

I wrote a program called poly.c which was

```
1 #include <stdio.h>
2 #include <math.h>
3
4 void mkdiff(int n,double X[n],double Y[n],
5             double P[n+1][n]){
6     for(int i=0;i<n;i++){
7         P[0][i]=X[i]; P[1][i]=Y[i];
8     }
9     for(int j=2;j<=n;j++){
10        for(int i=0;i<=n-j;i++){
11            P[j][i]=P[j-1][i+1]-P[j-1][i];
12        }
13    }
14 }
15 double evalP(int n,double P[n+1][n],
16              double h,double x){
17     double z=1.0,r=z*P[1][0];
18     for(int j=2;j<=n;j++){
19         z*=(x-P[0][j-2])/((j-1)*h);
20         r+=z*P[j][0];
21     }
22     return r;
23 }
24 void printP(int n,double P[n+1][n]){
25     for(int i=0;i<n;i++){
26         for(int j=0;j<=n;j++){
27             printf("%g ",P[j][i]);
28         }
29         printf("\n");
30     }
31 }
32 #define N 4
33 #define H 1.0
34 double X[N]={1, 2, 3, 4};
35 double Y[N]={-1,2,4,-3};
36 double P[N+1][N];
37 int main(){
38     mkdiff(N,X,Y,P);
39     // printP(N,P);
40     for(int k=0;k<50;k++){
41         double x=k/10.0;
42         printf("%g %g\n",x,evalP(N,P,H,x));
43     }
44     return 0;
45 }
```

The output was this:

0 3  
0.1 2.057  
0.2 1.256  
0.3 0.589  
0.4 0.048  
0.5 -0.375  
0.6 -0.688  
0.7 -0.899  
0.8 -1.016  
0.9 -1.047  
1 -1  
1.1 -0.883  
1.2 -0.704  
1.3 -0.471  
1.4 -0.192  
1.5 0.125  
1.6 0.472  
1.7 0.841  
1.8 1.224  
1.9 1.613  
2 2  
2.1 2.377  
2.2 2.736  
2.3 3.069  
2.4 3.368  
2.5 3.625  
2.6 3.832  
2.7 3.981  
2.8 4.064  
2.9 4.073  
3 4  
3.1 3.837  
3.2 3.576  
3.3 3.209  
3.4 2.728  
3.5 2.125  
3.6 1.392  
3.7 0.521  
3.8 -0.496  
3.9 -1.667  
4 -3  
4.1 -4.503  
4.2 -6.184  
4.3 -8.051  
4.4 -10.112  
4.5 -12.375  
4.6 -14.848  
4.7 -17.539  
4.8 -20.456

4.9 -23.607

The graph was this:

