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home work 1:

write a computer program to interpolate an equation and then plot it , then compute the

function points { p(3.5)=? , p(7.8)=? }

xi f(xi)

1 1.5709

2 1.5713

3 1.5719

4 1.5727

5 1.5751

6 1.5767

7 1.5785

8 1.5805

9 1.5833

1.Way one.....

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%  
% Lagrange Interpolation ; %  
% %  
% Programmed By:rahim borumandi %  
% 1391/3/28 %  
% %  
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%  
clc;  
clear;  
disp('Lagrange Interpolation');  
disp(' ');  
disp('Programmed By:rahim buromandi');  
disp(' ');  
  
n=input('Enter the number of data points: ');  
disp(' ');  
  
x=zeros(n,1);  
y=zeros(n,1);
```

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for i=1:n
    x(i)=input(['Enter x' mat2str(i) ': ']);
    y(i)=input(['Enter y' mat2str(i) ': ']);
    disp(' ');
end

x1=min(x);
x2=max(x);
dx=x2-x1;

x1=x1-0.2*dx;
x2=x2+0.2*dx;

xx=x1+(x2-x1)*(0:0.001:1);
yy=zeros(size(xx));
for k=1:numel(xx)
    L=ones(1,n);
    for i=1:n
        for j=1:n
            if j~=i
                L(i)=L(i)*(xx(k)-x(j))/(x(i)-x(j));
            end
        end
    end
    yy(k)=yy(k)+y(i)*L(i);
end
end

figure;
set(gcf,'color','white');
plot(xx,yy);
hold on;
plot(x,y,'r.','MarkerSize',25);

```

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output:

Lagrange Interpolation

Programmed By:rahim buromandi

Enter the number of data points: 9

Enter x1: 1

Enter y1: 1.5709

Enter x2: 2

Enter y2: 1.5713

Enter x3: 3

Enter y3: 1.5719

Enter x4: 4

Enter y4: 1.5727

Enter x5: 5

Enter y5: 1.5751

Enter x6: 6

Enter y6: 1.5767

Enter x7: 7

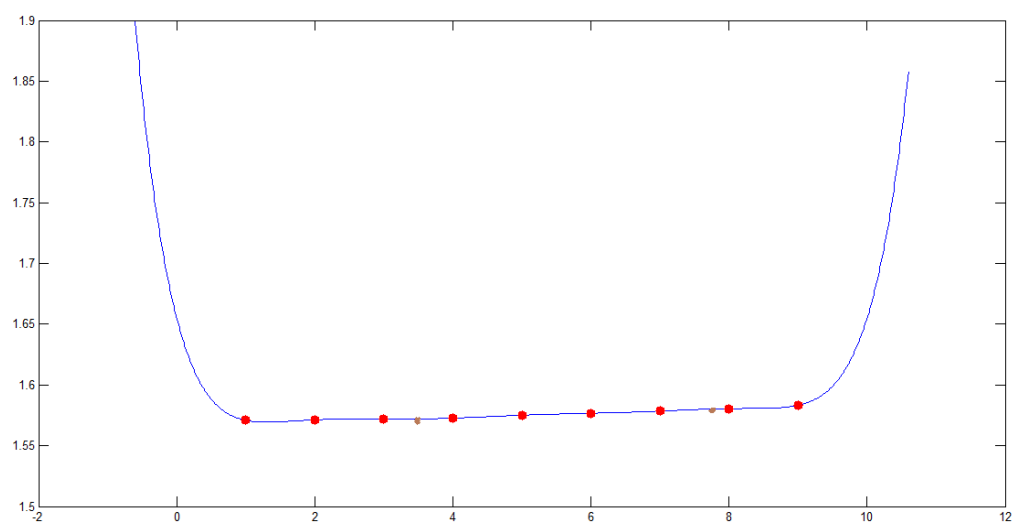
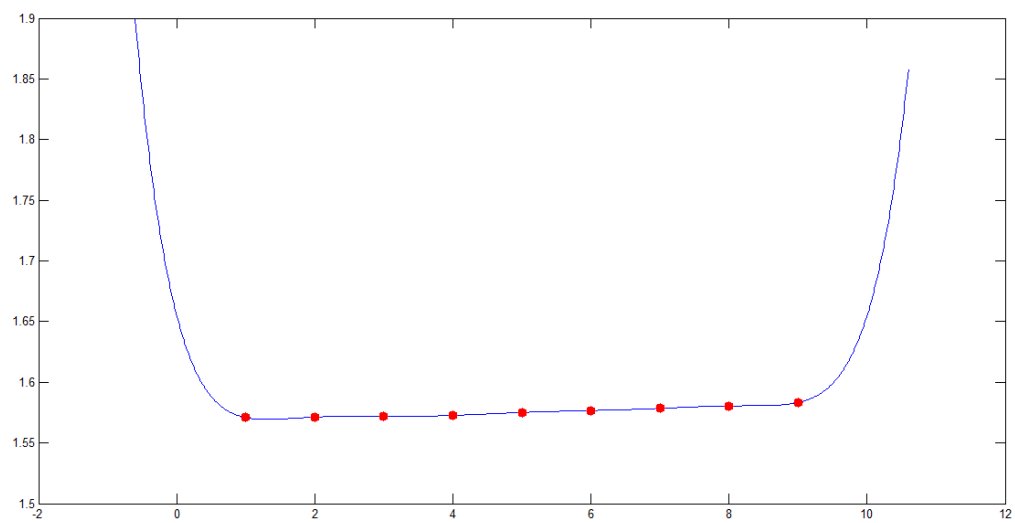
Enter y7: 1.5785

