

MA202

ASSIGNMENT 1

NAME:

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ROLL NO. :

202051213

SECTION:

2

```

>> % Q1
fprintf('***** \n')
fprintf('Q1 \n');
a = 1.2;
b = 2.3;
c = 4.5;
d = 4;
% S stores the final expression
S = a^3 + sqrt(b*d) - 4*c;
fprintf('The value of expression in Q1 is %0.5f \n', S);
fprintf('***** \n')
*****

Q1
The value of expression in Q1 is -13.23885
*****

>> %Q2
fprintf('***** \n')
fprintf('Q2 a \n');
X = ones(1,10) % vector of ones of size 10
fprintf('Q2 b \n');
Y = zeros(1,10); % vector of zeros of size 10
% updating index 1 and 2
Y(1)=2;
Y(2)=3
fprintf('***** \n')
*****

Q2 a

X =

    1    1    1    1    1    1    1    1    1    1

Q2 b

Y =

    2    3    0    0    0    0    0    0    0    0

*****

>> %Q3
fprintf('***** \n')
fprintf('Q3 \n');
A=[4 -6 ;6 10]
B=[6 -13;3.4 16]
fprintf('A+B is \n');
A+B
fprintf('B^2 is \n');
B*B
fprintf('AB is \n');

```

```

A*B
fprintf('Please note the common constant is taken out as common\n');
fprintf('Transpose of AB is\n');
(A*B) '
fprintf('A-B is\n');
A-B
fprintf('Inverse of A is \n');
inv(A)
fprintf('***** \n')
*****

```

Q3

A =

```

4      -6
6      10

```

B =

```

6.0000  -13.0000
3.4000   16.0000

```

A+B is

ans =

```

10.0000  -19.0000
9.4000   26.0000

```

B^2 is

ans =

```

-8.2000 -286.0000
74.8000  211.8000

```

AB is

ans =

```

3.6000 -148.0000
70.0000  82.0000

```

Please note the common constant is taken out as common
 Transpose of AB is

ans =

```

    3.6000    70.0000
   -148.0000    82.0000

```

A-B is

ans =

```

   -2.0000    7.0000
    2.6000   -6.0000

```

Inverse of A is

ans =

```

    0.1316    0.0789
   -0.0789    0.0526

```

```
*****
```

```
>> %Q4
```

```
fprintf('***** \n')
```

```
fprintf('Q4 \n');
```

```
fprintf('Assigning coefficient matrix as C');
```

```
fprintf('Assigning variable matrix as Z');
```

```
fprintf('Assigning constant matrix as b');
```

```
C=[5 6 10;3 0 14;0 7 21]
```

```
syms x y z;
```

```
Z = [x; y ;z]
```

```
b=[4 ;10 ;0]
```

```
C*Z == b
```

```
fprintf('The value of variables in the order x y and z are');
```

```
inv(C)*b
```

```
fprintf('***** \n')
```

```
*****
```

Q4

Assigning coefficient matrix as CAssigning variable matrix as ZAssigning constant matrix as b

C =

```

    5     6    10
    3     0    14
    0     7    21

```

Z =

x

y

z

b =

4
10
0

ans =

5*x + 6*y + 10*z == 4
3*x + 14*z == 10
7*y + 21*z == 0

The value of variables in the order x y and z are

ans =

1.4468
-1.2128
0.4043

>>

>> %Q5

fprintf('***** \n')

fprintf('Q5 \n');

%Note: Angle input is taken as radians by default since nothing was
%mentioned

count =0;

for (c= 1:30)

if sin(c)<0

count=count +1;

end

end

count

fprintf('***** \n')

