Question 1

[-6,-6,-6,-5,-4,-4,-1,1,2,9];

[-7,-7,-7,-6,-5,-5,-2,0,1,8]

The coefficient is 1

[-10,-7,-6,-3,0,2,3,5,10,10];

[-12,-22,-21,-18,11,13,-12,-10,8,21]

The coefficient is 0.7113

[-6,-5,-5,-2,-2,1,3,5,8,9];

[8,-7,-7,-20,-4,-17,-15,3,6,7]

The coefficient is 0.3148

[-7,-5,-1,1,3,4,4,8,9,10];

[17,-37,-5,-3,27,0,-28,4,-23,6]

The coefficient is 0.0303

[-10,-10,-10,-9,-3,-2,1,2,2,10];

[-5,-5,35,14,8,-13,-16,3,23,-5]

The coefficient is -0.2758

[-7,-7,-2,-1,0,0,4,4,6,7];

[20,11,-3,5,13,-5,9,-9,-2,-12]

The coefficient is -0.6956

[-10,-6,-4,-3,0,1,3,3,3,8];

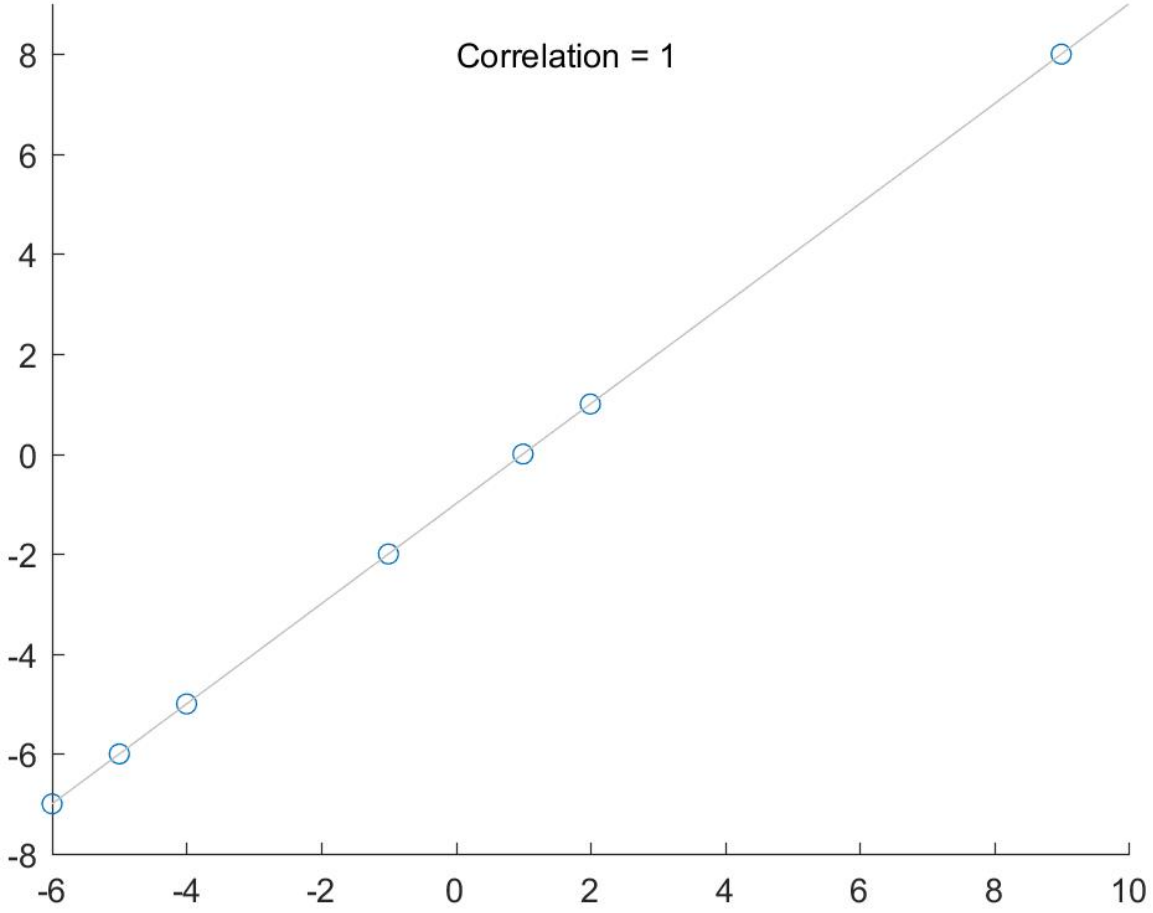
[12,8,6,5,2,1,-1,-1,-1,-6]

