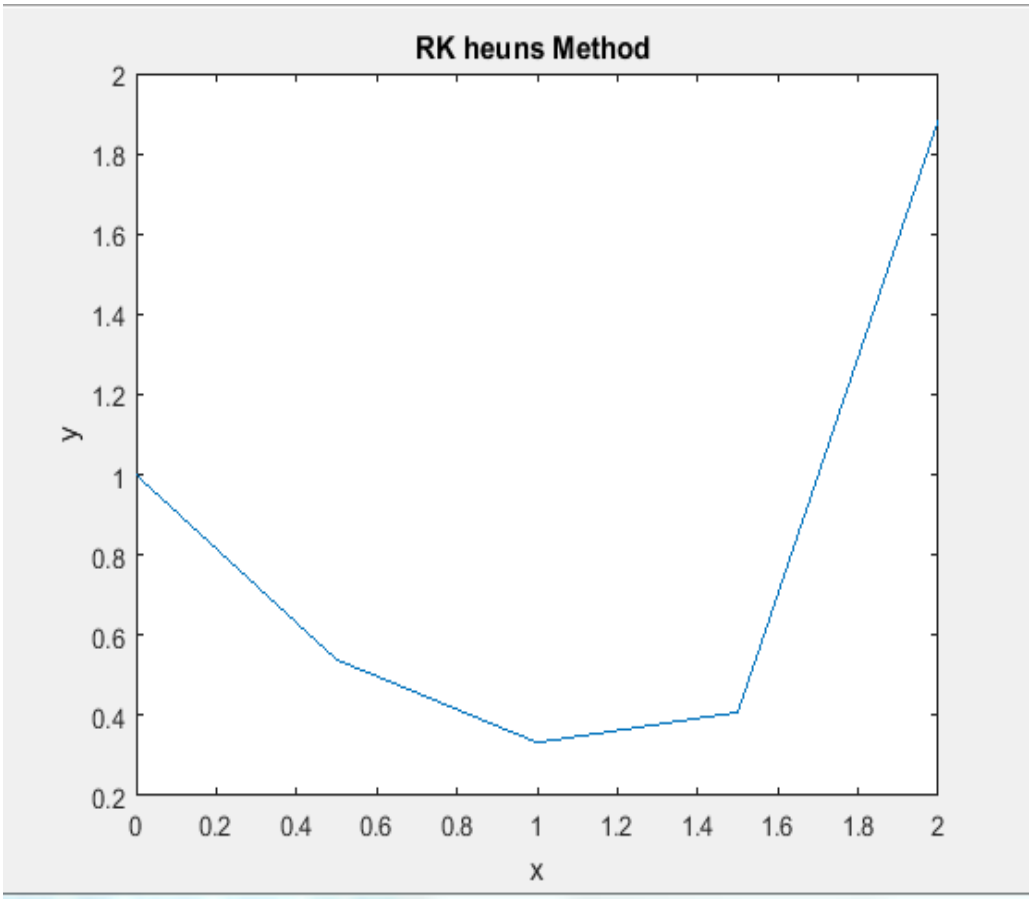
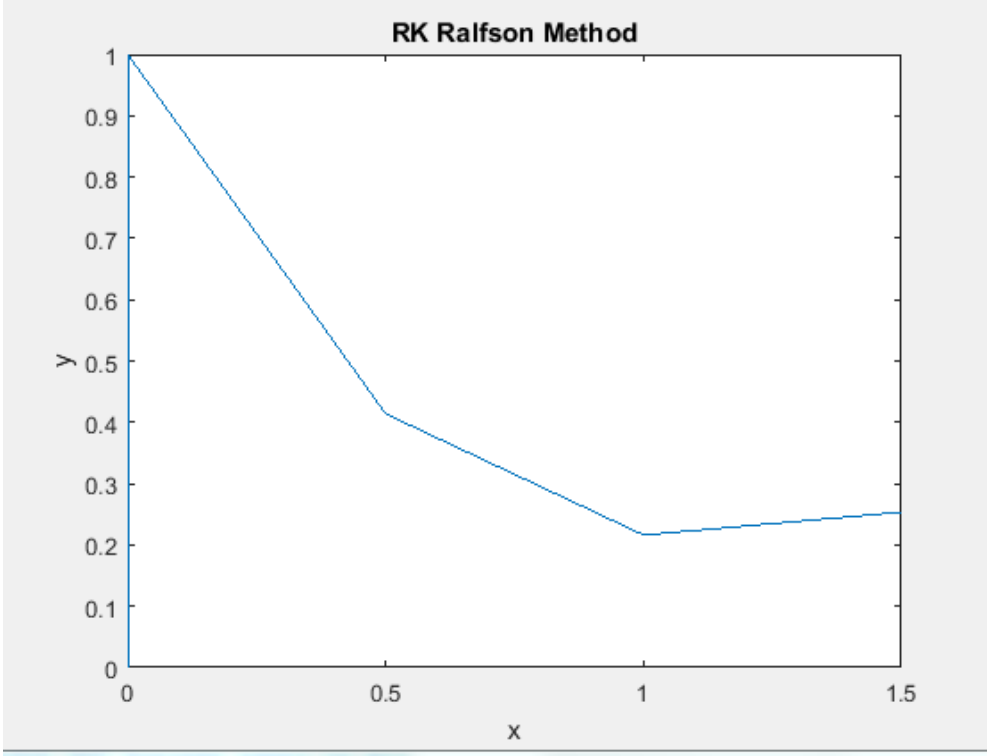