Q5

count =

15

>>

>> %Q6

fprintf('***** \n')

figure(1)

fprintf('Q6 a figure 1\n');

```
p = 0:pi/100:2*pi; %learning initial value: increment:finalvalue
q = sin(p);
plot(p,q)

fprintf('Q6 b figure 2\n');
x=[0:0.05:10];
f = (x.^2) -(10*x) +15;
figure(2)
plot(x,f)

fprintf('Q6 c figure 3\n');
figure(3)
plot(-2,1, '+', -1,2, '+', 0,3, '+', 1,4, '+', 2,5, '+')
xlim([-3 3])
ylim([0 6])
fprintf('***** \n')
*****
Q6 a figure 1
Q6 b figure 2
Q6 c figure 3
*****
>>
```

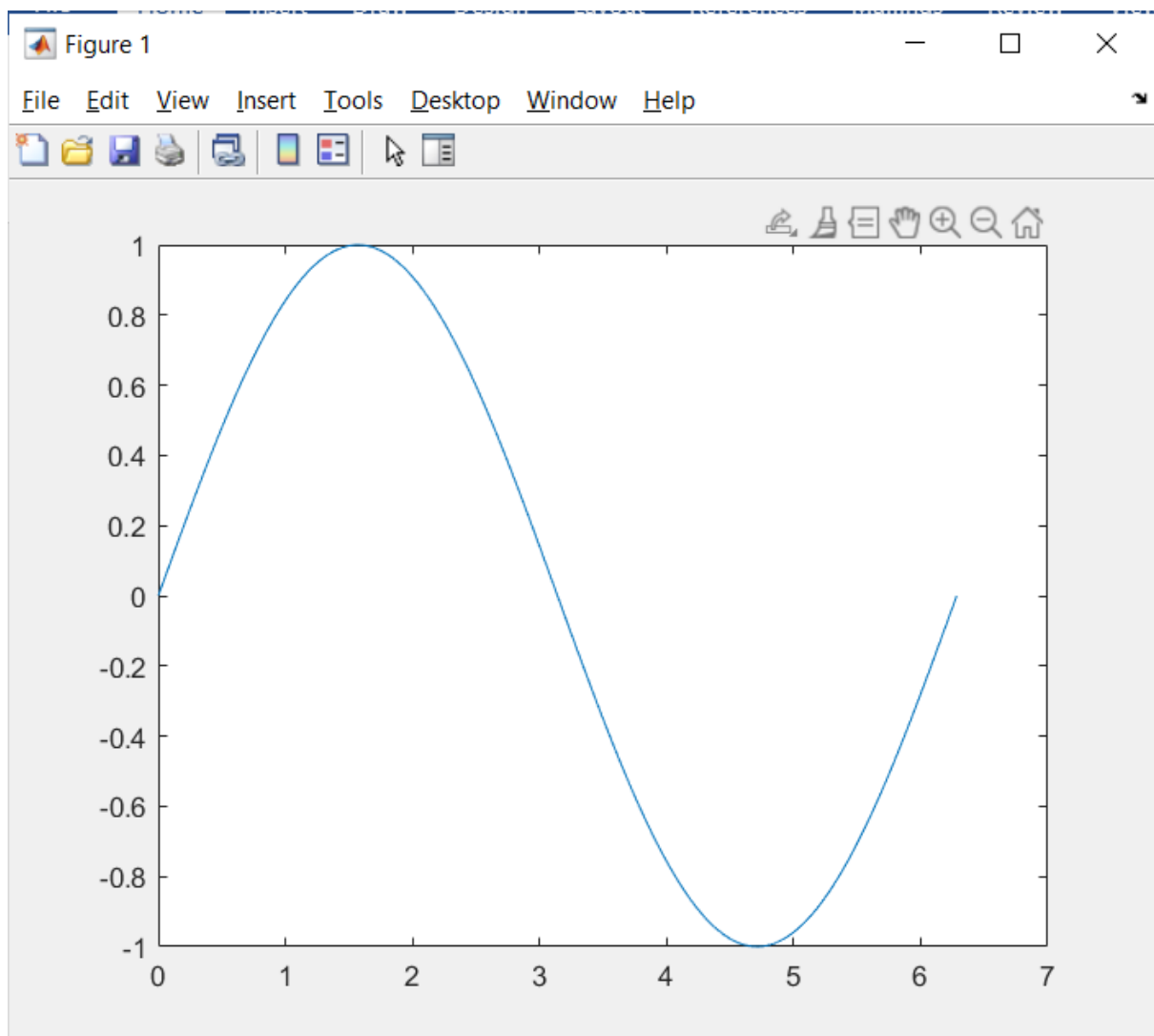


Figure 1 is Q6 a

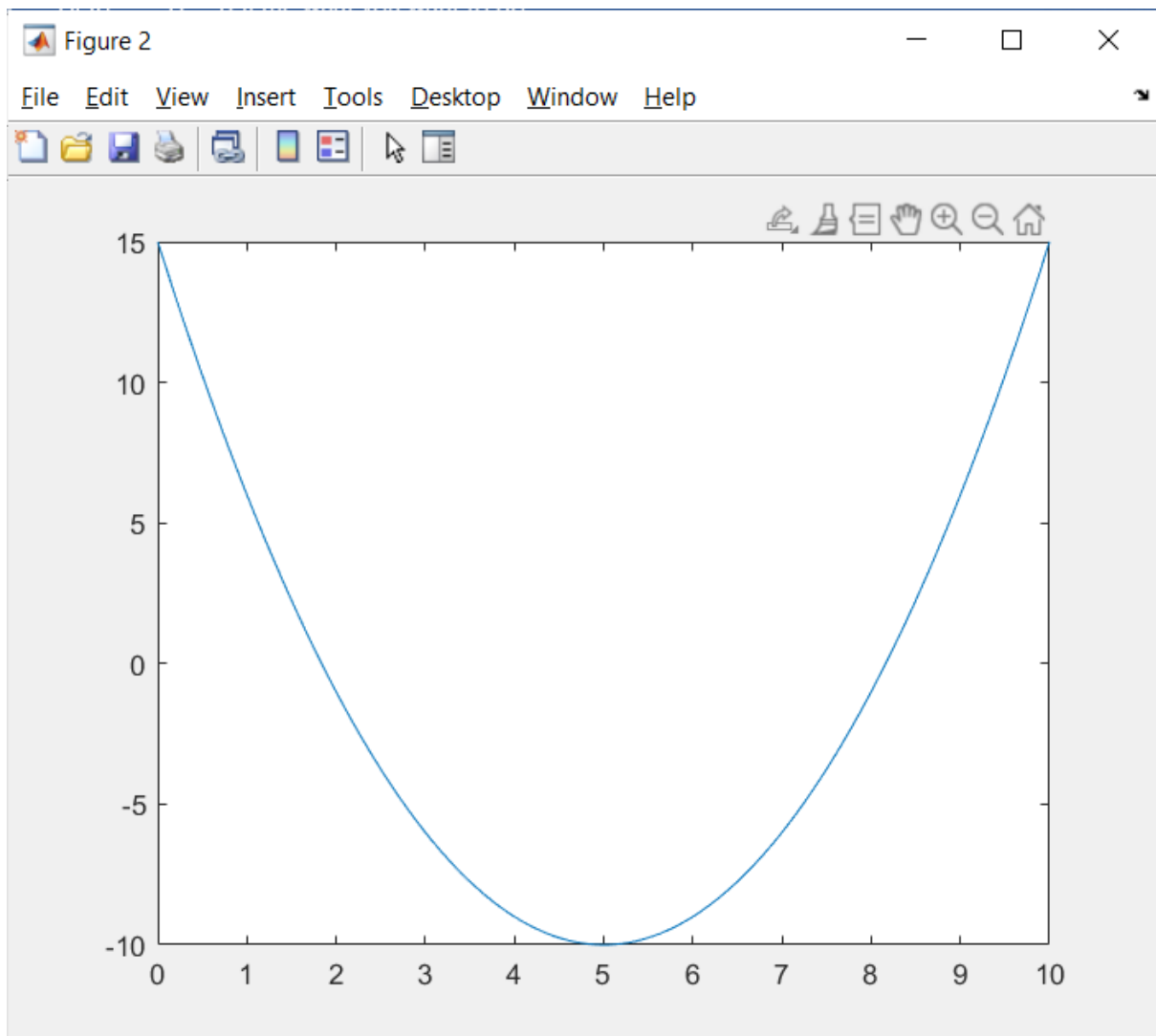


Figure 2 is Q6 b

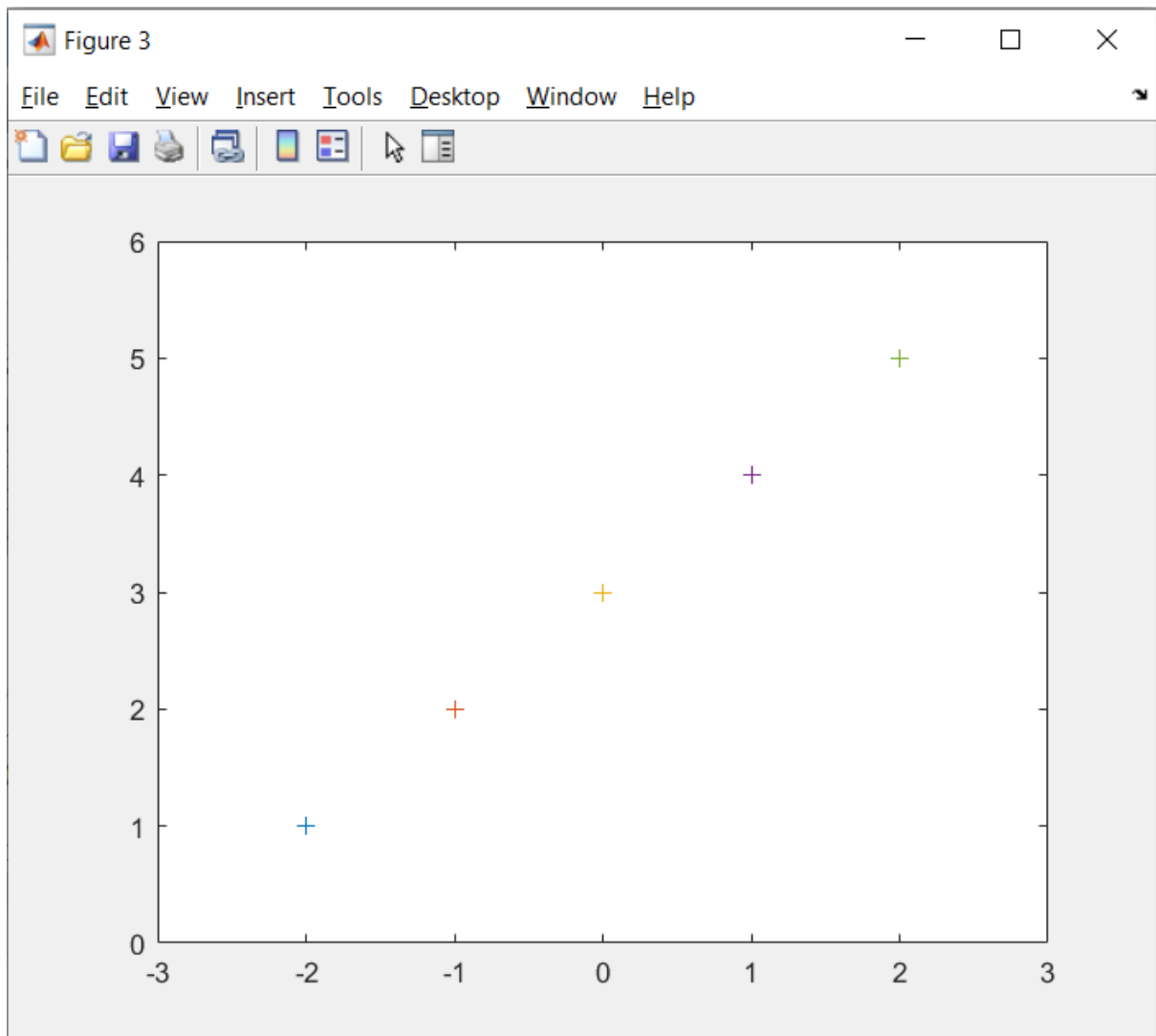


Figure 3 is Q6 c

```

>> %Q7
fprintf('***** \n')
A = [3 2 -2;-3 -1 3;1 2 0];
I = eye(3);
syms t
fprintf('The Characteristic Equation is\n')
det(A-t*I) ==0
fprintf('The roots of characteristic equation are')
roots([-1 2 1 -2])
fprintf('These roots of characteristic equation are the eigen values, the direct
function to do so is')
e = eig(A)
fprintf('The right eigen vectors are')
[V,D] = eig(A)
fprintf('***** \n')
*****
The Characteristic Equation is

ans =

