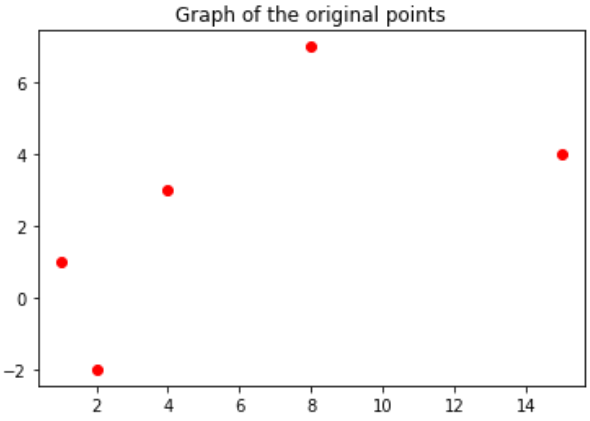
Application examples of the coursework

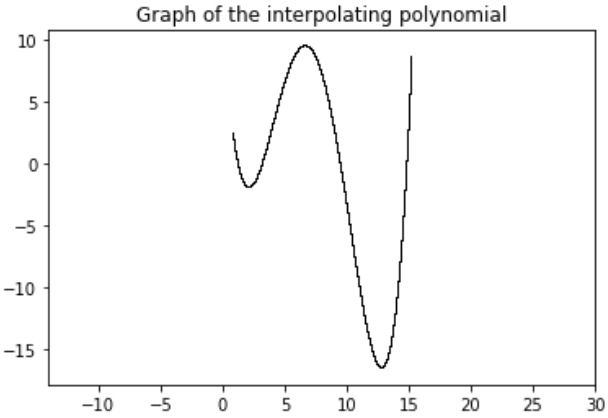
This is an example of program execution; I used the sys library so the file to be read from (table.txt) and the number of points plotted in the final graph (100000) are fed in the same line in which I run the program. If, however, you want to write all of this inside the py file, you will only have to write run "refdefpython.py" in that line

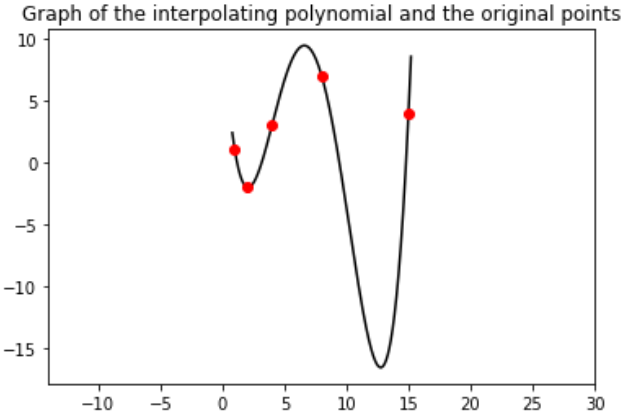
In [3]:
```
run "refdefpython.py" table.txt 100000
```

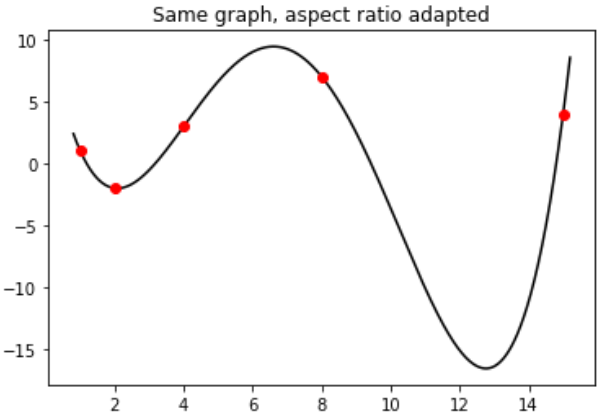
```
Your abscissae  [1.0, 2.0, 4.0, 8.0, 15.0]
Your ordinates  [1.0, -2.0, 3.0, 7.0, 4.0]
this is a representation of the points in the Cartesian plane:
```




```
The time taken is:  0.09085512161254883
```







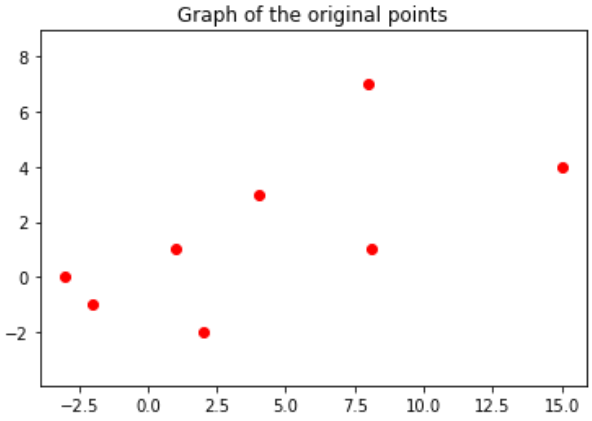
If we increase the number of points

In [4]:
```
with open("table.txt") as file:
    with open("table0.txt", "w") as file0:
        for line in file:
            file0.write(line)
file0.close()
file.close()
```

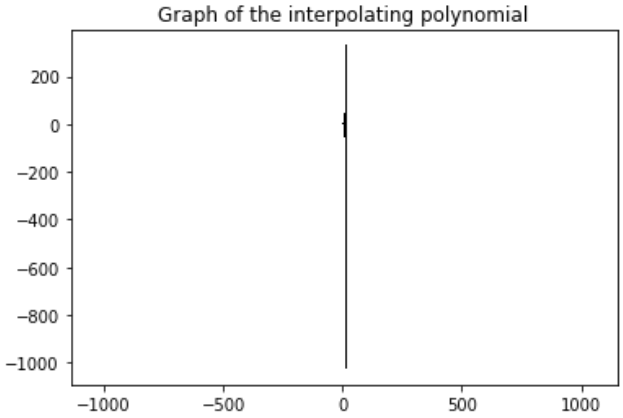
In [5]:
```
file=open("table0.txt","a")
file.write("{:.20f} \t {:.20f} \n".format(8.1,1))
file.write("{:.20f} \t {:.20f} \n".format(-2,-1))
file.write("{:.20f} \t {:.20f} \n".format(-3, 0))
file.close()
```

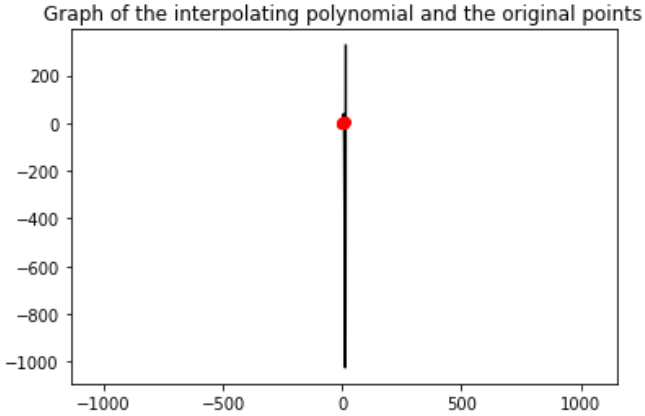
In [6]:
```
run "refdefpython.py" table0.txt 100000
```

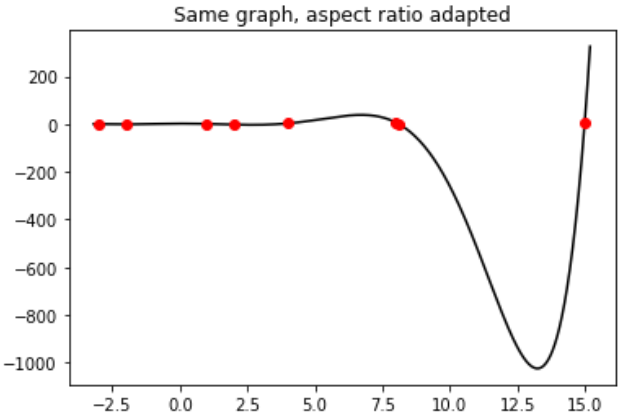
```
Your abscissae  [1.0, 2.0, 4.0, 8.0, 15.0, 8.1, -2.0, -3.0]
Your ordinates  [1.0, -2.0, 3.0, 7.0, 4.0, 1.0, -1.0, 0.0]
this is a representation of the points in the Cartesian plane:
```




```
The time taken is:  29.329187154769897
```







