HOMEWORK-1

SOLUTIONS

1. Evaluate the following expressions in MATLAB for given value of x.

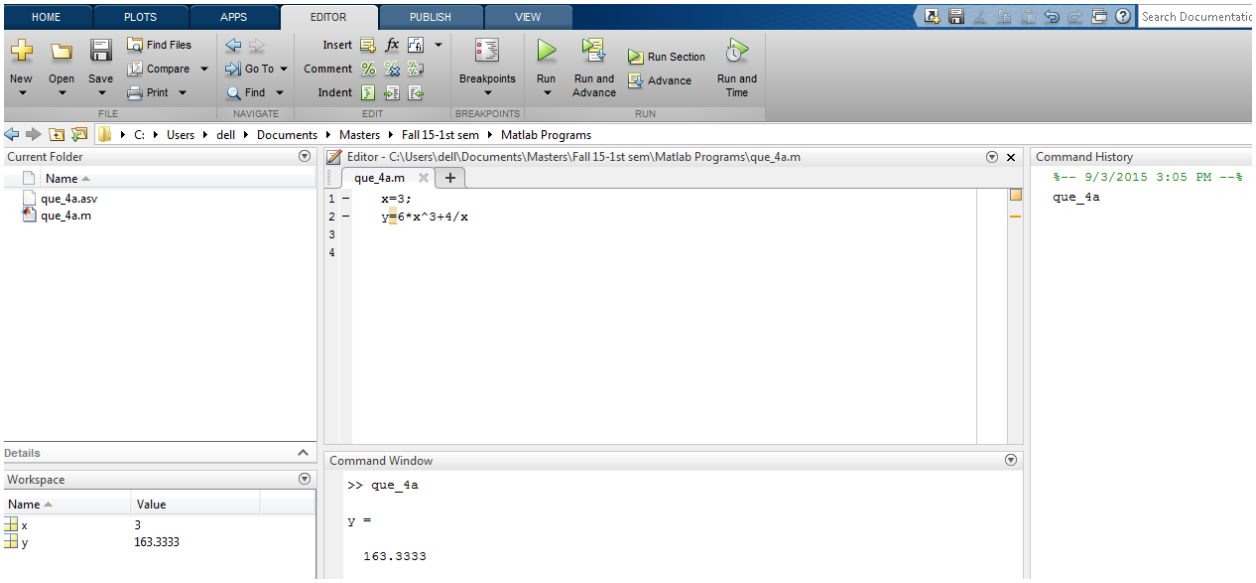
4a. $y=6x^3 + 4/x$, where x=3

Solution:

>> x=3;