- t^3 + 2*t^2 + t - 2 == 0

The roots of characteristic equation are
ans =

-1.0000
 2.0000
 1.0000

These roots of characteristic equation are the eigen values, the direct function to
do so is
e =

-1.0000
 1.0000
 2.0000

The right eigen vectors are
V =

-0.5774    0.7071    0.0000
 0.5774   -0.0000    0.7071
-0.5774    0.7071    0.7071

D =

-1.0000    0    0
 0    1.0000    0

```

```
0      0      2.0000
```

```
*****
```

```
>>
```

%Q8

```
fprintf('***** \n')
fprintf('Q8 \n')
fprintf('a)Celsous value \n')
C=[-40; 37; 20; 8; 34; 100; 14;30;76;23]

fprintf('b)Farenheit value \n')
F= (9/5)*C +32

fprintf('c)Merged \n')
D = [C F]
fprintf('***** \n')
```

%Q9

```
fprintf('***** \n')
fprintf('Q9 \n')
prompt = 'What is the temperature in Celsius? ';
x = input(prompt)
fprintf('the value is')
CtoF(x) %stored in CtoF.m function file
fprintf('***** \n')
```

%Q10

```
fprintf('***** \n')
fprintf('Q10 \n')
prompt10 = 'What is the number? ';
num = input(prompt10)
fprintf('The factorial is ')
factorial(num)
% Separate function file for factorial
fprintf('***** \n')
```

%Q11

```
fprintf('***** \n')
