

```
close all; clear all; clc;
Vd=[.1 .2 .3 .4 .5 .6 .7 .8 .9 1.0];
ld=[0.6*10^(-9) 4.2*10^(-9) 29*10^(-9) 176*10^(-9) 10^(-6) 7.3*10^(-6) ✓
40*10^(-6) 252*10^(-6) 2.3*10^(-3) 26*10^(-3) ];
A=[length(Vd) sum(Vd);sum(Vd) sum(Vd.^2)];
B=[sum(log(ld)); sum(Vd.*(log(ld)))];
a=A\B;
z=a(1)+a(2).*Vd;
format long
ls=exp(a(1))
n=1/(a(2)*0.025875)
plot(Vd,z, '-',Vd,log(ld), '+')
```

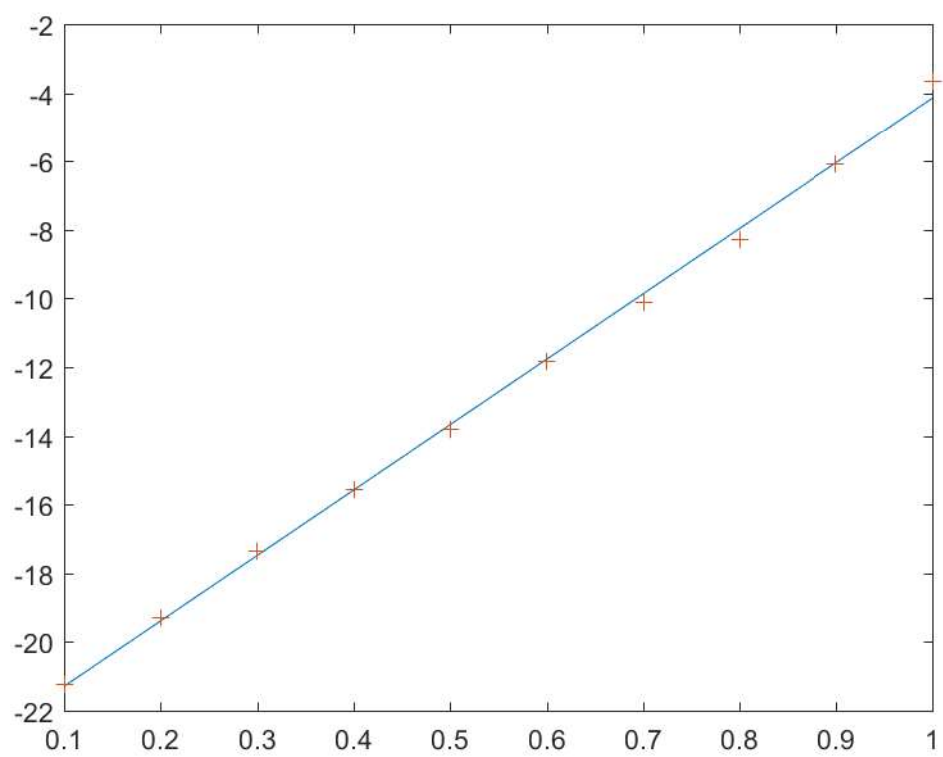
ls =

4.014601507781490e-05

n =

15.135055412689789

>>



```
close all; clear all; clc;
Vr = [1 2 3 4 5 6 7 8 9 10];
Pr = [.1 .38 .92 1.58 2.53 3.71 4.83 6.36 8.09 10.1];
n = length(Vr);
format long;
A = [n sum(log(Vr));sum(log(Vr)) sum((log(Vr)).^2)];
X = [];
Y = [sum(log(Pr)) sum(log(Pr).*log(Vr))];
X = Y/A;
a0 = X(1,1); a1 = X(1,2);
R = exp(-a0)
n = a1
yid = (Vr).^n./R;
plot(Vr,Pr,'o');
hold on;
plot(Vr,yid)
```

```
close all; clear all; clc;
```

```
%task 2
```

```
Vr = [1 2 3 4 5 6 7 8 9 10];
```

```
Pr = [.1 .38 .92 1.58 2.53 3.71 4.83 6.36 8.09 10.1];
```

```
n = length(Vr);
```

```
A = [n sum(Vr) sum(Vr.^2);sum(Vr) sum(Vr.^2) sum(Vr.^3);sum(Vr.^2) sum(Vr.^3) sum(Vr.^4)];
```

```
X = [];
```

```
Y = [sum(Pr); sum(Pr.*Vr); sum(Pr.*(Vr.^2))];
```

```
X = Y\A;
```

