Lab 1 -- MTH 351 -- John Waczak

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```
clear all;
```

TASK A

Fire up MATLAB on your computer can create two 3x5 matrices and name them tut1 and tut2. The matrix you call tut2 should contain no zeros. Use the size command to verify the size of the matrices you created above

```
tut1 = [1,2,3,4,5;5,4,3,2,1;0,0,0,0,0];
size(tut1)
tut2 = ones(3,5);
size(tut2)
```

```
ans =

     3     5


ans =

     3     5
```

TASK B

use only the commands ones and diag to create a 5x5 identity matrix Create a row vector of all even integers between 5 and 25.

creating identity matrix

```
diag_ones = ones(5,1);
id_mat = diag(diag_ones);
diag_ones
id_mat
```

```
diag_ones =

     1
     1
     1
     1
     1


id_mat =

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

creating even integer vector

```
even_ints = 6:2:24;
even_ints


even_ints =

     6     8    10    12    14    16    18    20    22    24
```

TASK C

```
fdj = [ 1 2 3;5 4 3; 6 5 8 ];

fdj
fdj+3
fdj-6
fdj./2
% Demonstrates component-wise addition, subtraction, and addition


fdj =

     1     2     3
     5     4     3
     6     5     8


ans =

     4     5     6
     8     7     6
     9     8    11
```

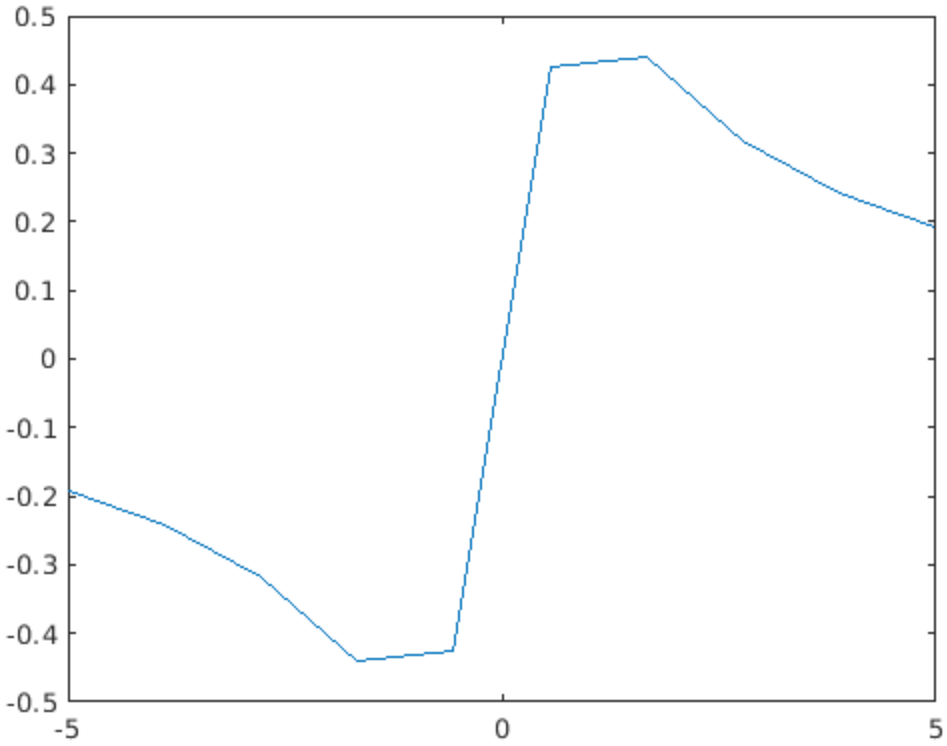
```
ans =

    -5    -4    -3
    -1    -2    -3
     0    -1     2


ans =

    0.5000    1.0000    1.5000
    2.5000    2.0000    1.5000
    3.0000    2.5000    4.0000


abc = 1:10;
def = 5:14;
% initialize two vectors of integers over two specified ranges
ghi = 3*abc + def
% perform vector arithmetic


ghi =

     8    12    16    20    24    28    32    36    40    44


abc = [1 2 3 4;5 6 7 8];
def = [4 3 2 1;8 7 6 5];
% initialize two 2x4 arrays
abc + def
% add arrays component-wise


ans =

     5     5     5     5
    13    13    13    13


tut1 .* tut2
tut2 .* tut1
tut1 ./ tut2
tut2 ./ tut1
tut1 .^ 2
% demonstrates component-wise operations on matrices from TASK A
% inf are created upon dividing by zero element wise


ans =

     1     2     3     4     5
     5     4     3     2     1
     0     0     0     0     0
```

```
ans =

     1     2     3     4     5
     5     4     3     2     1
     0     0     0     0     0


ans =

     1     2     3     4     5
     5     4     3     2     1
     0     0     0     0     0


ans =

    1.0000    0.5000    0.3333    0.2500    0.2000
    0.2000    0.2500    0.3333    0.5000    1.0000
       Inf       Inf       Inf       Inf       Inf


ans =

     1     4     9    16    25
    25    16     9     4     1
     0     0     0     0     0
```

