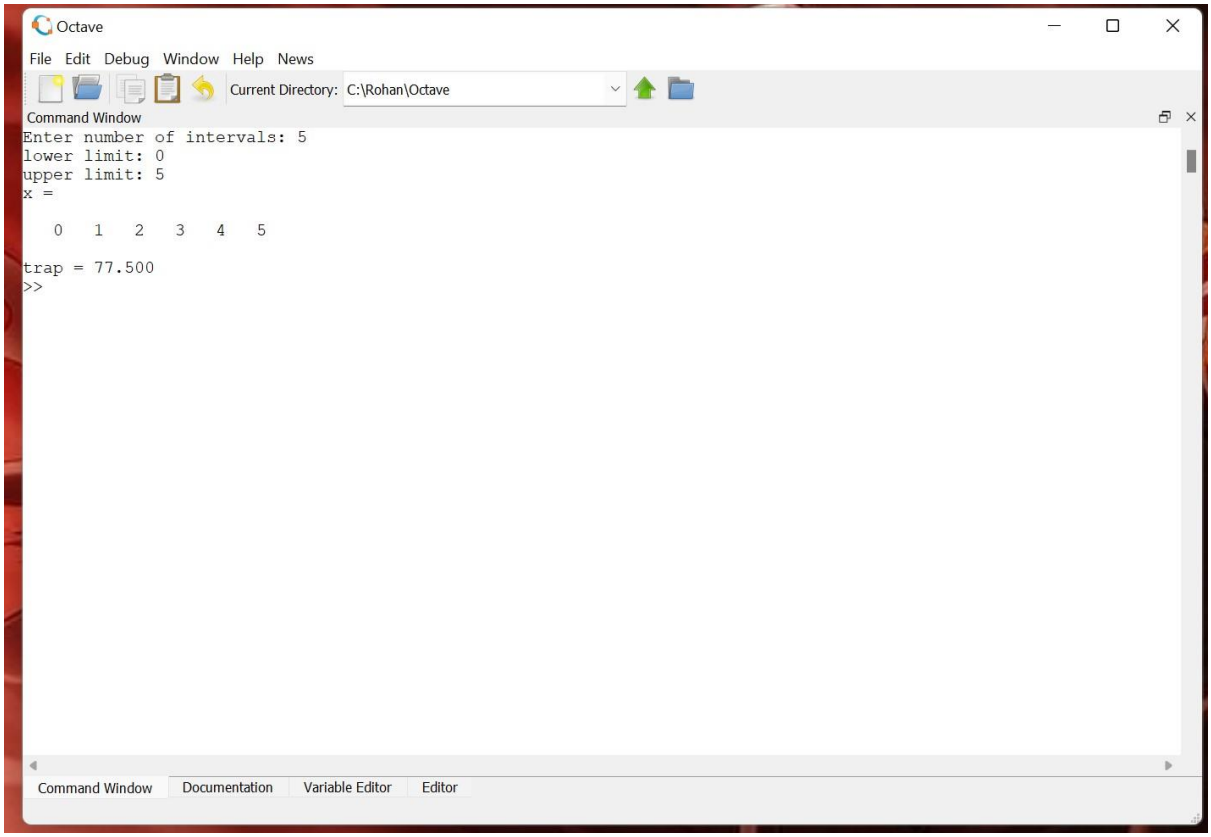



%Name: Rohan Kumar Saini

%Roll no: RM2041A01

%Reg no: 12011878

%Question2

clear all

clc

n=input('Enter number of intervals: ');

a=input('lower limit: ');

b=input('upper limit: ');