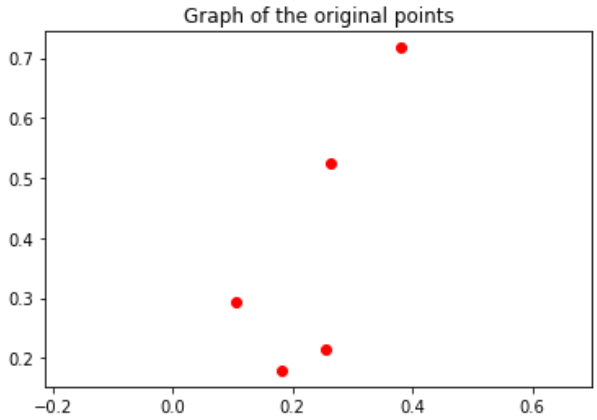
We create a brand new txt file from the Jupyter notebook itself.

In [9]:
```
from random import *
```

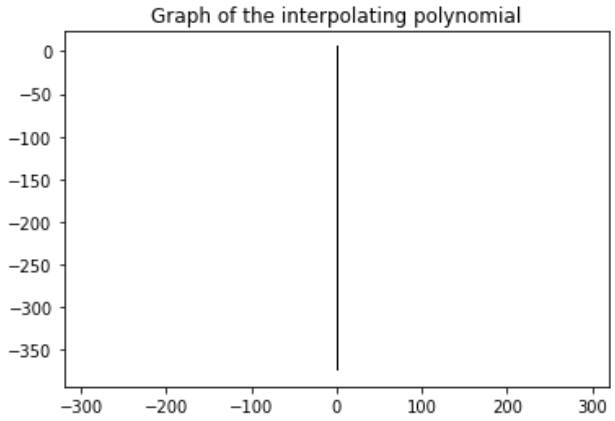
In [10]:
```
file=open("table1.txt","w")
for x in range(5):
    file.write("{:.20f} \t {:.20f} \n".format(random(),random()))

file.close()
```

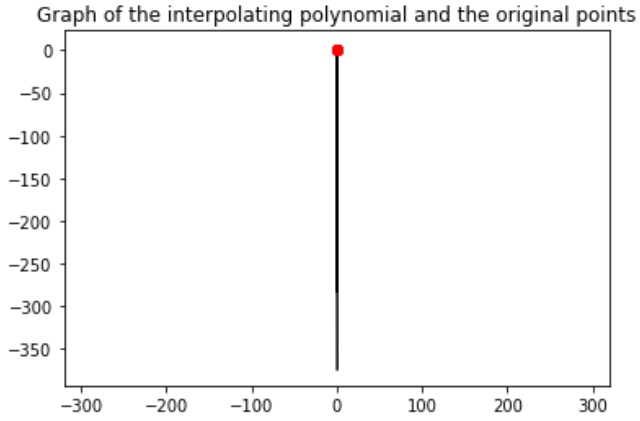
In [11]:
```
run "refdefpython.py" table1.txt 100000
```

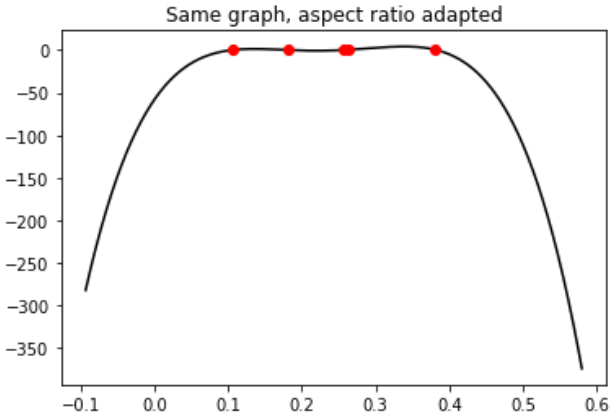
```
Your abscissae  [0.18183383885492455, 0.10610118269930635, 0.2631893412954622
3, 0.2567268844776961, 0.38018629983703545]
Your ordinates  [0.1791358730986249, 0.29319091992859514, 0.5252361601944064,
0.2153443158519167, 0.7171306444103412]
this is a representation of the points in the Cartesian plane:
```




```
The time taken is:  0.06137871742248535
```



