SCS2211 Laboratory II
Practical Sheet 03

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1.

```
octave:1> a = [11,12,2,3,45,3,42,7,89,100,105,8,98,3,7,23,21,28
,7,80,87,70,9,10,7,6]
a =

 Columns 1 through 10:

    11    12     2     3    45     3    42     7    89   100

 Columns 11 through 20:

   105     8    98     3     7    23    21    28     7    80

 Columns 21 through 26:

    87    70     9    10     7     6
```

a.

```
octave:2> mode(a)
ans = 7
```

b.

```
octave:3> median(a)
ans = 11.500
```

c.

```
octave:4> sort(a)
ans =

 Columns 1 through 10:

    2    3    3    3    6    7    7    7    7    8

 Columns 11 through 20:

    9   10   11   12   21   23   28   42   45   70

 Columns 21 through 26:

   80   87   89   98  100  105
```

d.
```
octave:5> mean(a)
ans = 33.962
```

e.
```
octave:6> sum(a)
ans = 883
```

f.
```
octave:7> min(a)
ans = 2
```

g.
```
octave:8> max(a)
ans = 105
```

2.

```
octave:9> w = ones(11,11)
w =

   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1
```

3.

```
octave:10> u = zeros(11,11)
u =

   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0
```

4.

```
octave:11> tril(w)
ans =

   1   0   0   0   0   0   0   0   0   0   0
   1   1   0   0   0   0   0   0   0   0   0
   1   1   1   0   0   0   0   0   0   0   0
   1   1   1   1   0   0   0   0   0   0   0
   1   1   1   1   1   0   0   0   0   0   0
   1   1   1   1   1   1   0   0   0   0   0
   1   1   1   1   1   1   1   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0
   1   1   1   1   1   1   1   1   1   0   0
   1   1   1   1   1   1   1   1   1   1   0
   1   1   1   1   1   1   1   1   1   1   1
```

5. D

```
octave:12> v = triu(w)
v =

   1   1   1   1   1   1   1   1   1   1   1
   0   1   1   1   1   1   1   1   1   1   1
   0   0   1   1   1   1   1   1   1   1   1
   0   0   0   1   1   1   1   1   1   1   1
   0   0   0   0   1   1   1   1   1   1   1
   0   0   0   0   0   1   1   1   1   1   1
   0   0   0   0   0   0   1   1   1   1   1
   0   0   0   0   0   0   0   1   1   1   1
   0   0   0   0   0   0   0   0   1   1   1
   0   0   0   0   0   0   0   0   0   1   1
   0   0   0   0   0   0   0   0   0   0   1
```

6.

```
octave:13> u - v
ans =

  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0   0  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0   0   0  -1  -1  -1  -1  -1  -1  -1  -1
   0   0   0   0  -1  -1  -1  -1  -1  -1  -1
   0   0   0   0   0  -1  -1  -1  -1  -1  -1
   0   0   0   0   0   0  -1  -1  -1  -1  -1
   0   0   0   0   0   0   0  -1  -1  -1  -1
   0   0   0   0   0   0   0   0  -1  -1  -1
   0   0   0   0   0   0   0   0   0  -1  -1
   0   0   0   0   0   0   0   0   0   0  -1
```

7.

```
octave:14> y = u - v
y =

  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0  -1  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0   0  -1  -1  -1  -1  -1  -1  -1  -1  -1
   0   0   0  -1  -1  -1  -1  -1  -1  -1  -1
   0   0   0   0  -1  -1  -1  -1  -1  -1  -1
   0   0   0   0   0  -1  -1  -1  -1  -1  -1
   0   0   0   0   0   0  -1  -1  -1  -1  -1
   0   0   0   0   0   0   0  -1  -1  -1  -1
   0   0   0   0   0   0   0   0  -1  -1  -1
   0   0   0   0   0   0   0   0   0  -1  -1
   0   0   0   0   0   0   0   0   0   0  -1
```

```
octave:15> sqrt(y)
ans =

 Columns 1 through 6:

   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 0i

 Columns 7 through 11:

   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 1i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 1i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 1i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 1i    0 + 1i
   0 + 0i    0 + 0i    0 + 0i    0 + 0i    0 + 1i
```

8.

```
octave:16> y = [1,19]
y =

    1    19

octave:17> z = [3,21]
z =

    3    21

octave:18> plot(y,z)
```


Figure 1

File   Edit   Tools
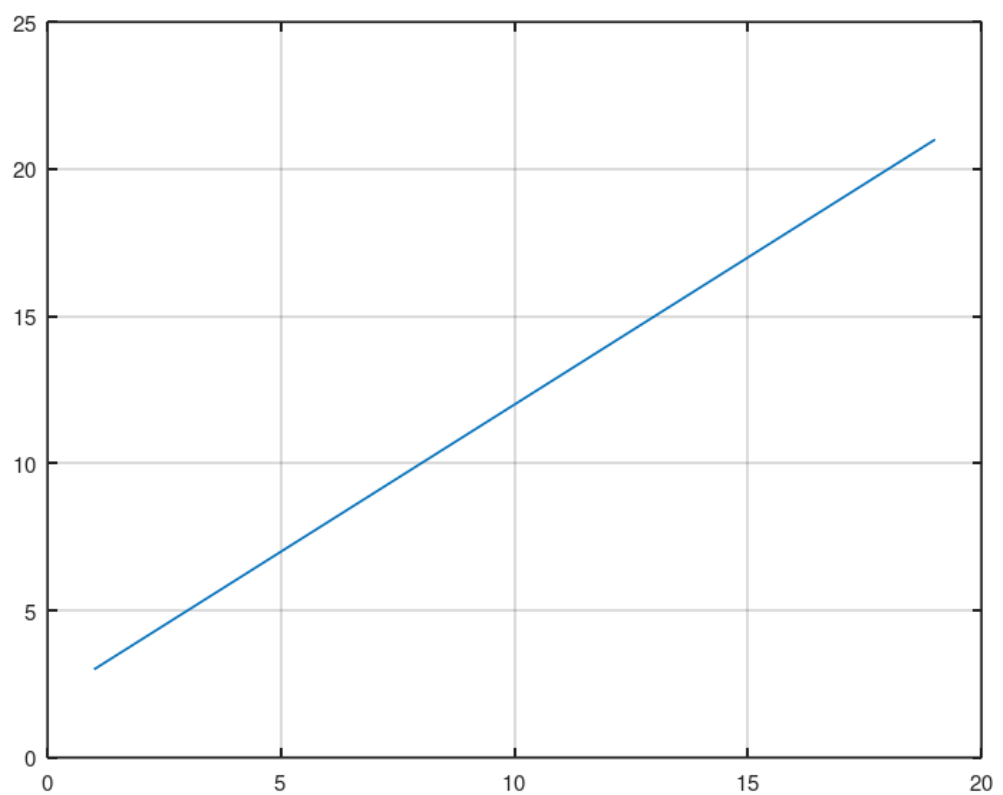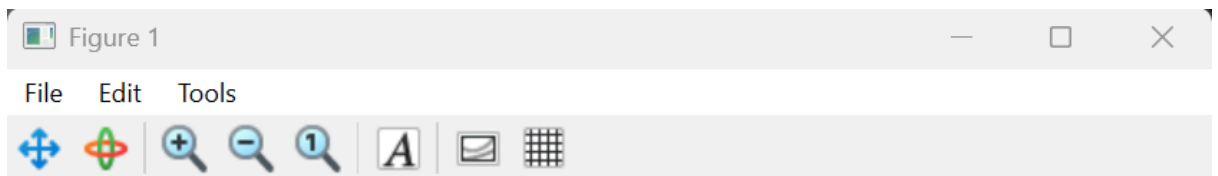
(19.641, 13.351)

9.

```
octave:19> x = [1,2,3,4,5,6,7]
x =

   1   2   3   4   5   6   7

octave:20> y = [1,4,9,16,25,36,49]
y =

    1    4    9   16   25   36   49

octave:21> plot(x,y)
```

Figure 1

File   Edit   Tools

sc01
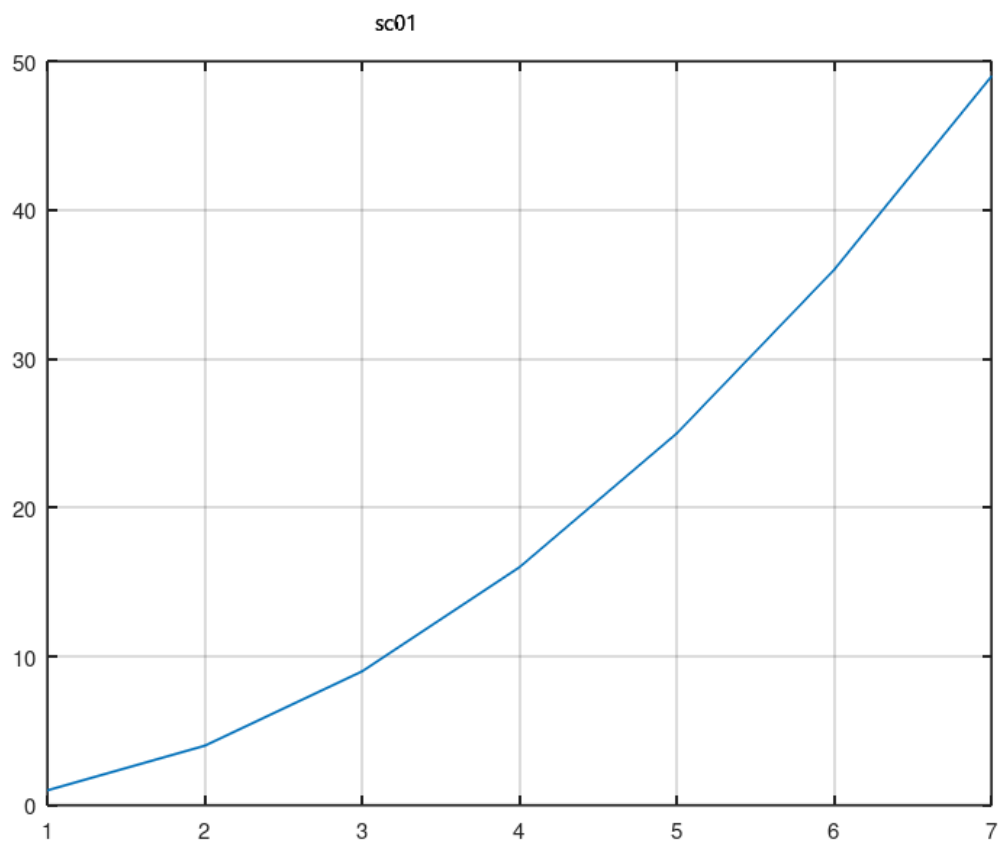
(6.671, 49.927)

10.

```
octave:22> x = linspace(1,7,98)
x =

 Columns 1 through 7:

    1.0000    1.0619    1.1237    1.1856    1.2474    1.3093    1.3711

 Columns 8 through 14:

    1.4330    1.4948    1.5567    1.6186    1.6804    1.7423    1.8041

 Columns 15 through 21:

    1.8660    1.9278    1.9897    2.0515    2.1134    2.1753    2.2371

 Columns 22 through 28:

    2.2990    2.3608    2.4227    2.4845    2.5464    2.6082    2.6701

 Columns 29 through 35:

    2.7320    2.7938    2.8557    2.9175    2.9794    3.0412    3.1031
```

```
 Columns 36 through 42:

    3.1649    3.2268    3.2887    3.3505    3.4124    3.4742    3.5361

 Columns 43 through 49:

    3.5979    3.6598    3.7216    3.7835    3.8454    3.9072    3.9691

 Columns 50 through 56:

    4.0309    4.0928    4.1546    4.2165    4.2784    4.3402    4.4021

 Columns 57 through 63:

    4.4639    4.5258    4.5876    4.6495    4.7113    4.7732    4.8351

 Columns 64 through 70:

    4.8969    4.9588    5.0206    5.0825    5.1443    5.2062    5.2680

 Columns 71 through 77:

    5.3299    5.3918    5.4536    5.5155    5.5773    5.6392    5.7010
```

```
Columns 78 through 84:

   5.7629    5.8247    5.8866    5.9485    6.0103    6.0722    6.1340

Columns 85 through 91:

   6.1959    6.2577    6.3196    6.3814    6.4433    6.5052    6.5670

Columns 92 through 98:

   6.6289    6.6907    6.7526    6.8144    6.8763    6.9381    7.0000
```

```
octave:25> y = x .^ 2
y =

 Columns 1 through 13:

   1.0000    1.1275    1.2627    1.4056    1.5561    1.7142    1.8800    2.0535    2.2346    2.4233    2.6197    2.8238    3.0355

 Columns 14 through 26:

   3.2549    3.4819    3.7165    3.9589    4.2088    4.4665    4.7317    5.0047    5.2853    5.5735    5.8694    6.1729    6.4841

 Columns 27 through 39:

   6.8030    7.1295    7.4636    7.8054    8.1549    8.5120    8.8767    9.2491    9.6292   10.0169   10.4123   10.8153   11.2260