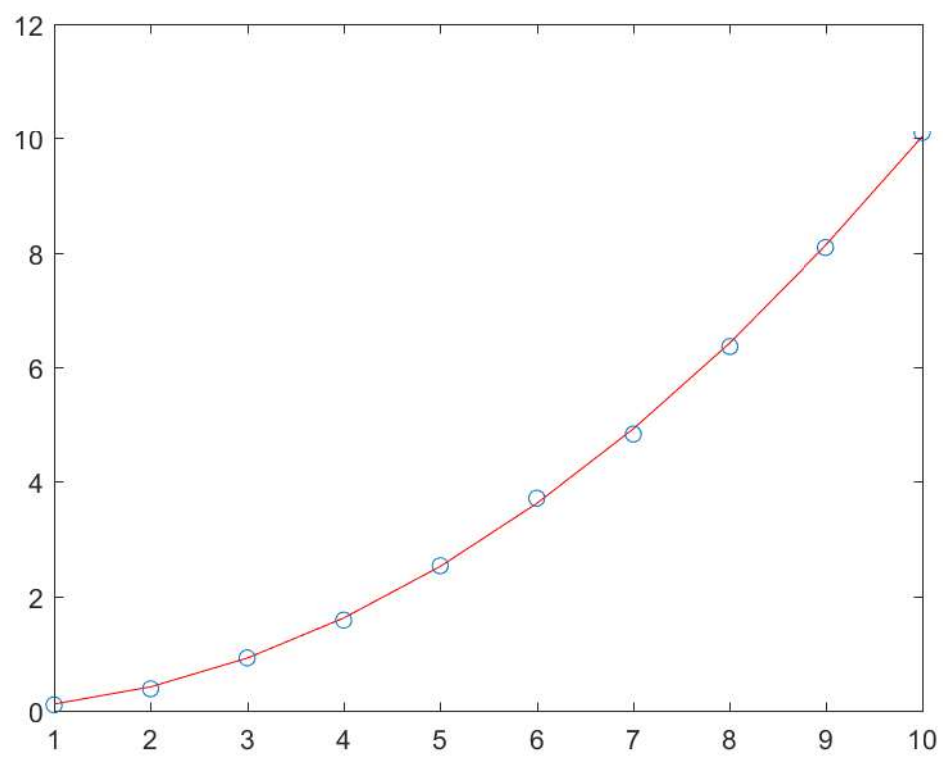
```
a0 = X(1)
```

```
a1 = X(2)
```

```
a2 = X(3)
```

```
yid = a0+a1.*Vr+a2.*(Vr.^2);
```

```
plot(Vr,yid./100,'r',Vr,Pr,'o');
```