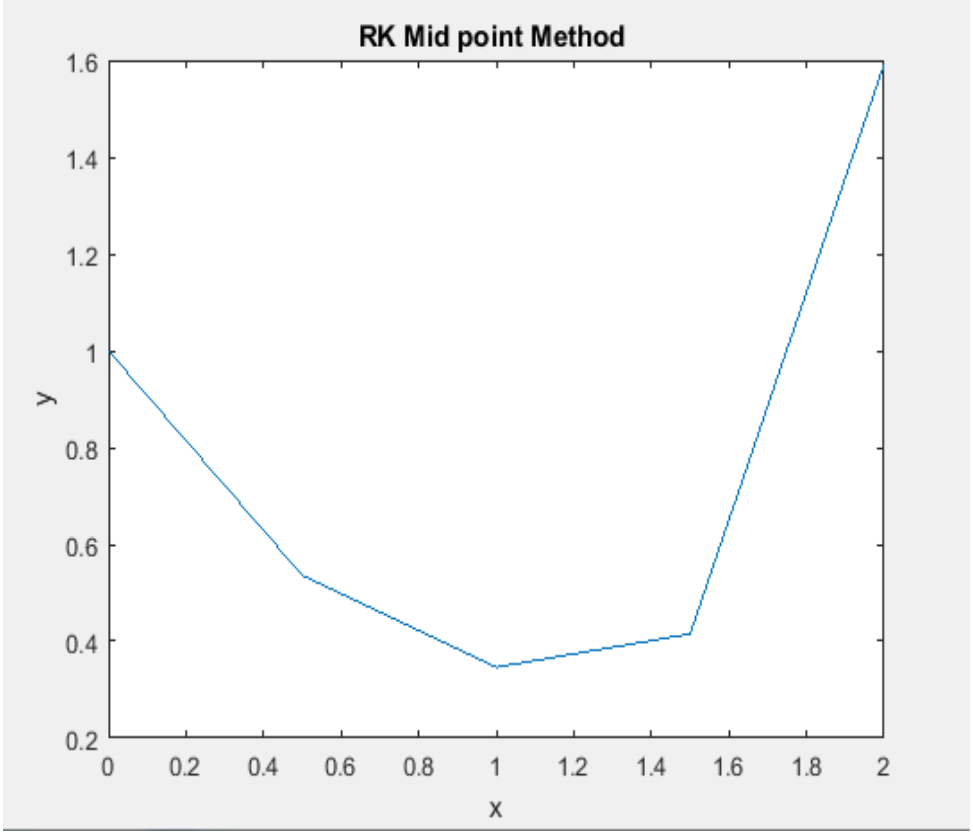
RK Method