 Columns 40 through 52:

  11.6443   12.0703   12.5039   12.9452   13.3941   13.8507   14.3149   14.7868   15.2663   15.7535   16.2484   16.7509   17.2610

 Columns 53 through 65:

  17.7788   18.3043   18.8374   19.3781   19.9266   20.4826   21.0463   21.6177   22.1967   22.7834   23.3777   23.9797   24.5893
```

```
 Columns 66 through 78:

  25.2066   25.8315   26.4641   27.1044   27.7523   28.4078   29.0710   29.7418   30.4203   31.1065   31.8003   32.5018   33.2109

 Columns 79 through 91:

  33.9276   34.6520   35.3841   36.1238   36.8712   37.6262   38.3889   39.1592   39.9372   40.7228   41.5161   42.3170   43.1256

 Columns 92 through 98:

  43.9419   44.7658   45.5973   46.4365   47.2833   48.1378   49.0000
```
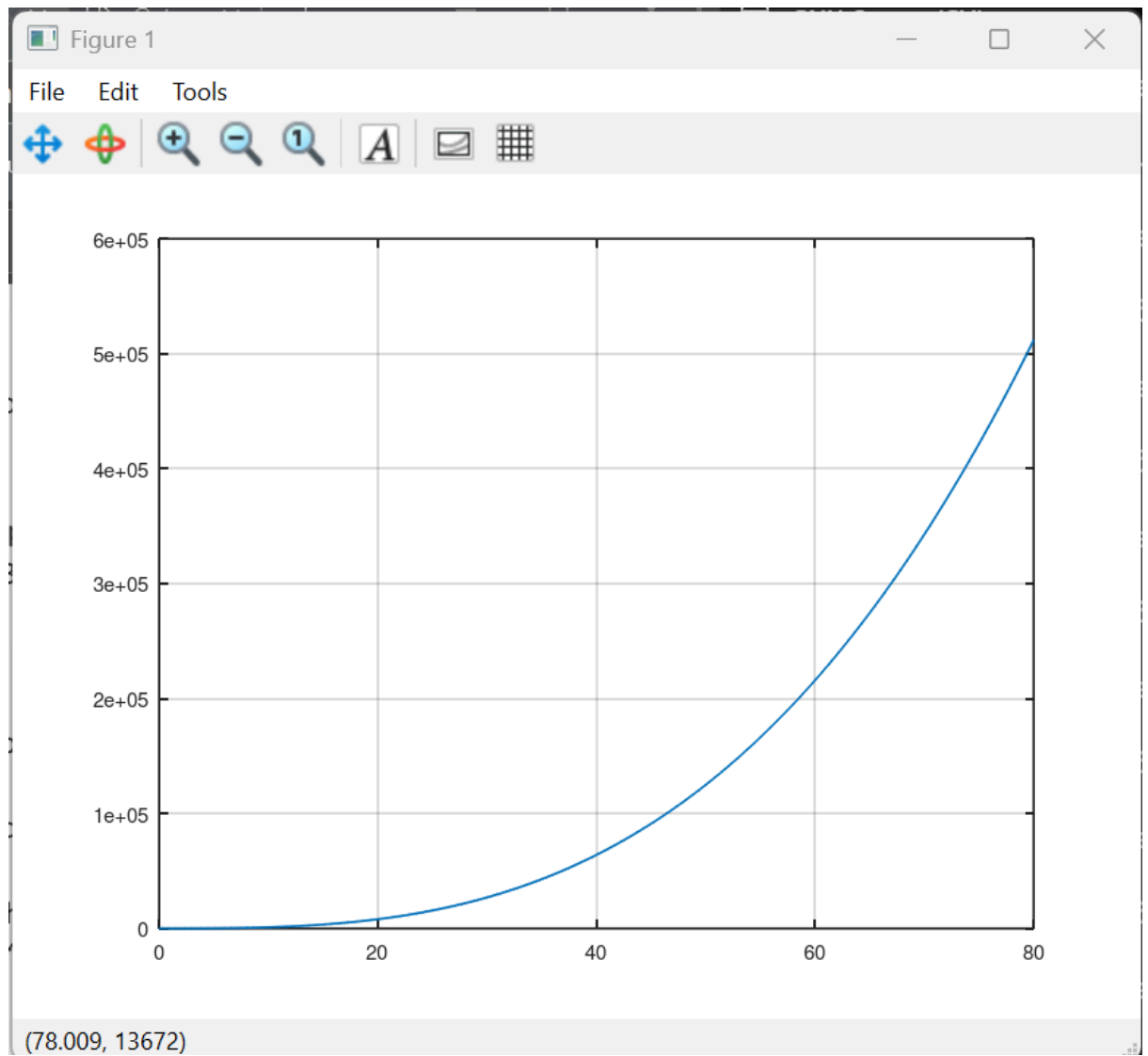
```
octave:26> plot(x,y)
```
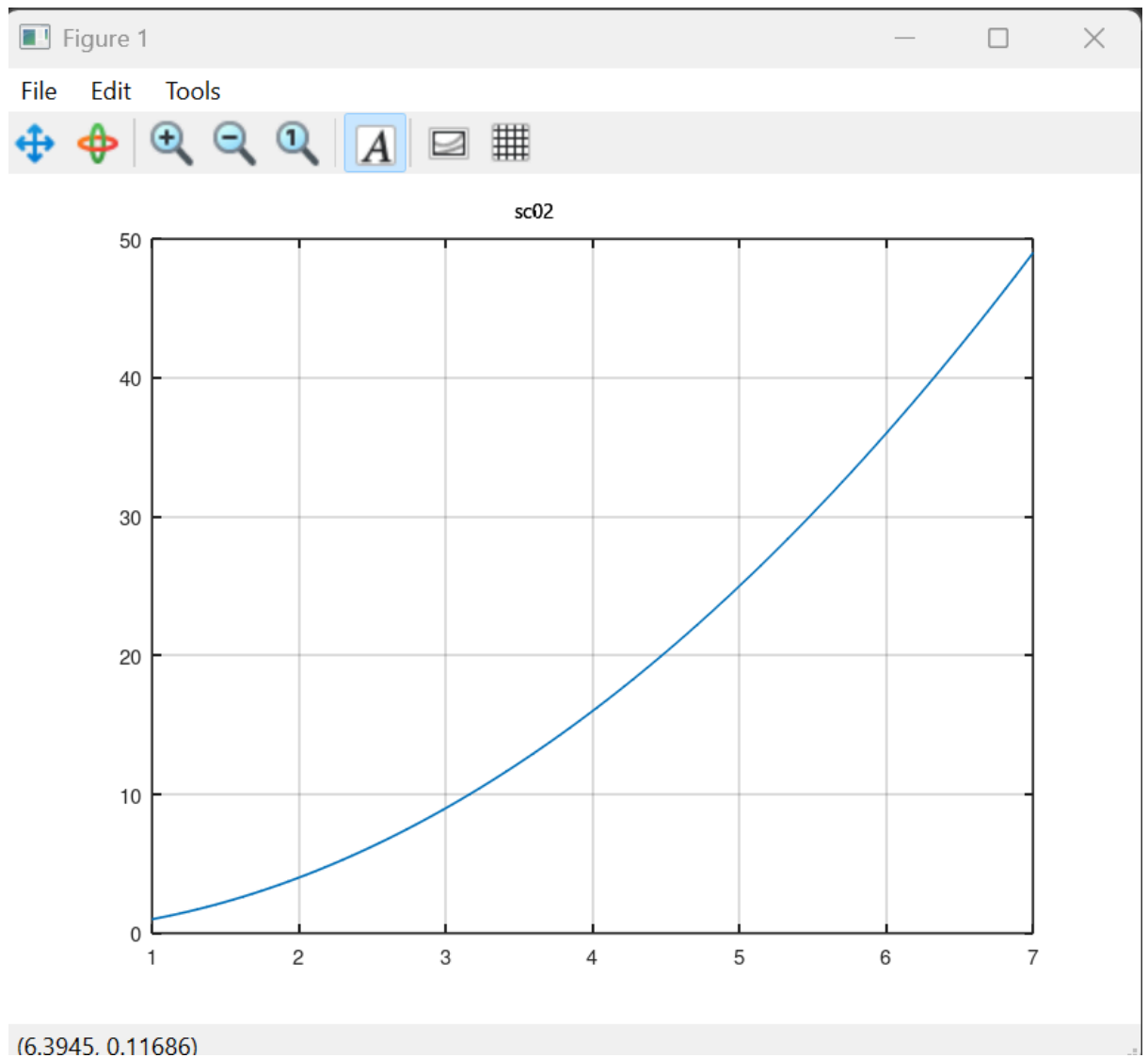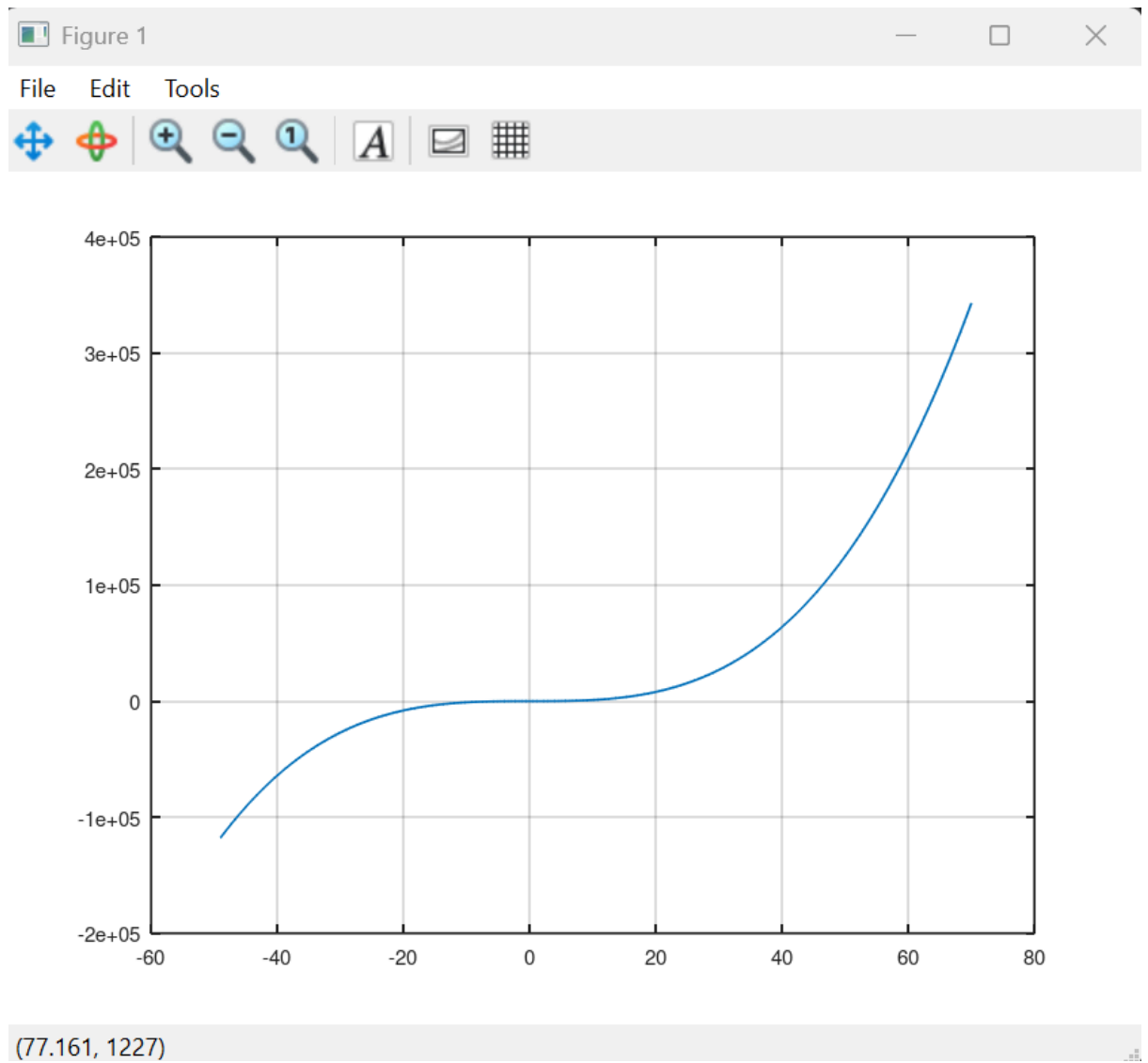
11. Comparison between sc01 and sc02