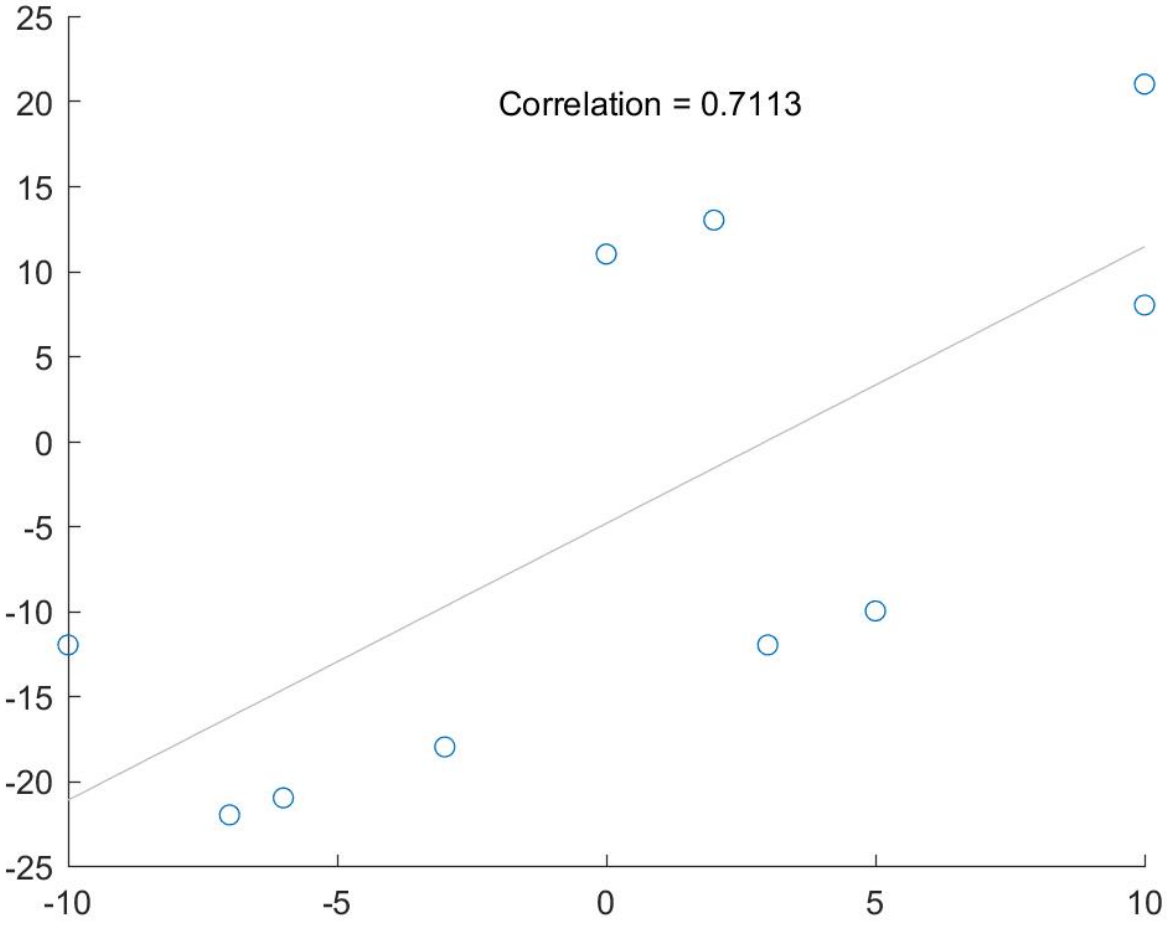
The coefficient is -1

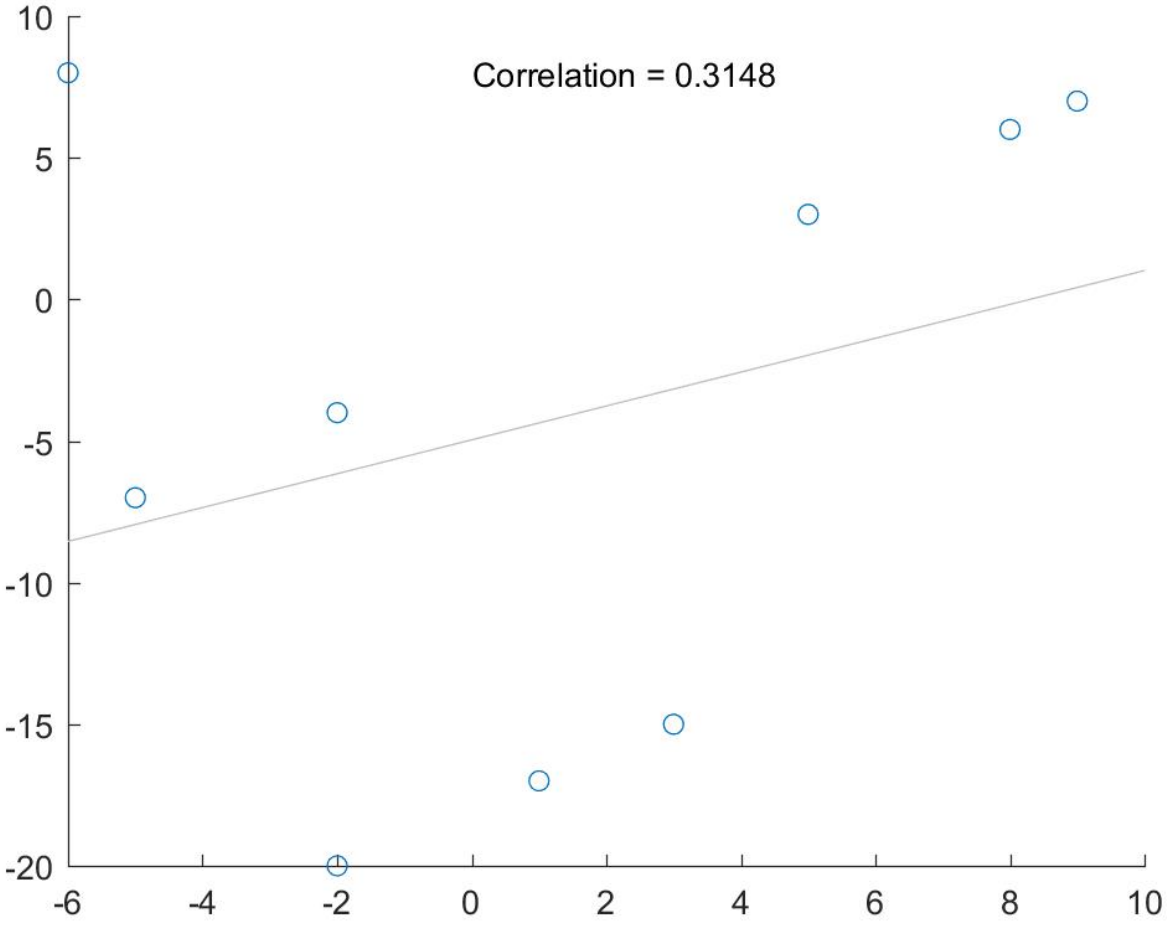
Theory I find is that the amount of noise should be the square root of the product of both vectors standard deviation.