fprintf('Q11 \n')
%str is negative
x=-3;
if x>0
    str='positive';
elseif x<0
    str='negative';
elseif x== 0
    str='zero';
else str='error';
end
fprintf('The value of str is ')
```

```
str
fprintf('***** \n')

%Q12
fprintf('***** \n')
fprintf('Q12 \n')
x=-10;
while x < 0
x=x+1;
end
fprintf('The value of x is ')
x
fprintf('***** \n')

%Q13
fprintf('***** \n')
fprintf('Q13 \n')
X=0;
for i=1:10
X=X+1;
end
fprintf('The value of X is ')
X
fprintf('***** \n')

%Q14
fprintf('***** \n')
fprintf('Q14 \n')
prompt1 = 'What is the number? ';
num1 = input(prompt1)
fprintf('The value of summation is ')
summation(num1)
% Separate function file for summation function.
fprintf('***** \n')

%15
%There is error in this code as there should be one more end in atleast to
%terminate while loop.
fprintf('***** \n')
fprintf('Q15 \n')
x=-10;
while x < 0
x=x+2;
if x == -2
break;
end
```

```
end %Error in question : added one more end statement to the original code
fprintf('The value of x is ')
x
fprintf('***** \n')
```

```
%16
fprintf('***** \n')
fprintf('Q16 \n')
fprintf('The sum of positive even integers till 1000 is')