sc01 : Discrete plot with fewer points; appears segmented
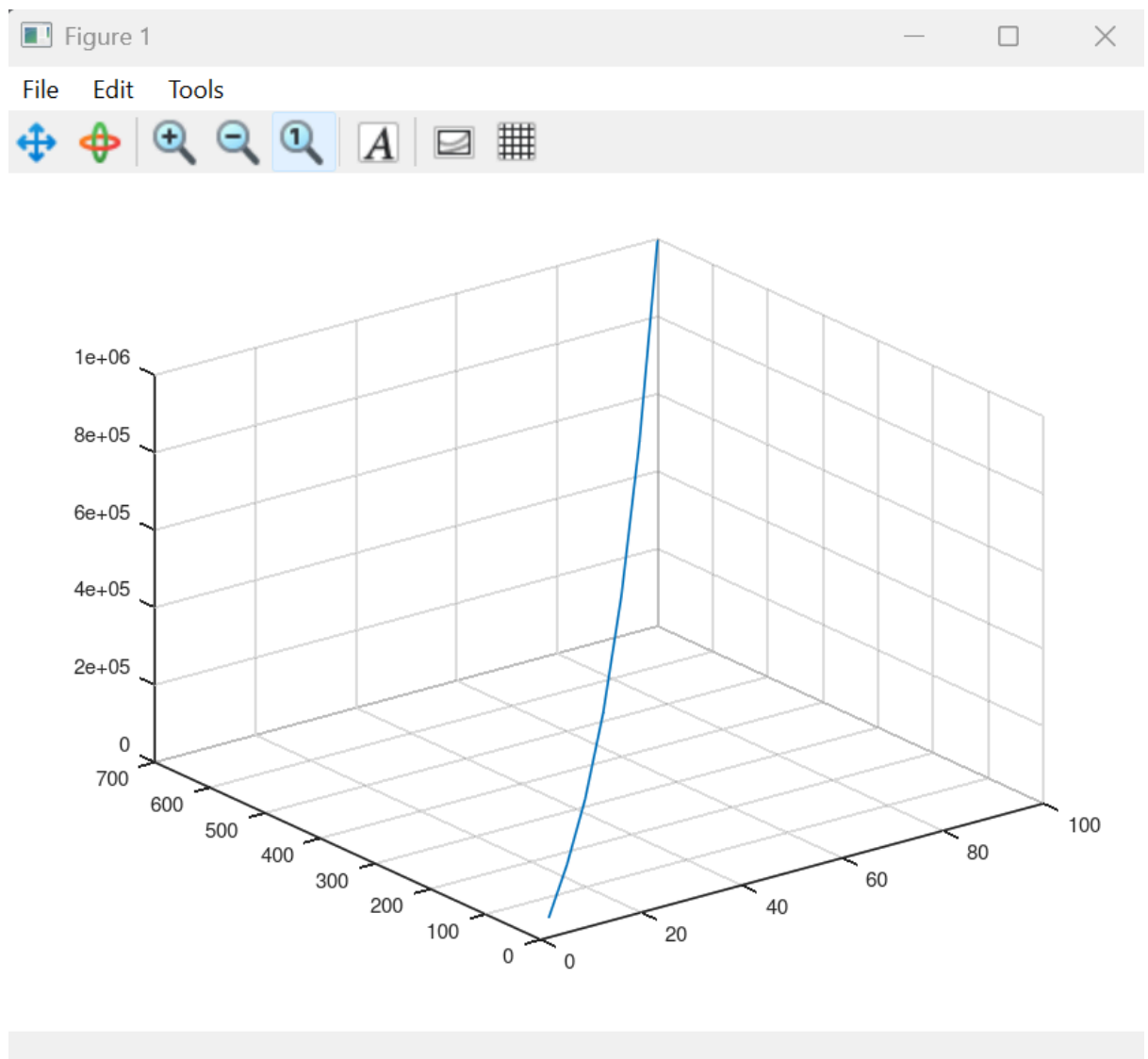