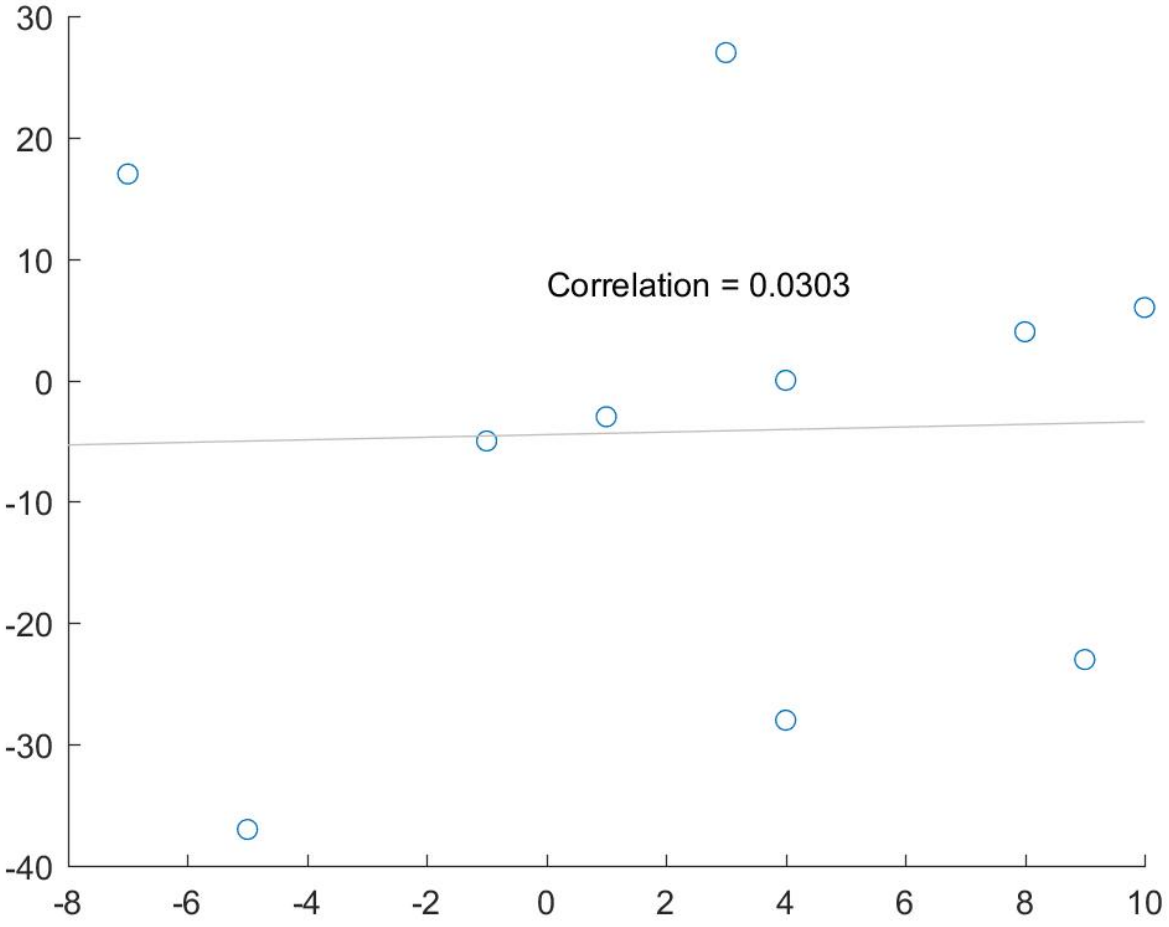
If we want vectors haave coefficient near 1, we need add no noise; if we want 0.7, add 1 times noise; if we want 0.3, add 3 times noise; if we want 0, add 5 times noise; if we want -1, we need set a vector's element equals to the others' negative.