a0 =

0.151958766215834

a1 =

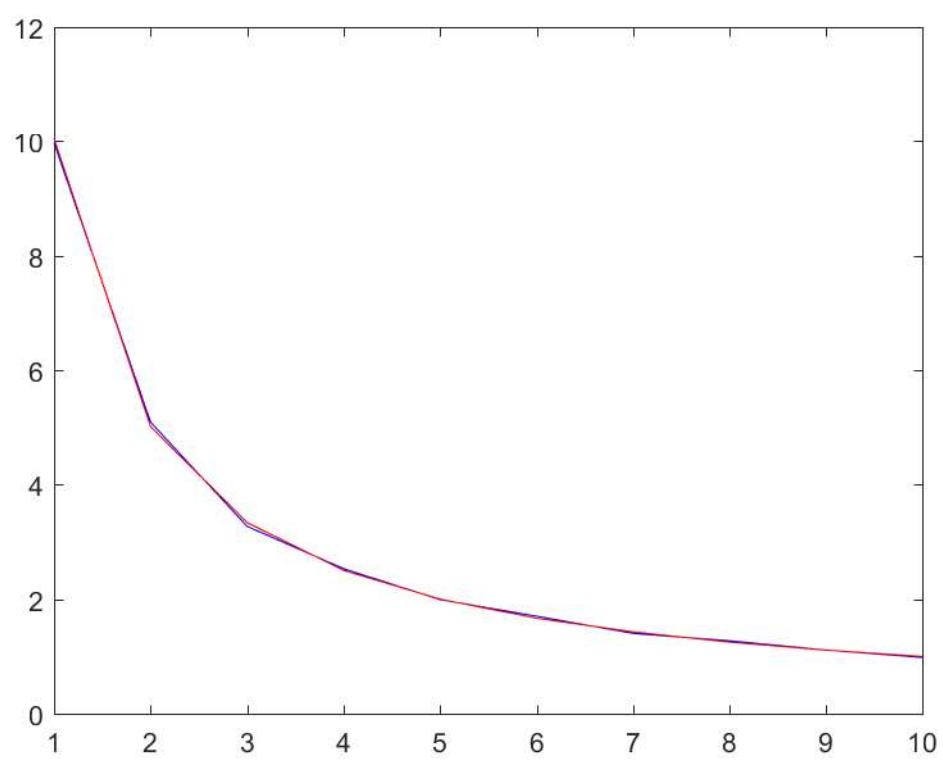
1.191639549119859

a2 =

9.969768712606626

>>

```
close all; clear all; clc;
r = [1 2 3 4 5 6 7 8 9 10];
i = [9.97 5.09 3.27 2.53 1.99 1.7 1.4 1.27 1.11 .98];
l = log(i); R = log(r);
A = [length(r) sum(R); sum(R) sum(R.^2)];
Y = [sum(l); sum(l.*R)];
x = A\Y;
Vs = exp(x(1))
n = -x(2)
plot(r,i,'b');
hold on;
yi = Vs./(R.^n);
yi = x(1)+x(2).*R;
plot(r,exp(yi),'r');
```