Command Window

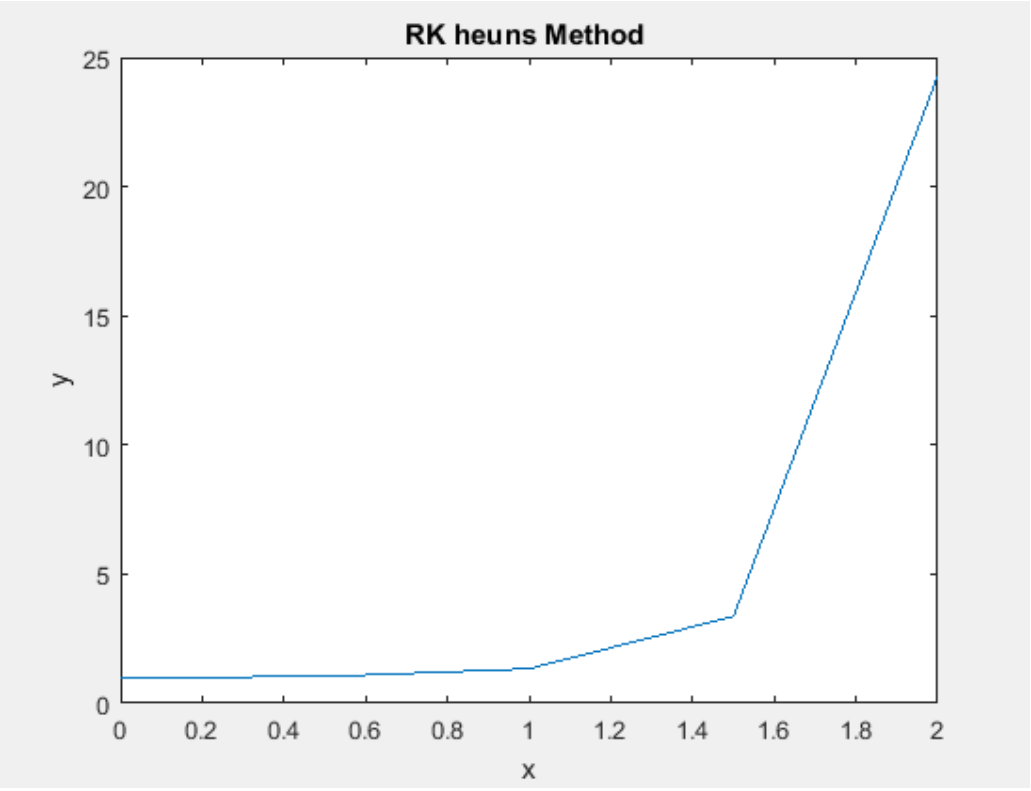
```
>> rk
Enter your equation in terms of variable x:y*(t^3)-1.5*y
Enter the initial limit of x:0
Enter the final limit of x:2
Enter value of h:0.5
For Heus method enter 1,For mid point enter 2,for ralfson enter 3:2
y(0.000000)= 1.000000
y(1.000000)= 0.536133
y(2.000000)= 0.346471
y(3.000000)= 0.415156
y(4.000000)= 1.591802
function:y*(t^3)-1.5*y>>
>> rk
Enter your equation in terms of variable x:y*(t^3)-1.5*y
Enter the initial limit of x:0
Enter the final limit of x:2
Enter value of h:0.5
For Heus method enter 1,For mid point enter 2,for ralfson enter 3:1
y(0.000000)= 1.000000
y(0.500000)= 0.539063
y(1.000000)= 0.332703
y(1.500000)= 0.408081
y(2.000000)= 1.884185
function:y*(t^3)-1.5*y>>
>> rk
Enter your equation in terms of variable x:y*(t^3)-1.5*y
Enter the initial limit of x:0
Enter the final limit of x:2
Enter value of h:0.5
For Heus method enter 1,For mid point enter 2,for ralfson enter 3:3
y(1.000000)= 1.000000
y(2.000000)= 0.413940
y(3.000000)= 0.216171
y(4.000000)= 0.253528
function:y*(t^3)-1.5*y>>
```


RK Ralfson Method
y
x
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.5
1
1.5