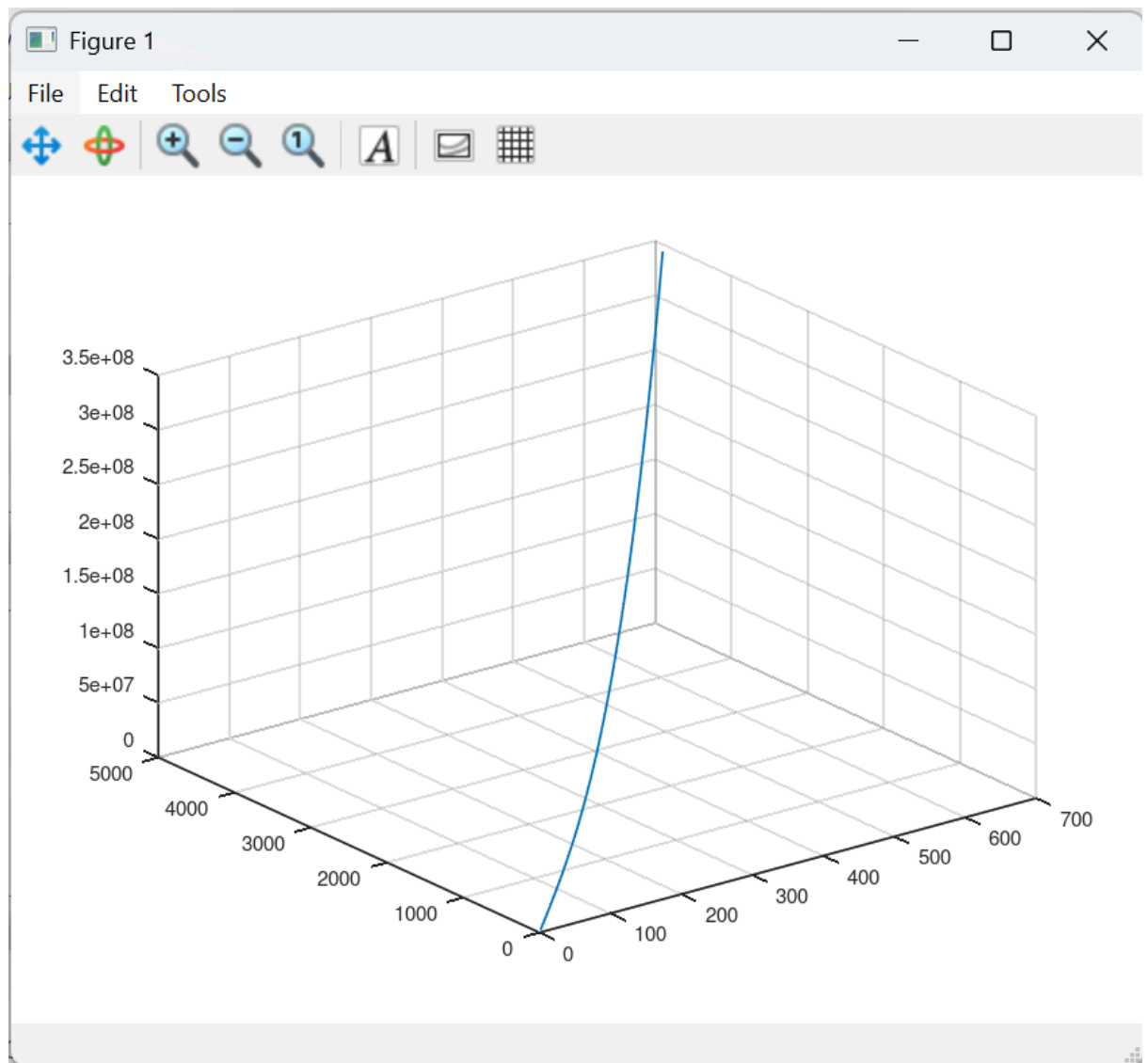sc02 : Smooth plot with a continuous curve due to more data points.