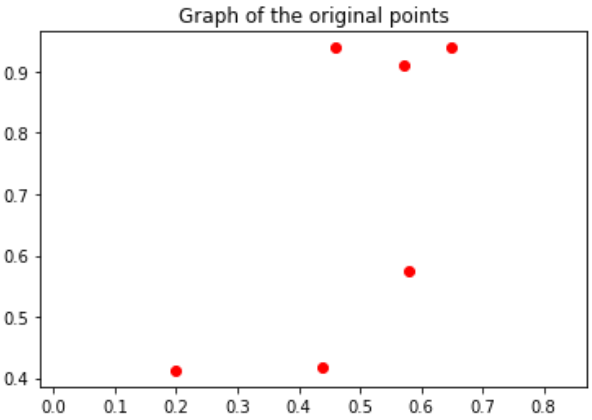




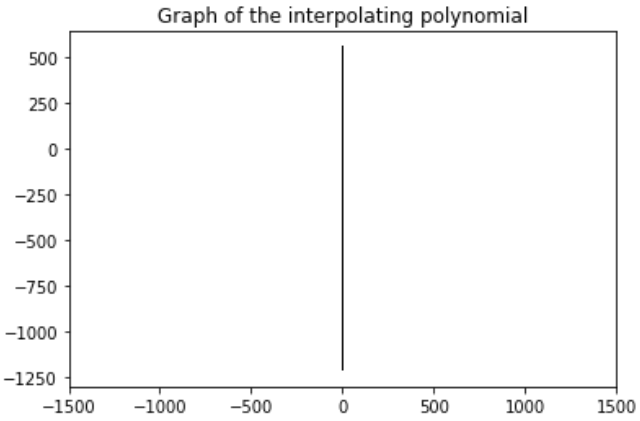
In [14]:
```
file=open("table2.txt","w")
for x in range(6):
    file.write("{:.20f} \t {:.20f} \n".format(random(),random()))

file.close()
```

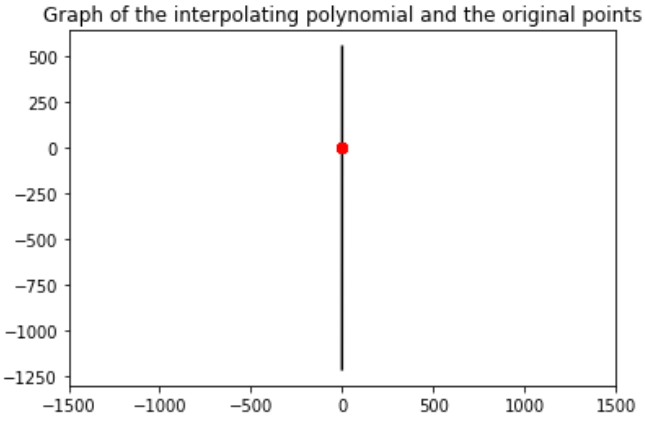
In [15]:
```
run "refdefpython.py" table2.txt 100000
```

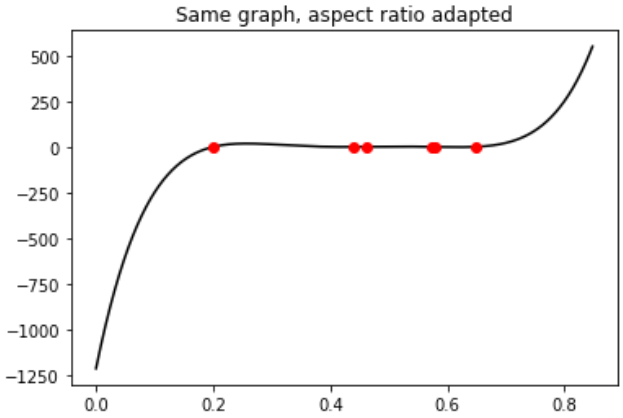
```
Your abscissae  [0.6479231109410769, 0.4609477902904441, 0.43906134623509185,
0.5729553446715119, 0.5797334966563505, 0.19954624802314147]
Your ordinates  [0.9387563702537409, 0.9391829440350736, 0.4168717813931403,
0.909983048343281, 0.5746702514183921, 0.412550379144053]
this is a representation of the points in the Cartesian plane:
```




```
The time taken is:  0.4386880397796631
```