$V_s =$

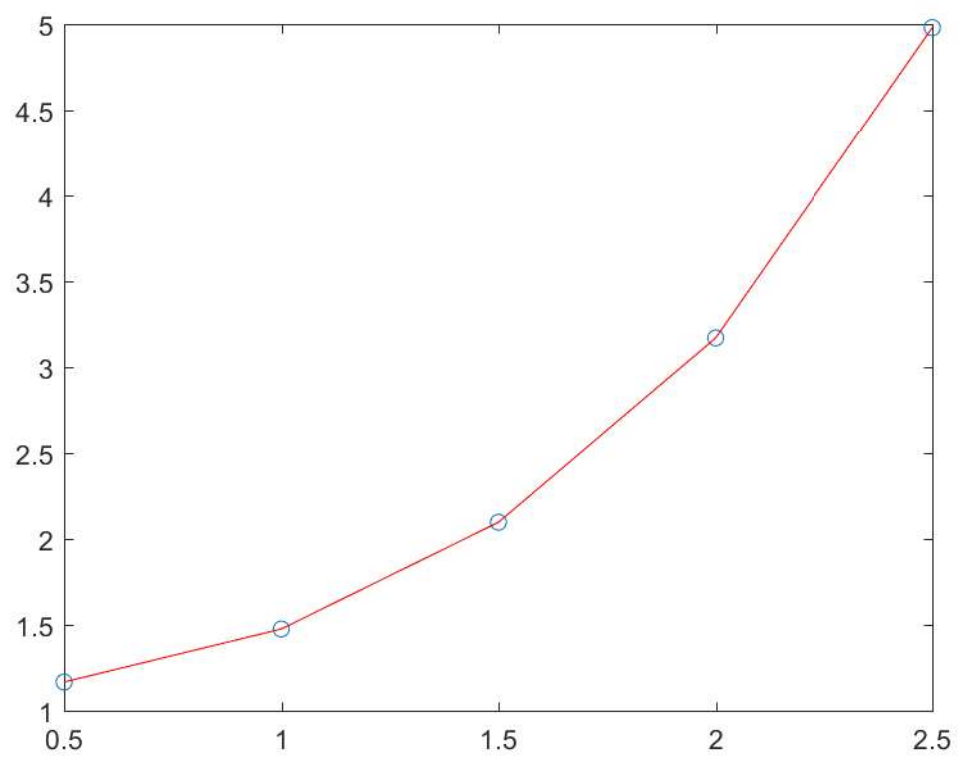
10.0438002080931

$n =$

1.00310279422768

>>

```
close all; clear all; clc;
r = [.5 1 1.5 2 2.5];
i = [1.166 1.475 2.0967 3.17 4.98 ];
l = log(i); R = log(r);
A = [length(r) sum(R) sum(R.^2) sum(R.^3) sum(R.^4);sum(R) sum(R.^2) sum(R.^3) sum(R.^4) sum(R.^5);sum(R.^2) sum(R.^3) sum(R.^4) sum(R.^5) sum(R.^6);sum(R.^3) sum(R.^4) sum(R.^5) sum(R.^6) sum(R.^7);sum(R.^4) sum(R.^5) sum(R.^6) sum(R.^7) sum(R.^8)];
Y = [sum(l);sum(l.*R);sum(l.*(R.^2)); sum(l.*(R.^3));sum(l.*(R.^4))];
x = A\Y;
yi = x(1)+x(2).*R +x(3).*(R.^2)+x(4).*(R.^3)+x(5).*(R.^4);
plot(r,i,'o');
hold on;
plot(r,exp(yi),'r');
```



%interpolation. problem1 & 2

close all; clear all; clc;

x = [1 2 4 6];

y = [1 8 64 216];

xn = x(1):0.1:x(end);

yn = linear_interp(x,y,xn);

ynp=polynomial_interp(x,y,xn);

subplot(2,1,1)

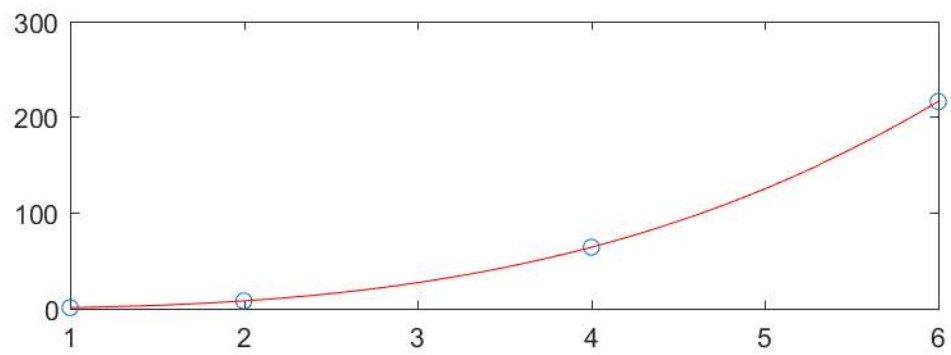
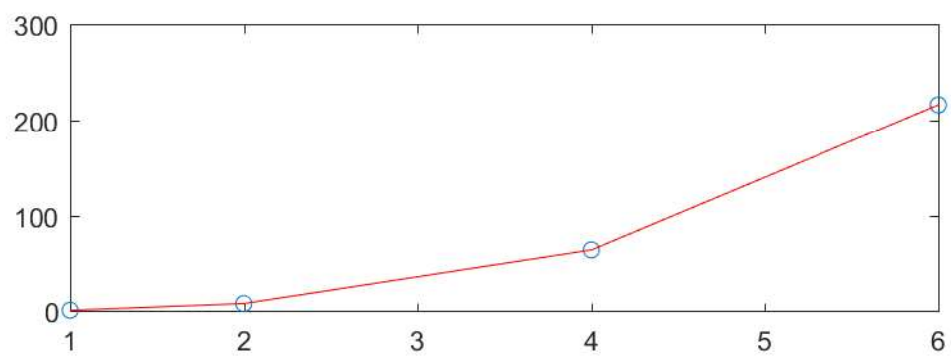
plot(x,y,'o',xn,yn,'r');

