CURVE FITTING USING POLYNOMIALS

Problem Statement: Obtain the best fit curve for the relation between the arrays x and y for one degree, two-degree, three degree and fourth degree polynomial curves.

```
import numpy as np
import matplotlib.pyplot as plt
x= [1,3,5,7,9,11,12]
y= [5,7,18,10,28,15,42]
xx=np.linspace(np.min(x),np.max(x),101)

p1=np.polyfit(x,y,1)
p1=np.poly1d(p1)
print("First Degree equation is p1=",'\n',p1)
y1=np.polyval(p1,xx)



p2=np.polyfit(x,y,2)
p2=np.poly1d(p2)
print("Second Degree equation is p2=",'\n',p2)
y2=np.polyval(p2,xx)
```

```
p3=np.polyfit(x,y,3)
p3=np.poly1d(p3)
print("Third Degree equation is p3=",'\n',p3)
y3=np.polyval(p3,xx)


p4=np.polyfit(x,y,4)
p4=np.poly1d(p4)
print("Fourth Degree equation is p4=",'\n',p4)
y4=np.polyval(p4,xx)

plt.plot(x,y,'o')
plt.plot(xx,y1,'b')
plt.plot(xx,y2,'g')
plt.plot(xx,y3,'r')
plt.plot(xx,y4,'k')
plt.legend(['Data','1','2','3','4'])
plt.grid()
```

OUTPUT

First Degree equation is p1=

$2.477\ x + 0.8697$

Second Degree equation is p2=

$0.1602\ x^2 + 0.3562\ x + 5.574$

Third Degree equation is p3=

$0.07311\ x^3 - 1.261\ x^2 + 7.821\ x - 3.026$

Fourth Degree equation is p4=

$0.03326\ x^4 - 0.7879\ x^3 + 6.038\ x^2 - 14.49\ x + 14.46$