12.

13.

Figure 1

(77.161, 1227)

14.

15.

```
1  x = linspace(7,700,98)
2  y = x .* 7
3  z = x .^ 3
4  plot3(x,y,z)
```

16.

octave:40> polar(30,70)

17.
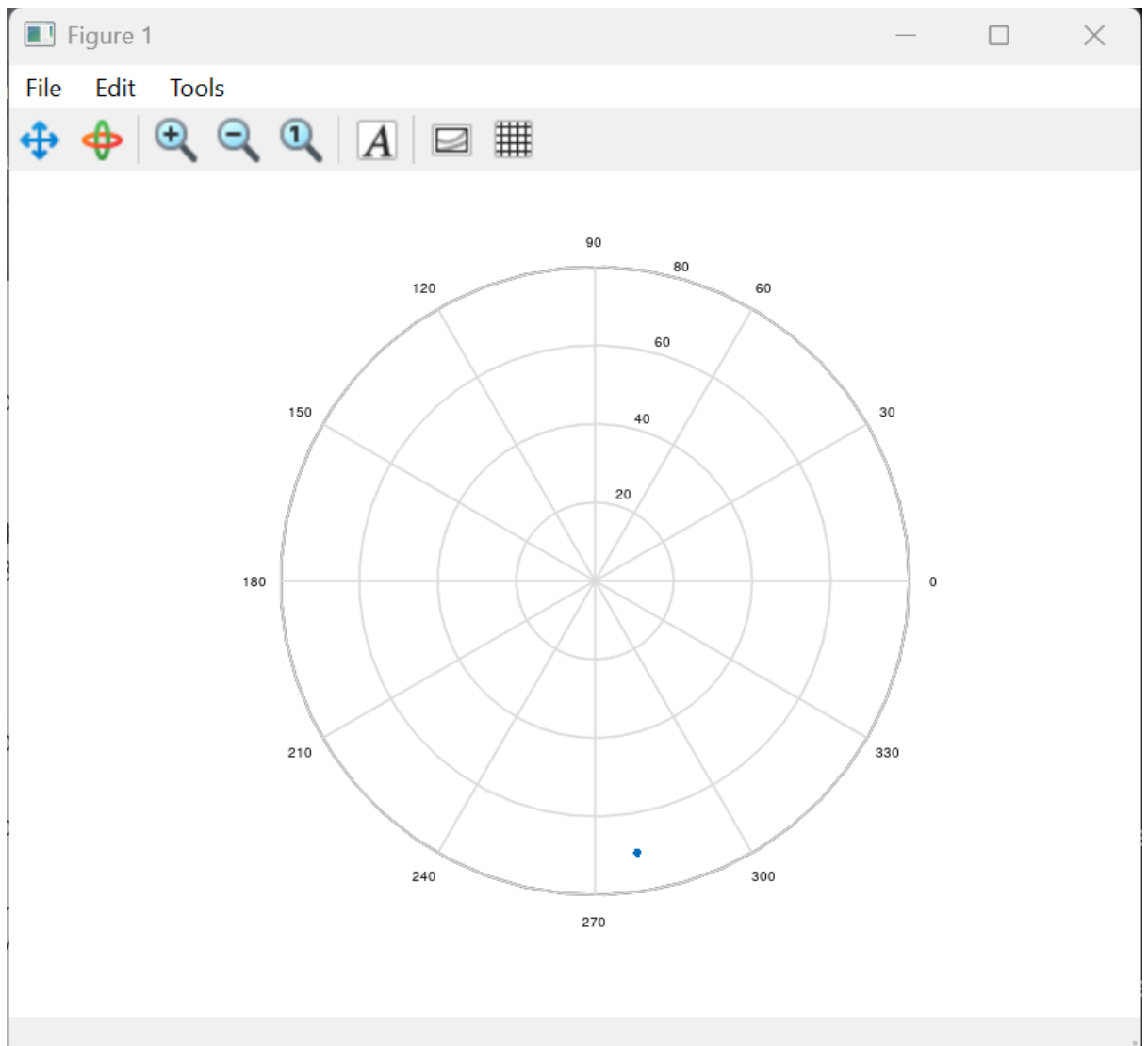

```
1  theta = 0: 0.02 : 2 * pi;
2  a1 = 0.5 + 1.3 .^ theta;
3  a2 = 5 * cos(theta);
4  r = [a1; a2];
5  PolarGraph = polar(theta,r);
6  set(PolarGraph,'LineWidth',3);
7
```