sumOfEven(1:1000)
fprintf('***** \n')
```

```
function [F] = CtoF(C)
%UNTITLED2 Summary of this function goes here
% Detailed explanation goes here
F= (9/5)*C +32;
end
```

```
function f1 = summation(num2)
    f1=0;
    for i= 1:num2
        f1 = f1+i;
    end
end
```



```
function evenSum = sumOfEven(x)
    eindex = x(2:2:end);
    evenSum = sum(eindex);
end
```

```
>> Ma202Sheet1
```

```
*****
```

```
Q8
```

```
a) Celsous value
```

```
C =
```

```
-40
```

```
37
```

```
20
```

```
8
```

```
34
```

```
100
```

```
14
```

```
30
```

```
76
```

```
23
```

```
b) Farenheit value
```

```
F =
```

```
-40.0000
```

```
98.6000
```

```
68.0000
```

```
46.4000
```

```
93.2000
```

```
212.0000
```

```
57.2000
```

```
86.0000
```

```
168.8000
```

```
73.4000
```

```
c) Merged
```

```
D =
```

```
-40.0000 -40.0000
```

```
37.0000 98.6000
```

```
20.0000 68.0000
```

```
8.0000 46.4000
```

```
34.0000 93.2000
```

```
100.0000 212.0000
```

```
14.0000 57.2000
```

```
30.0000 86.0000
```

```
76.0000 168.8000
```

```
23.0000 73.4000
```

```
*****
```