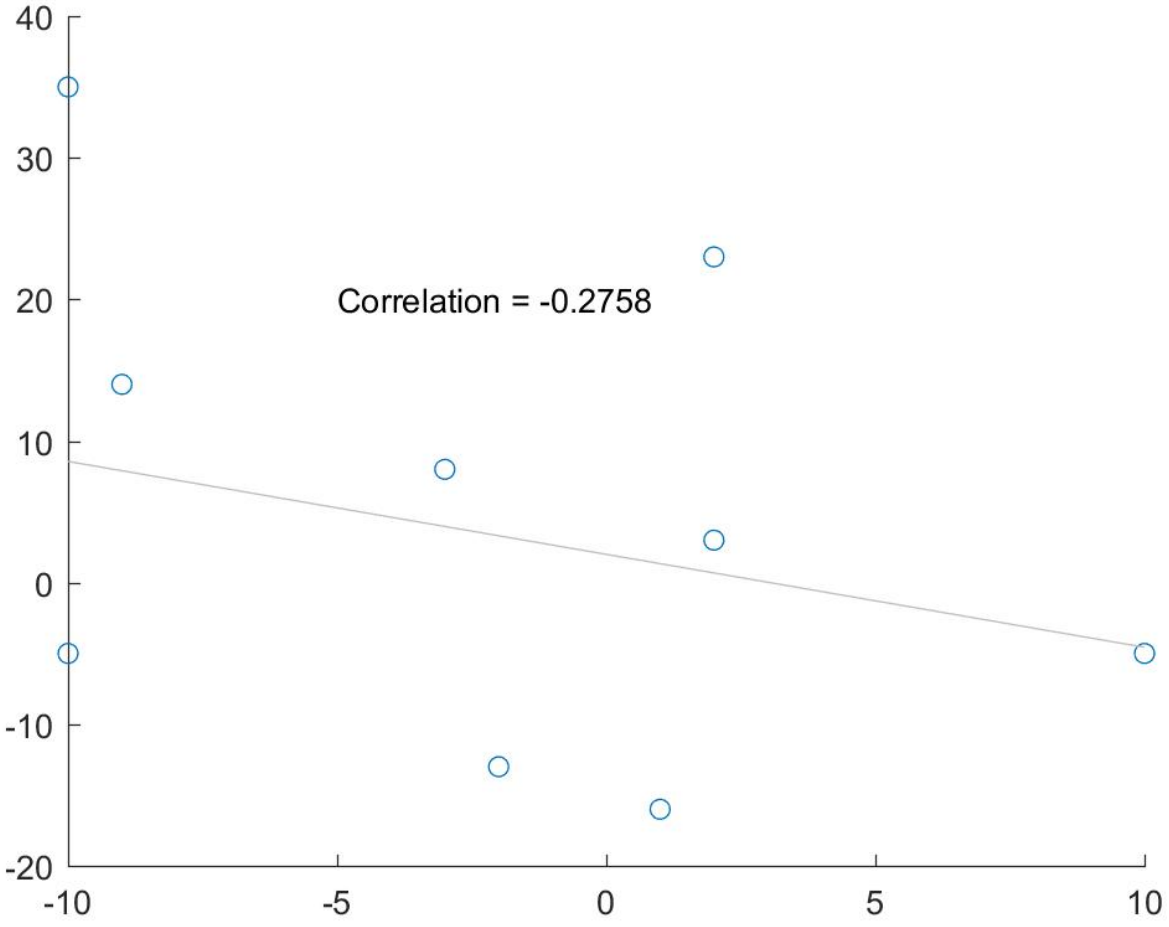
Question 2

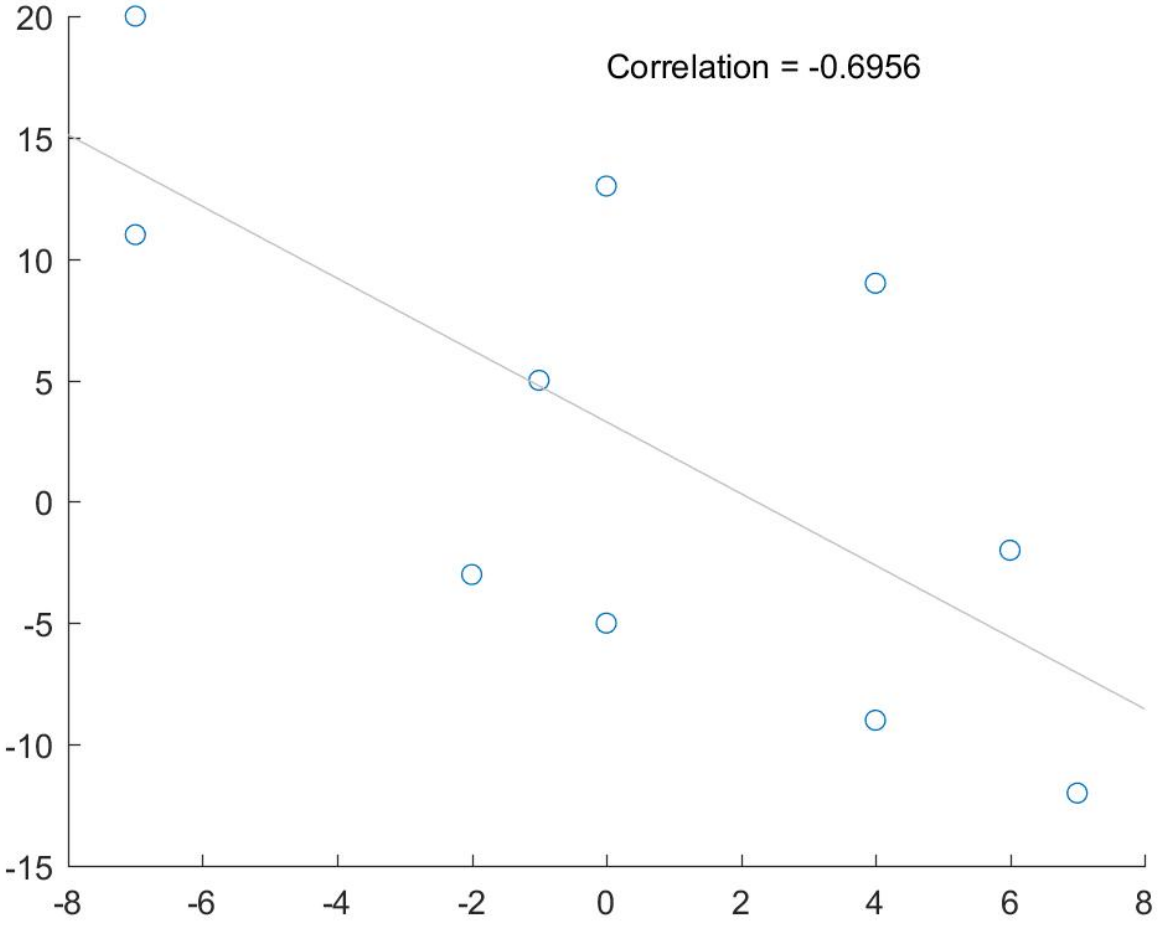


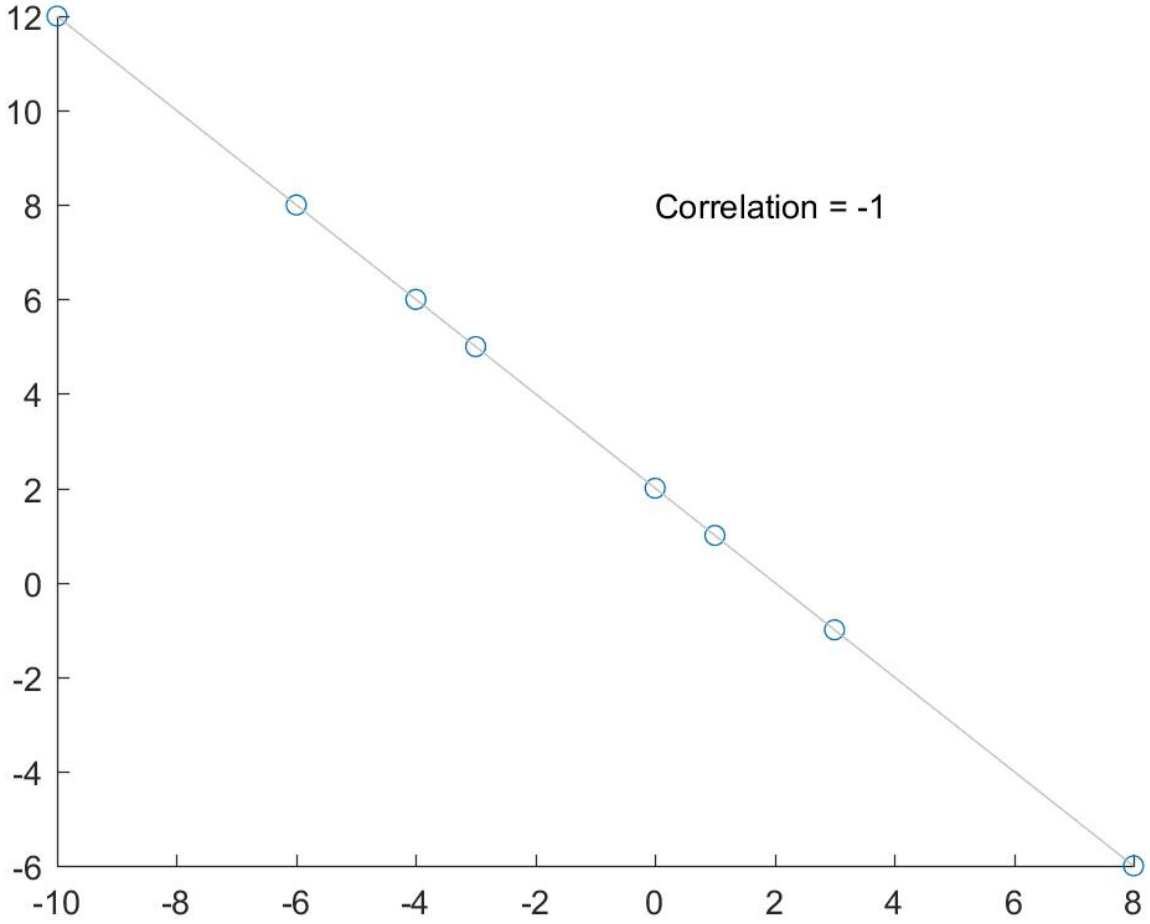

Correlation = 0.7113
25
20
15
10
5
0
-5
-10
-15
-20
-25
-10
-5
0
5
10


Correlation = 0.3148
10
5
0
-5
-10
-15
-20
-6
-4
-2
0
2
4
6
8
10


Correlation = 0.0303
30
20
10
0
-10
-20
-30
-40
-8
-6
-4
-2
0
2
4
6
8
10


Correlation = -0.2758
40
30
20
10
0
-10
-20
-10
-5
0
5
10


Correlation = -0.6956
20
15
10
5
0
-5
-10
-15
-8
-6
-4
-2
0
2
4
6
8


Correlation = -1
12
10
8
6
4
2
0
-2
-4
-6
-10
-8
-6
-4
-2
0
2
4
6
8