Lab 01: Introduction to Matlab

Task 1

Part A

```
>> A = [1 2 3 4 5; 6 7 8 9 10; 11 12 13 14 15; 16 17 18 19 20; 21 22 23 24 25]

A =

    1    2    3    4    5

    6    7    8    9   10

   11   12   13   14   15

   16   17   18   19   20

   21   22   23   24   25
```

Part B

```
>> A = A / 2

A =

    0.5000    1.0000    1.5000    2.0000    2.5000

    3.0000    3.5000    4.0000    4.5000    5.0000

    5.5000    6.0000    6.5000    7.0000    7.5000

    8.0000    8.5000    9.0000    9.5000   10.0000

   10.5000   11.0000   11.5000   12.0000   12.5000
```

Part C

```
>> det(A)

ans =

   5.1436e-46
```

Part D

```
>> inv(A)

Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  1.052405e-18.
```

```
ans =

  1.0e+16 *

   0.0118   0.0703  -0.0842  -0.0897   0.0918
  -0.3051   0.3506   0.2587  -0.3487   0.0446
   0.5535  -0.8751  -0.3528   1.1168  -0.4424
  -0.2391   0.4172   0.2665  -0.8285   0.3838
  -0.0212   0.0370  -0.0882   0.1501  -0.0778
```

Part E

```
>> A

A =

   0.5000   1.0000   1.5000   2.0000   2.5000
   3.0000   3.5000   4.0000   4.5000   5.0000
   5.5000   6.0000   6.5000   7.0000   7.5000
   8.0000   8.5000   9.0000   9.5000  10.0000
  10.5000  11.0000  11.5000  12.0000  12.5000


>> A(:,2)

ans =

   1.0000
   3.5000
   6.0000
   8.5000
  11.0000
```

Part F

```
>> A(4,:)

ans =
```

8.0000 8.5000 9.0000 9.5000 10.0000

Task 2

Part A

```
>> z = [0.9347,0.3835,0.5194,0.8310]

z =

   0.9347   0.3835   0.5194   0.8310
```

Part B

```
>> max(z)

ans =

   0.9347
```

Part C

```
>> min(z)

ans =

   0.3835
```

Part D

```
>> sort(z)

ans =

   0.3835   0.5194   0.8310   0.9347
```

Part E

```
>> sum(z)

ans =

   2.6686
```

Part F

```
>> mean(z)

ans =
```

0.6672

Task 3

Part A

```
>> eye(4,4)

ans =

    1    0    0    0

    0    1    0    0

    0    0    1    0

    0    0    0    1
```

Part B

```
>> zeros(2,3)

ans =

    0    0    0

    0    0    0
```

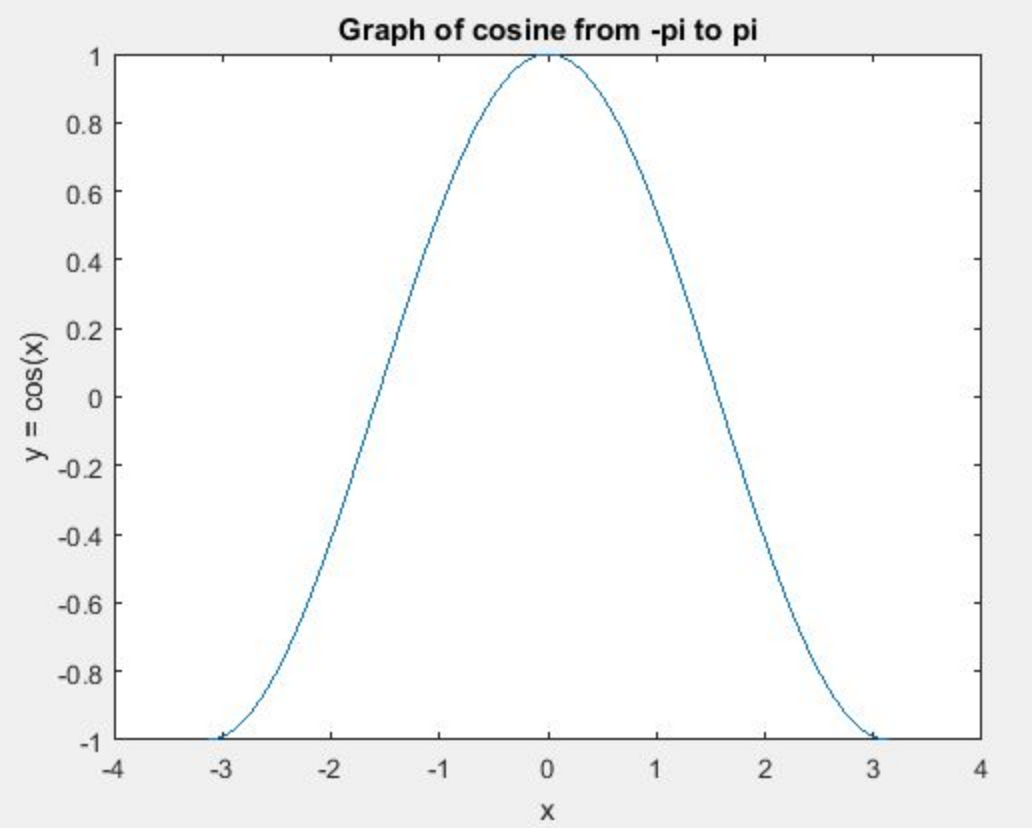
Part C

```
>> ones(2)

ans =

    1    1

    1    1
```