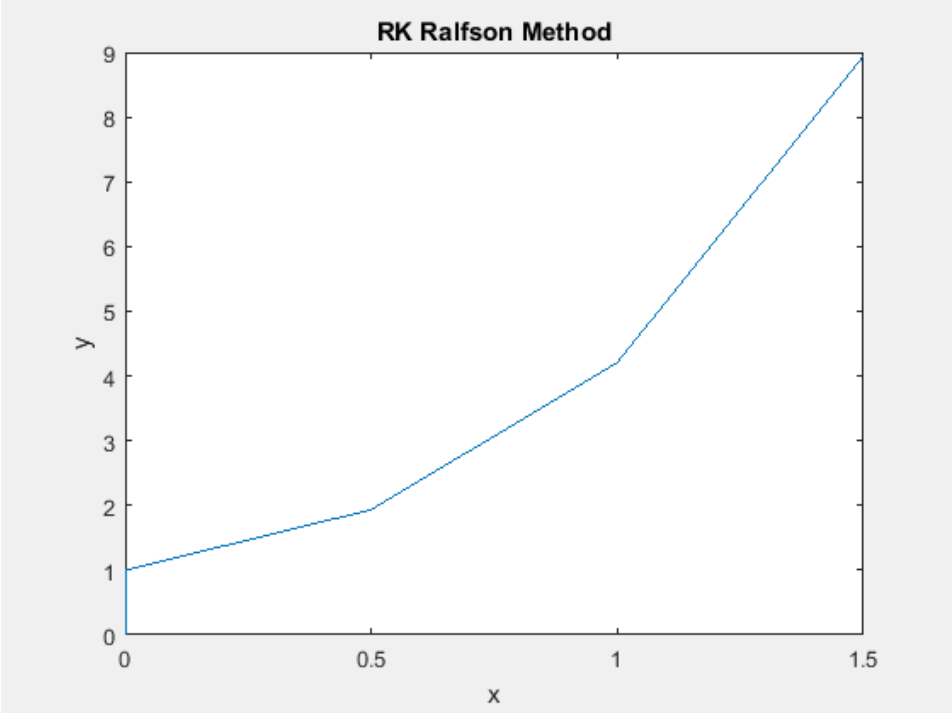

RK Mid point Method
y
x
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

```
>> rk
Enter your equation in terms of variable x:y*(sint^3)
Enter the initial limit of x:0
Enter the final limit of x:2
Enter value of h:0.5
For Heus method enter 1,For mid point enter 2,for ralfson enter 3:1
y(0.000000)= 1.000000
y(0.500000)= 1.031250
y(1.000000)= 1.337402
y(1.500000)= 3.364403
y(2.000000)= 24.286783
function:y*(sint^3)>>
>> rk
Enter your equation in terms of variable x:(1+2*x)*(y^0.5)
Enter the initial limit of x:0
Enter the final limit of x:2
Enter value of h:0.5
For Heus method enter 1,For mid point enter 2,for ralfson enter 3:3
y(1.000000)= 1.000000
y(2.000000)= 1.934019
y(3.000000)= 4.210989
y(4.000000)= 8.941721
function:(1+2*x)*(y^0.5)>>
```

Sine Function



Square root function



Program:

```
a=input('Enter your equation in terms of variable x:','s');
xi=input('Enter the initial limit of x:');
xf=input('Enter the final limit of x:');
h=input('Enter value of h:');
s=input('For Heus method enter 1,For mid point enter 2,for ralfson enter
3:');
fun=inline(a);
y=1;
n=(xf/h);
t=xi;
c(1)=0;
u(1)=0;
switch s
    case 1
   for i=0:n
    c(i+1)=t;
    u(i+1)=y;
    k1=fun(t,y);
    k2=fun(t+h,y+k1*h);
    fprintf('y(%f)= %f\n',t,y);
    y=y+(h*0.5)*(k1+k2);
    t=t+0.5;
   end

    case 2
        for j=0:n
          c(j+1)=t;
          u(j+1)=y;
```

```
            k1=fun(t,y);
            k2=fun(t+(h/2),y+(h*k1/2));
            fprintf('y(%f)= %f\n',j,y);
            y=y+(h*k2);
            t=t+0.5;
             end
    case 3
              for k=1:n
            c(k+1)=t;
            u(k+1)=y;
            k1=fun(t,y);
            k2=fun(t+(h*(3/4)),y+(h*k1*(3/4)));
            fprintf('y(%f)= %f\n',k,y);
            y=y+(((0.5*k1)+((2/3)*k2))*h);
            t=t+0.5;
              end
       otherwise
           fprintf('Invalid input\n');


end
fprintf('function:%s',a);
plot(c,u);
xlabel('x');
ylabel('y');
switch s
    case 1
        title('RK heuns Method ');
    case 2
        title('RK Mid point Method ');
    case 3
        title('RK Ralfson Method');
    otherwise
end
```