TASK E

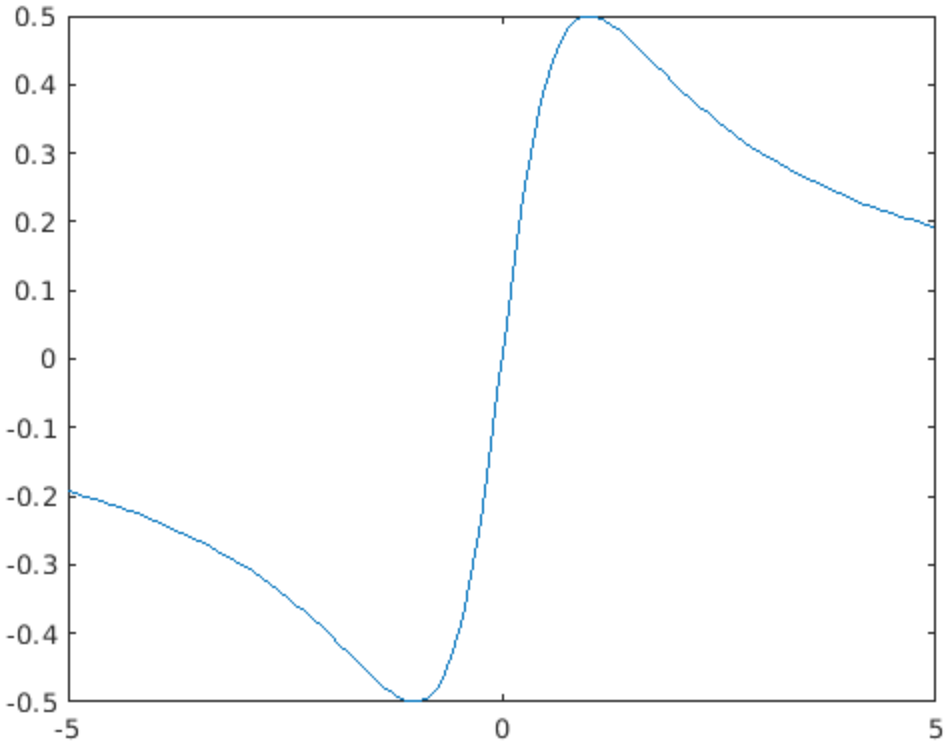
graph has poor resolution... only using 10 data points

```
figure()
x1 = linspace(-5,5,10) ;
y=x1./(1+x1.^2);
plot(x1,y)
```