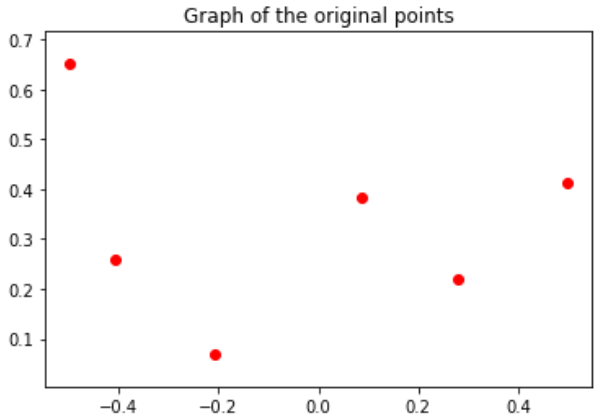




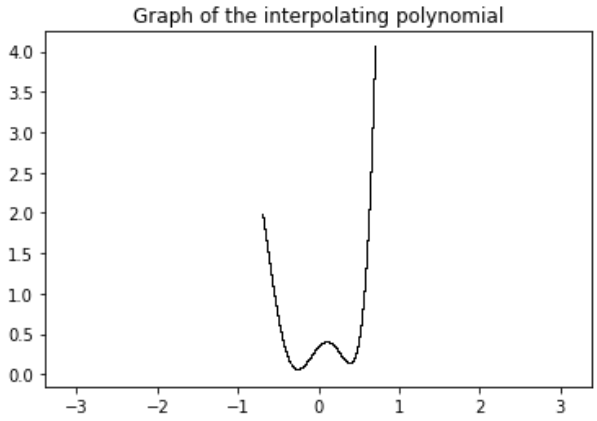
In [20]:
```
file=open("table3.txt","w")
for x in range(3):
    file.write("{:.20f} \t {:.20f} \n".format(random(),random()))
    file.write("{:.20f} \t {:.20f} \n".format(-random(),random()))
file.close()
```

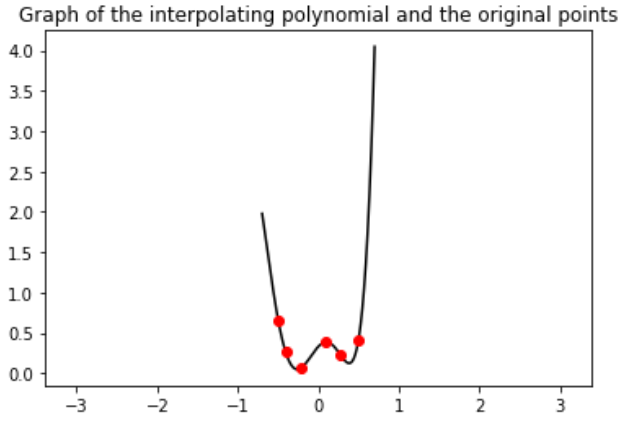
In [21]:
```
run "refdefpython.py" table3.txt 100000
```

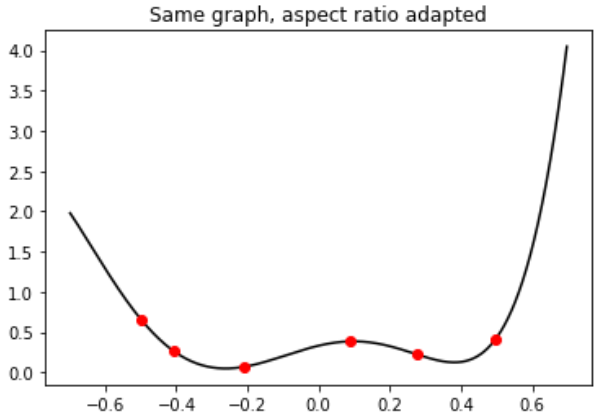
```
Your abscissae  [0.49723835441439224, -0.20743696916294752, 0.0871123252100237
7, -0.40657257182558915, 0.277620253812637, -0.4982728887563689]
Your ordinates  [0.41290815541391934, 0.06889671863964797, 0.3833777847175352
5, 0.2606134910292942, 0.21926272496393118, 0.6515594567648456]
this is a representation of the points in the Cartesian plane:
```




```
The time taken is:  0.46852612495422363
```






Same graph, aspect ratio adapted
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6