Enter x8: 8

Enter y8: 1.5805

Enter x9: 9

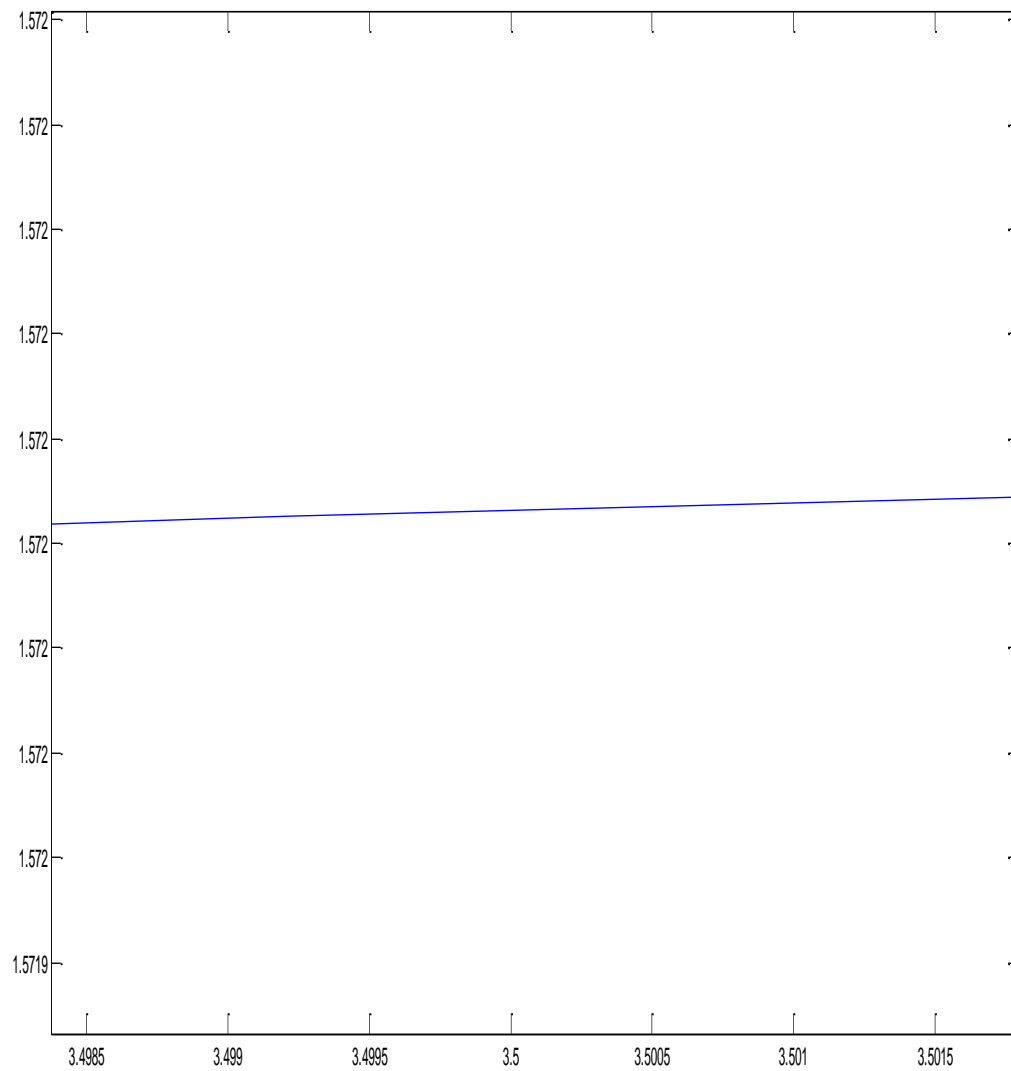
Enter y9: 1.5833

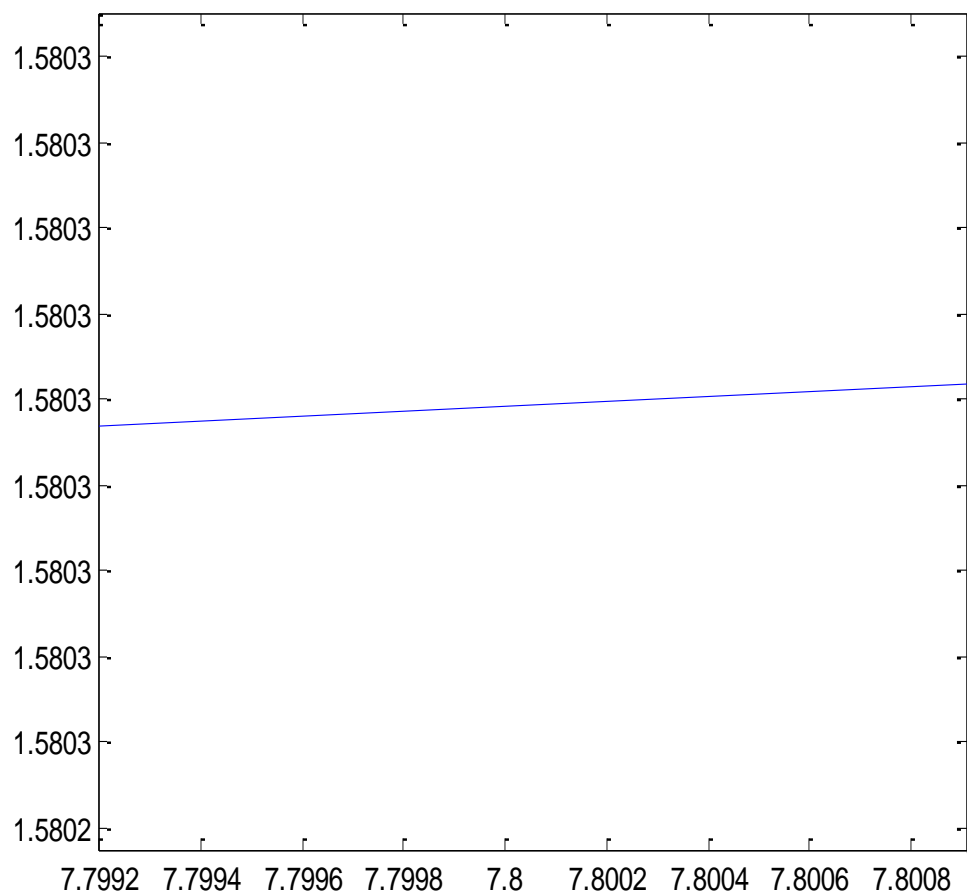


F(3.5) and F(7.8) indicate in polt 2;

F(3.5)=1.572

F(7.8)=1.5803





2.way two

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%writing a computer program to interpolate an equation and then plot %
%it then compute the function points (m). %
%by rahim borumandi 1391/3/29 %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
clc
A=[1 2 3 4 5 6 7 8 9];
B=[1.5709 1.5713 1.5719 1.5727 1.5751 1.5767 1.5785 1.5805 1.5833];

```

```

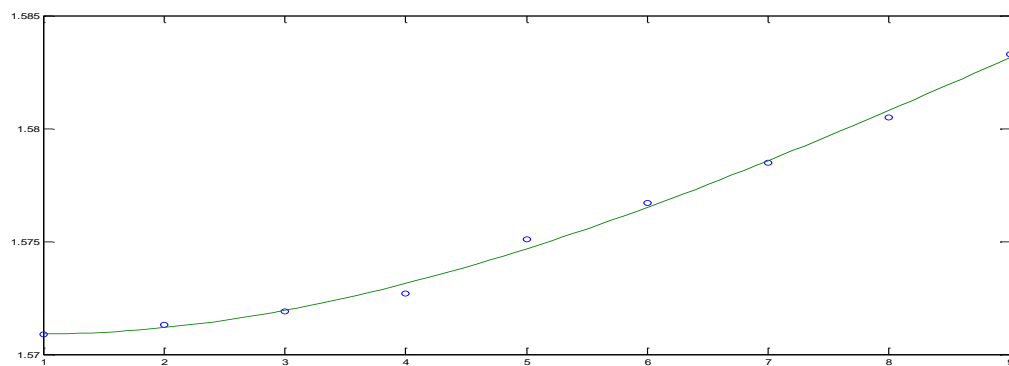
n=input('enter degree of poly');