Q9

What is the temperature in Celsius? C

x =

-40

37

20

8

34

100

14

30

76

23

the value is

ans =

-40.0000

98.6000

68.0000

46.4000

93.2000

212.0000

57.2000

86.0000

168.8000

73.4000

Q10

What is the number? 5

num =

5

The factorial is

ans =

120

Q11

The value of str is

```
str =
```

```
    'negative'
```

```
*****  
*****
```

```
Q12
```

```
The value of x is
```

```
x =
```

```
    0
```

```
*****  
*****
```

```
Q13
```

```
The value of X is
```

```
X =
```

```
   10
```

```
*****  
*****
```

```
Q14
```

```
What is the number? 10
```

```
num1 =
```

```
   10
```

```
The value of summation is
```

```
ans =
```

```
   55
```

```
*****  
*****
```

```
Q15
```

```
The value of x is
```

```
x =
```

```
   -2
```

```
*****  
*****
```

```
Q16
```

```
The sum of positive even integers till 1000 is
```

```
ans =
```

```
250500
```

>>

Q11

The value of str should be negative. To check , we can also run the program which shows negative. A screenshot of this is attached below. The code is also available in the MATLAB file.

```
>>
%Q11
fprintf('***** \n')
%str is negative
x=-3;
if x>0
    str='positive';
elseif x<0
    str='negative';
elseif x== 0
    str='zero';
else str='error';
end
*****
>>
>> str

str =

    'negative'
fx >>
```

Q12

The value of x should be 0. To check , we can also run the program which shows negative. A screenshot of this is attached below. The same code was provided in the sheet.

```
x=-10;

while x < 0

x=x+1;
```

Output Screenshot

```
>> x=-10;
while x < 0
x=x+1;
end
>> x

x =

    0
```

Q13

The value of X is 10 after the execution of the code. A screenshot of this is attached below as proof. The code is also attached in the file.

```
X=0;
for i=1:10
X=X+1;
end
```

Output Screenshot

```
>> X=0;
for i=1:10
X=X+1;
end
>> X

X =

    10
```

Q15

There is error in the code given as there should be one more end statement in the code. One end for if block and one end for while block.

```
x=-10;
while x < 0
x=x+2;
if x == -2
break;
end
end %Error : added one more end
statement to the original code
```

The value of x after execution is -2 as the loop breaks when the value of x reaches -2 in the if block.

Output Screenshot

```
>> while x<0
```

```
x = x+2
```

```
if x== -2
```

```
break;
```

```
end
```

```
end
```

```
x =
```

```
-8
```

```
x =
```

```
-6
```

```
x =
```

```
-4
```

```
x =
```

```
-2
```