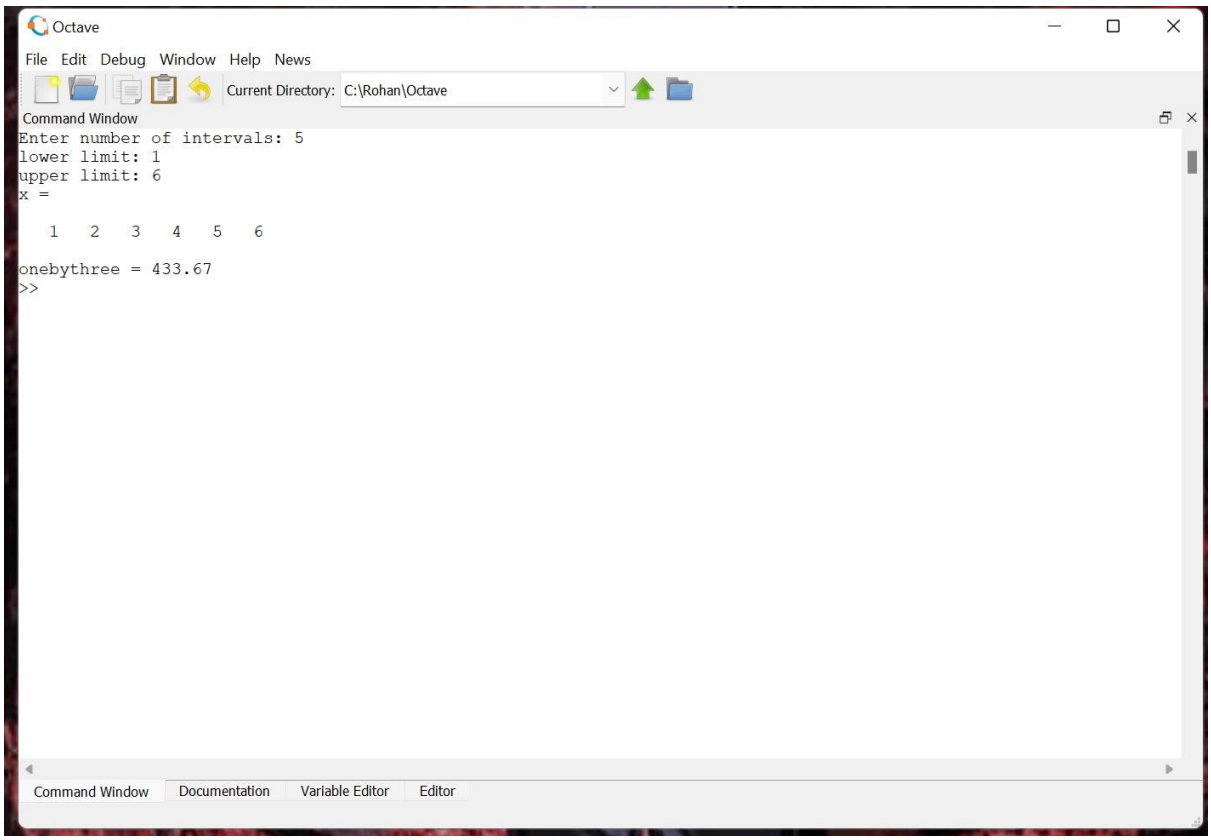
h=(b-a)/n;

x=a:h:b

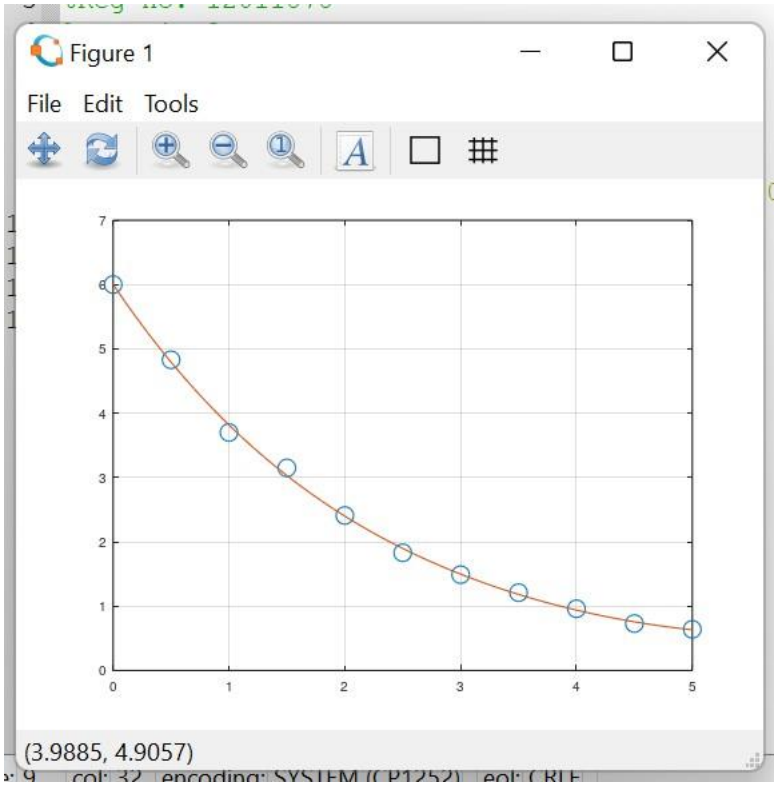
j=1;