p=polyfit(A,B,n);
disp(p);
A2=1:.1:9;
B2=polyval(p,A2);
plot(A,B,'o',A2,B2);
m=input('enter a data to give you value of data');
disp(polyval(p,m));

```

out put:

enter degree of poly3

-0.0000 0.0003 -0.0006 1.5712



enter a data to give you value of data

enter a data to give you value of data3.5

1.5725

enter a data to give you value of data7.8

1.5804

.....

home work 2:

write a main program with the following subroutines

1) trapezoidal rule

2) simpson's rule

value the integral $\int (1-x^2)^{3/2} dx, 0,1$

and compare with exact number

exact = $\int (1-x^2)^{3/2} dx, 0,1 = 0.589048622$

1).....

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%this program is written to compute value the integral (1-x^2)^(3/2) %
%dx,0,1 by rahim borumandi 1391/3/27 in trapezoidal rule %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
clc
n = input('Please tell me "n" value:');
if ( n>0)
h=1/n;
sum=h/2;
i=1;
while i<n;
x=i*h;
y = sqrt((1-x^2)^3);
sum=sum+(h)*y;
i=i+1;
end

disp('sum=');
fprintf('%d ', sum);
exact=.589048622;
if( sum > exact )
disp('sum>exact');
end
if (sum < exact)
disp('sum < exact');
end
if (sum==exact)
disp('sum=exact');
end
disp('type "end" please to close program')
end
```

output: Please tell me "n" value:40

sum=

5.890415e-001 sum < exact

type "end" please to close program

>>

.....

