1(b)

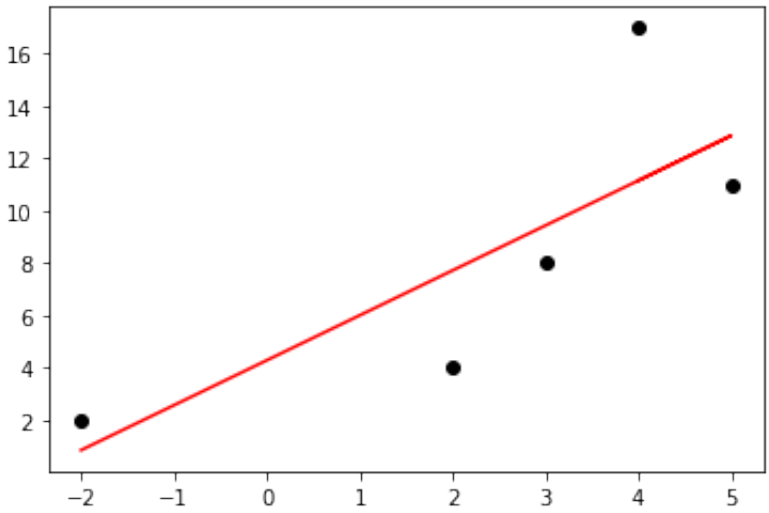
In [1]:

```
import numpy as np
import sympy as sym
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
lr = LinearRegression(normalize=True)
X = []
Y = []
print('Please enter the number of coordinates')
m = int(input())
for i in range(m):
    print('Please input X value')
    X.append(int(input()))
    print('Please input Y value')
    Y.append(int(input()))
    i+=1
sum_x = sum(X)
sum_y = sum(Y)
x_2 = 0
a_3 = 0
for i in range(m):
    x_2 += X[i]*X[i]
    a_3 += X[i]*Y[i]

# print(sum_x)
# print(sum_y)
# print(x_2)
# print(a_3)
b_0 = ((sum_x*a_3)-(sum_y*x_2))/((-m*x_2)+(sum_x*sum_x))
print('b_0 value = ', b_0)

b_1 = (a_3-(b_0*sum_x))/x_2
print('b_1 value = ', b_1)
g = []
for i in range(m):
    g.append(float())
    i+=1
for i in range(m):
    g[i] = b_0 + b_1*X[i]
    i+=1
#print(g)
# h = []
# for i in range(m):
#     h.append(float())
#     i+=1
# for i in range(m):
#     h[i] = [X[i],Y[i]]
#     i+=1
#print(h)
plt.scatter(X,Y, color = 'black')
plt.plot(X, g, color = 'red')
plt.show()
```

```
Please enter the number of coordinates
5
Please input X value
-2
Please input Y value
2
Please input X value
2
Please input Y value
4
Please input X value
3
Please input Y value
8
Please input X value
5
Please input Y value
11
Please input X value
4
Please input Y value
17
b_0 value =  4.273972602739726
b_1 value =  1.7191780821917808
```



1(c)

In [2]:

```
# load csv file
import csv
X.clear()
Y.clear()
with open('data.csv') as csv_file:
    csv_reader = csv.reader(csv_file, delimiter=',')
    headings = next(csv_reader)
    for row in csv_reader:
        #print(row)
        X.append(float(row[0]))
        Y.append(float(row[1]))

m = len(X)
# Using the code from above:
sum_x = sum(X)
sum_y = sum(Y)
x_2 = 0
a_3 = 0
for i in range(m):
    x_2 += X[i]*X[i]
    a_3 += X[i]*Y[i]

b_0 = ((sum_x*a_3)-(sum_y*x_2))/((-m*x_2)+(sum_x*sum_x))
b_1 = (a_3-(b_0*sum_x))/x_2

print('b_0 value =',b_0)
print('b_1 value =',b_1)

#Since the above solution runs, the following are the new b_0 and b_1 values
```

```
b_0 value = 4.080657141896105
b_1 value = -0.44236913850438075
```