Part D

```
>> A = [9,7,0;0,8,6;7,1,-6]

A =

    9    7    0

    0    8    6

    7    1   -6

>> size(A)

ans =
```

```
    3     3


>> det(A)

ans =

 -192.0000


>> inv(A)

ans =

    0.2812   -0.2187   -0.2187

   -0.2187    0.2812    0.2812

    0.2917   -0.2083   -0.3750


>> x=-pi:0.01:pi;

>> y=cos(x);

>> plot(x,y)

>> xlabel('x')

>> ylabel('y = cos(x)')

>> title('Graph of cosine from -pi to pi')
```



Task 4

```
>> B = [2 2 3; 4 0 6; 8 1 5]

B =

   2   2   3

   4   0   6

   8   1   5


>> C = [1 1 2; 6 3 5; 1 9 1]

C =

   1   1   2

   6   3   5

   1   9   1
```

Task A

```
>> D = B - C
```

D =

```
   1    1    1
  -2   -3    1
   7   -8    4
```

Task B

```
>> E = B + C
```

E =

```
   3    3    5
  10    3   11
   9   10    6
```

Task C

```
>> F = E + 2
```

F =

```
   5    5    7
  12    5   13
  11   12    8
```

Task D

```
>> G = B * C
```

G =

```
  17   35   17
  10   58   14
  19   56   26
```

Task E

```
>> H = B .* C
```

H =

```
   2     2     6

  24     0    30

   8     9     5
```

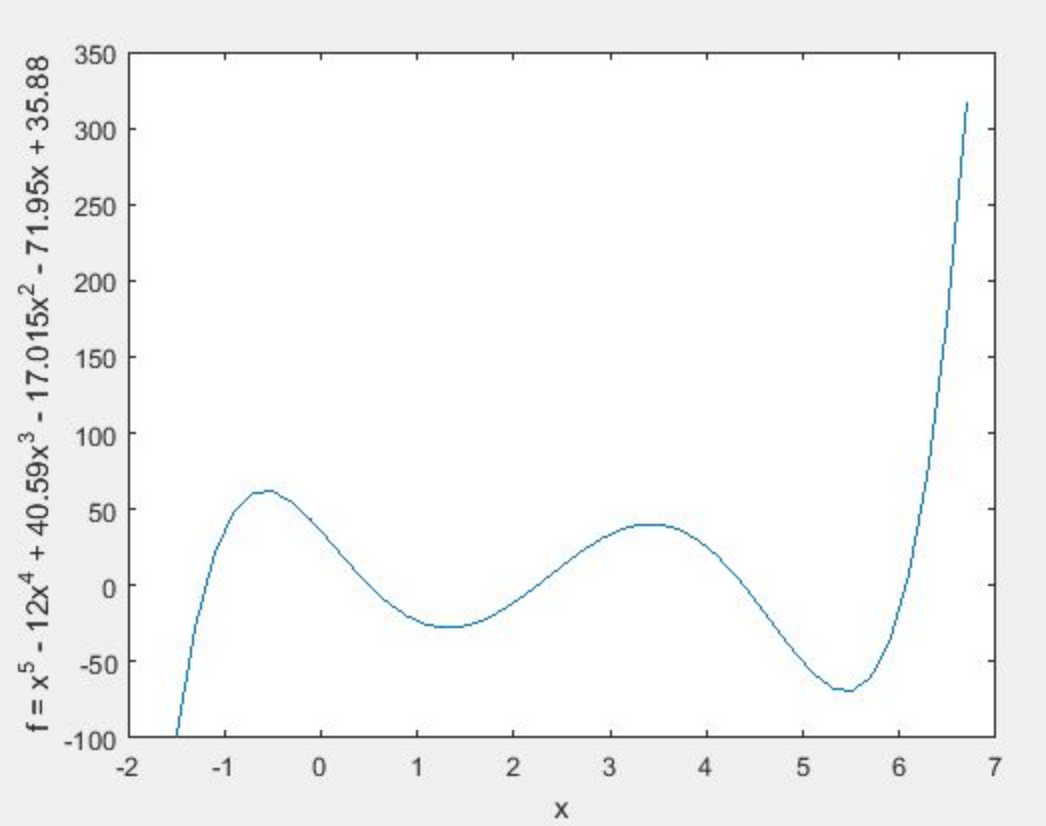
Task 5

Task A

```
>> coefficients = [1 -12 40.59 -17.015 -71.95 35.88]

coefficients =

   1.0000  -12.0000   40.5900  -17.0150  -71.9500   35.8800


>> polyval(coefficients, 9)

ans =

  7.9172e+03
```

Task B

```
>> f = x.^5 - 12*x.^4 + 40.59*x.^3 - 17.015*x.^2 - 71.95*x + 35.88;

>> plot(x,f)

>> xlabel('x')

>> ylabel('f = x^5 - 12x^4 + 40.59x^3 - 17.015x^2 - 71.95x + 35.88')
```



Task C

```
>> roots(coefficients)

ans =

    6.0705

    4.3867

    2.2436

   -1.2009

    0.5001
```