Please tell me "n" value:466

sum=

5.890486e-001 sum <exact

type "end" please to close program

>>

.....

2)

%%
%simpson way compute value the integral $(1-x^2)^{(3/2)}$ dx,0,1 ; %
%by rahim borumandi 1391/3/29 %
%%

clc

n = input('Please tell me even "n" value:');

if (mod(n,2)==0)

h=1/n;

sum=0;kum=0;sham=h/3;

i=1;

while i<n;

 i=i+2;

 x=i*h;

 y = sqrt((1-x^2)^3);

 sum=sum+(h/3)*4*y;

end

i=2;

while i<n;

 x=i*h;

 i=i+2;

 y = sqrt((1-x^2)^3);

 kum=kum+(h/3)*2*y;

end

sham=sham+sum+kum;

disp('sham=');

 fprintf('%d ', sham);

 exact=.589048622;

if(sham > exact)

 disp('sham>exact');

end

if (sham<exact)

 disp('sham <exact');

end

```

if (sham==exact)
    disp('sham=exact');
end
disp('type "end" please to close program')
end
if( mod(n,2)~=0)
    disp('n is no even ');
end

```

output:

Please tell me even "n" value:260

sham=

5.839206e-001 sham <exact

type "end" please to close program

.....

Please tell me even "n" value:25606

sham=

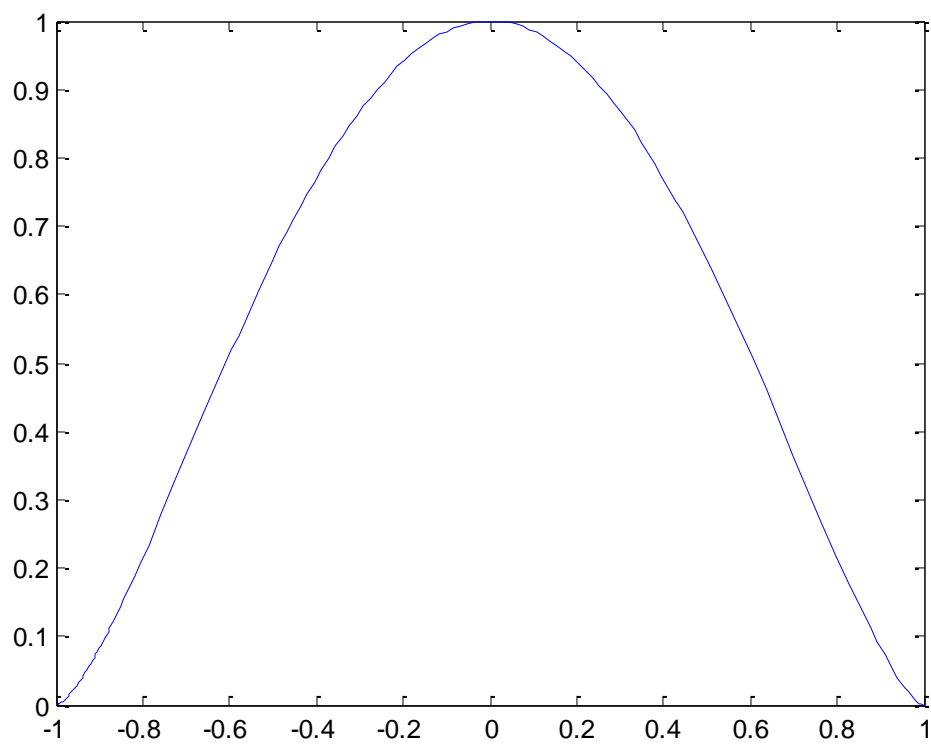
5.889966e-001 sham <exact

type "end" please to close program

.....

By knowing correct value for x x (-1,1)

fplot('sqrt((1-x*x)^3)',[-1 1])



End ;1391/3/29