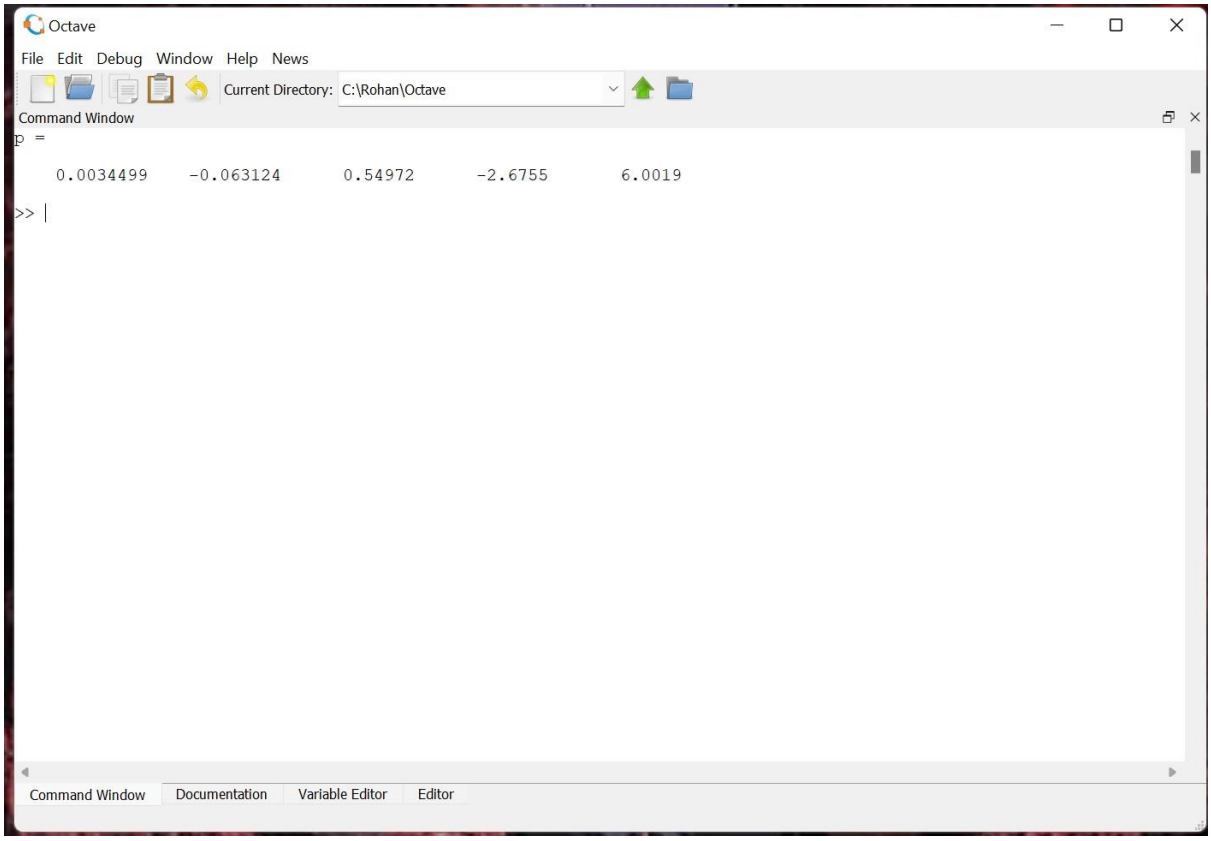
for i=a:h:b

```
 y(j)=7*i^2-4*i+1;
 j=j+1;
end
for j=1:(n-1)/2
 yodd(j)=y(2*j+1);
end
for j=1:(n/2)
 yeven(j)=y(2*j);
end

onebythree=(h/3)*(y(1)+y(end)+4*(sum(yodd))+2*(sum(yeven)))
```



```
%Name: Rohan Kumar Saini

%Roll no: RM2041A01

%Reg no: 12011878

%Question3

clear all

clc

format short g


t=[0.0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5];

w=[6 4.83 3.7 3.15 2.41 1.83 1.49 1.21 0.96 0.73 0.64];

p=polyfit(t,w,4)

tp=0.0:0.1:5;

wp=polyval(p,tp);

plot(t,w,'o',tp,wp)
```




Octave
File Edit Debug Window Help News
Current Directory: C:\Rohan\Octave
Command Window
p =
0.0034499 -0.063124 0.54972 -2.6755 6.0019
>>
Command Window
Documentation
Variable Editor
Editor