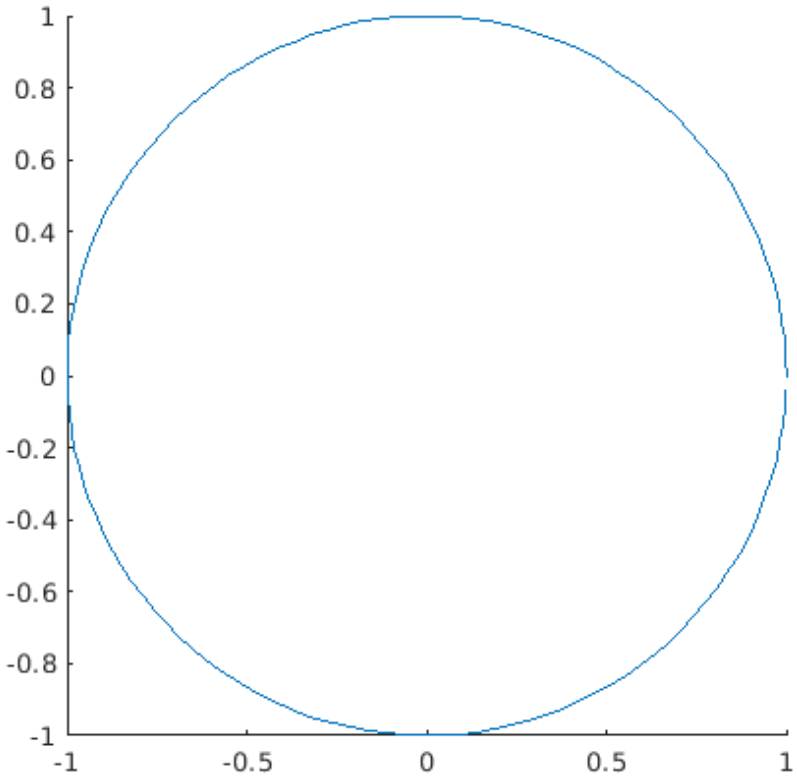
better resolution due to increased number of points

```
figure()
x2 = linspace(-5,5,100) ;
y=x2./(1+x2.^2);
plot(x2,y)
```



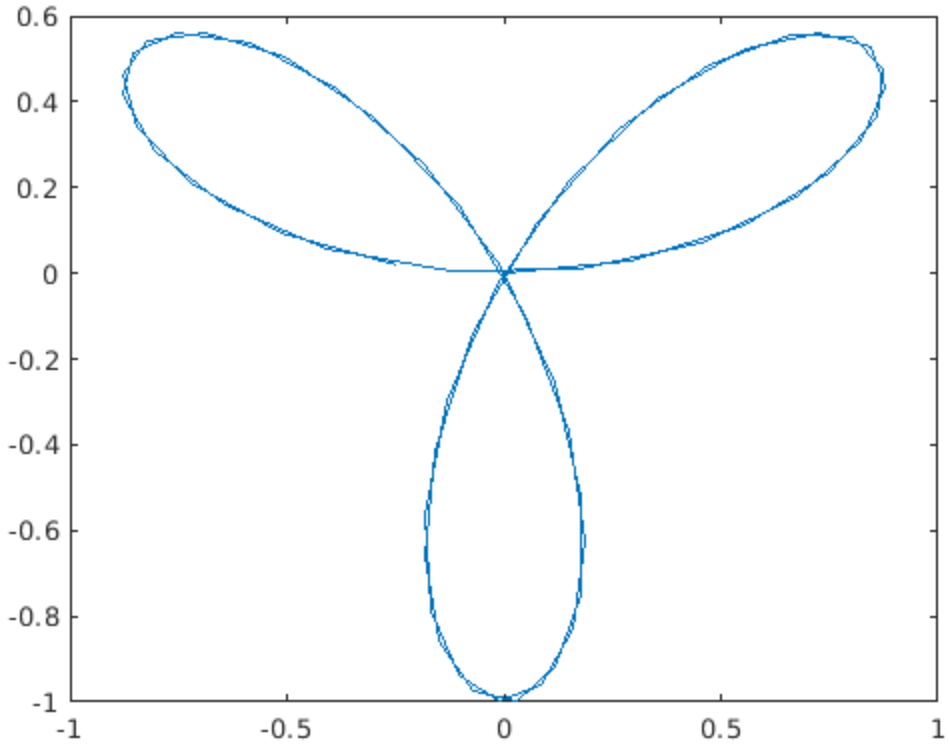
square makes sure that axes have same length in screen so circles aren't distorted

```
figure()
theta = 0 : 0.05 : 2*pi;
hold on
axis('square')
plot(cos(theta),sin(theta))
hold off
```



example of a parametric polar plot

```
figure()
theta = 0 : 0.1 : 2*pi;
r = sin(3*theta);
plot(r .* cos(theta), r .* sin(theta))
```



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