subplot(2,1,2)

plot(x,y,'o',xn,ynp,'r');

```
function [ yn ] = linear_interp( x,y,xn )
n = length(x); N = length(xn);
m = 1;
for i = 1:N
    for j = 1:n-1
        if xn(i) > x(j) && xn(i) < x(j+1)
            m=j;
        end
    end
    yn(i)=((xn(i)-x(m+1))*y(m)/(x(m)-x(m+1)))-((xn(i)-x(m))*y(m+1)/(x(m)-x
(m+1)));
end
end
```

```
function [ yn ] = polynomial_interp(x,y,xn)
n=length(x);
N=length(xn);
for i=1:N
    p = 0;
    for j = 1:n
        s = 1;
        for k = 1:n
            if j~=k
                s=s*(xn(i)-x(k))/(x(j)-x(k));
            end
        end
        p=p+s*y(j);
    end
    yn(i) = p;
end
```



%Interpolation,Problem 3

close all; clear all; clc;

n=input('Number of data points:');

for i=1:n

 x(i)=input('x value:');

 y(i)=input('y value:');

end

interp_mode=input('Press 1 for linear and 2 for polynomial:');

xn=x(1):0.1:x(end);

if interp_mode == 1

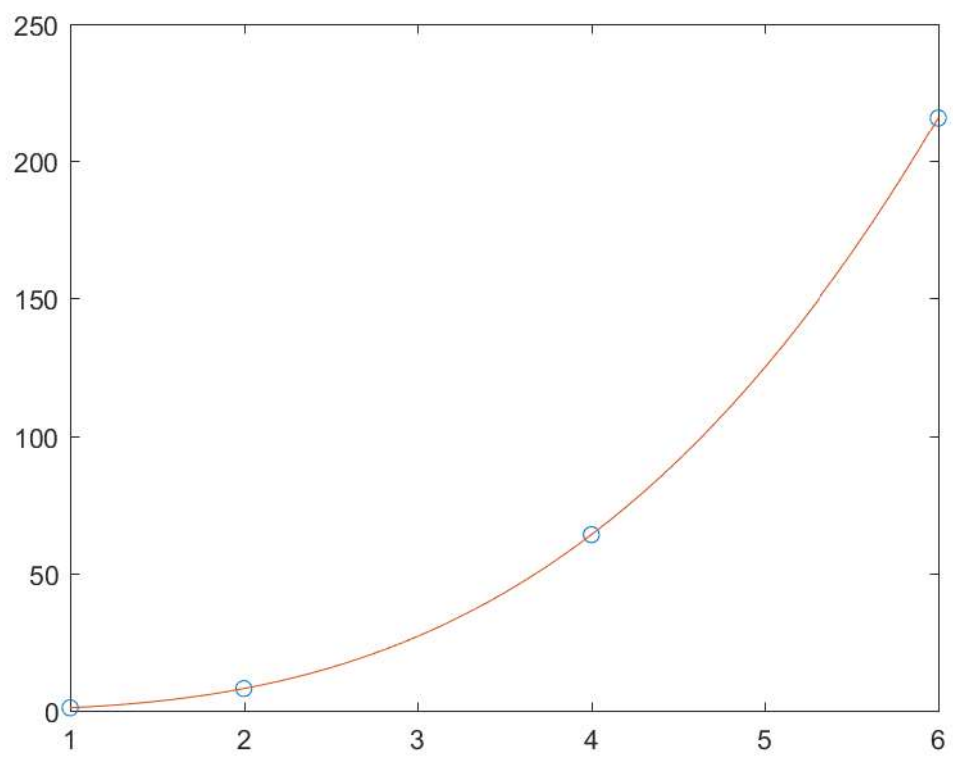
 yn = linear_interp(x,y,xn);

else

 yn = polynomial_interp(x,y,xn);

end

plot(x,y,'o',xn,yn);



Number of data points:4

x value:1

y value:1

x value:2

y value:8

x value:4

y value:64

x value:6

y value:216

Press 1 for linear and 2 for polynomial:2

>>