>> y=6*x^3+4/x

y = 163.3333



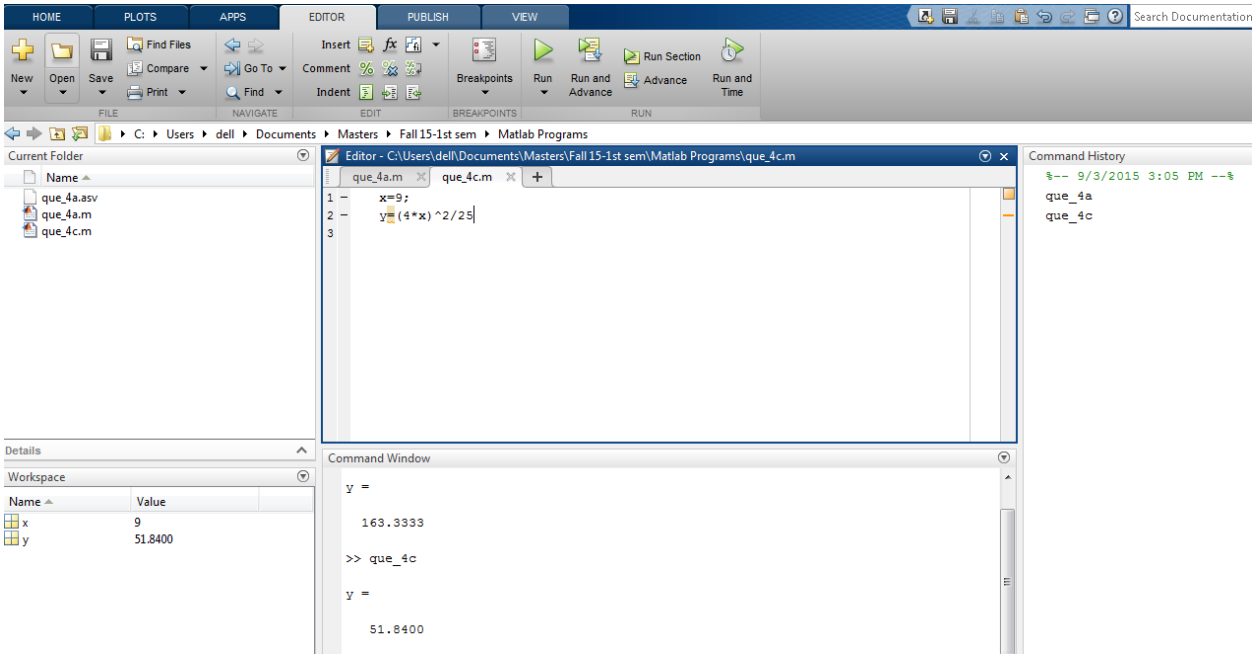
4c. $y=(4x)^2/25$ where x=9

Solution:

>> x=9;

>> y=(4*x)^2/25

y = 51.8400



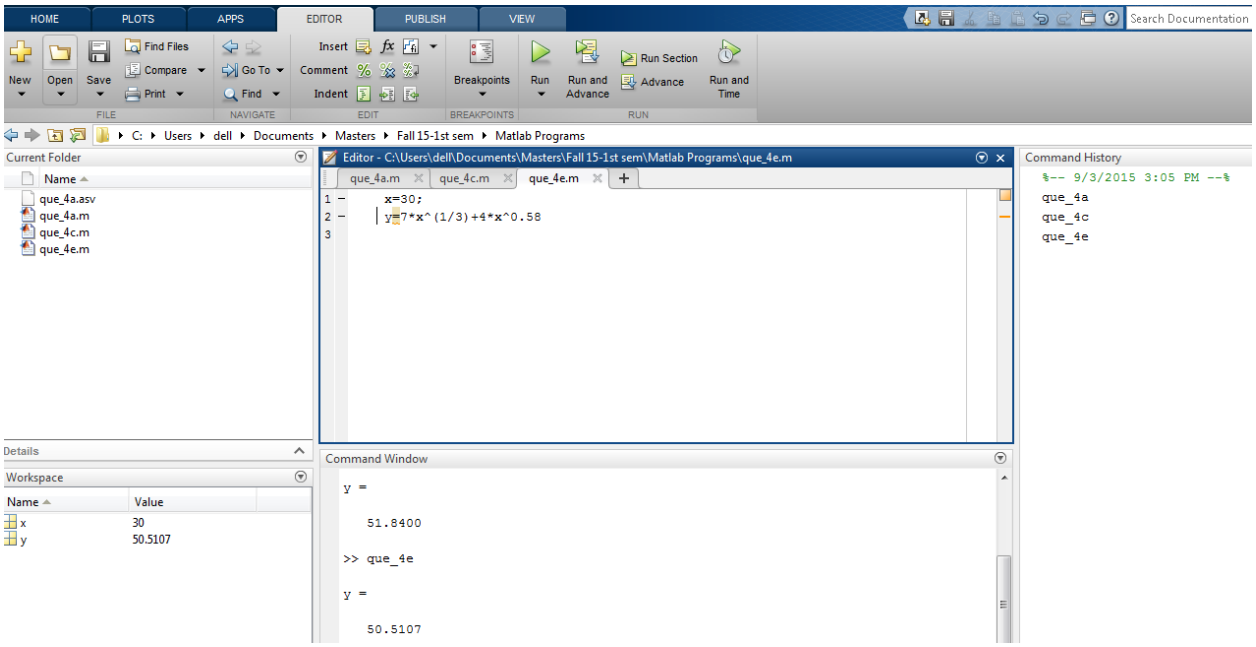
4e. $y= 7(x^{1/3})+4x^{0.58}$ where x=30

Solution:

>> x=30;

>> y=7*x^(1/3)+4*x^0.58

y = 50.5107



5. Assuming that variables a,b,c,d and f are scalars,write MATLAB statements to compute and display the following expressions.

$x=1+(a/b)+(c/f^2)$ $s=(b-a)/(d-c)$ $r=1/(1/a+1/b+1/c+1/d)$ $y=ab(1/c)(f^2/2)$

where a=1.12, b=2.34, c=0.71,d=0.81and f=19.83

Solution:

```
>>  a=1.12;

>> b=2.34;

>> c=0.72;

>> d=0.81;

>> f=19.83;

>> x=1+(a/b)+(c/f^2)

x =

  1.4805
```

>> s=(b-a)/(d-c)

s =

13.5556

>> r=1/((1/a)+(1/b)+(1/c)+(1/d))

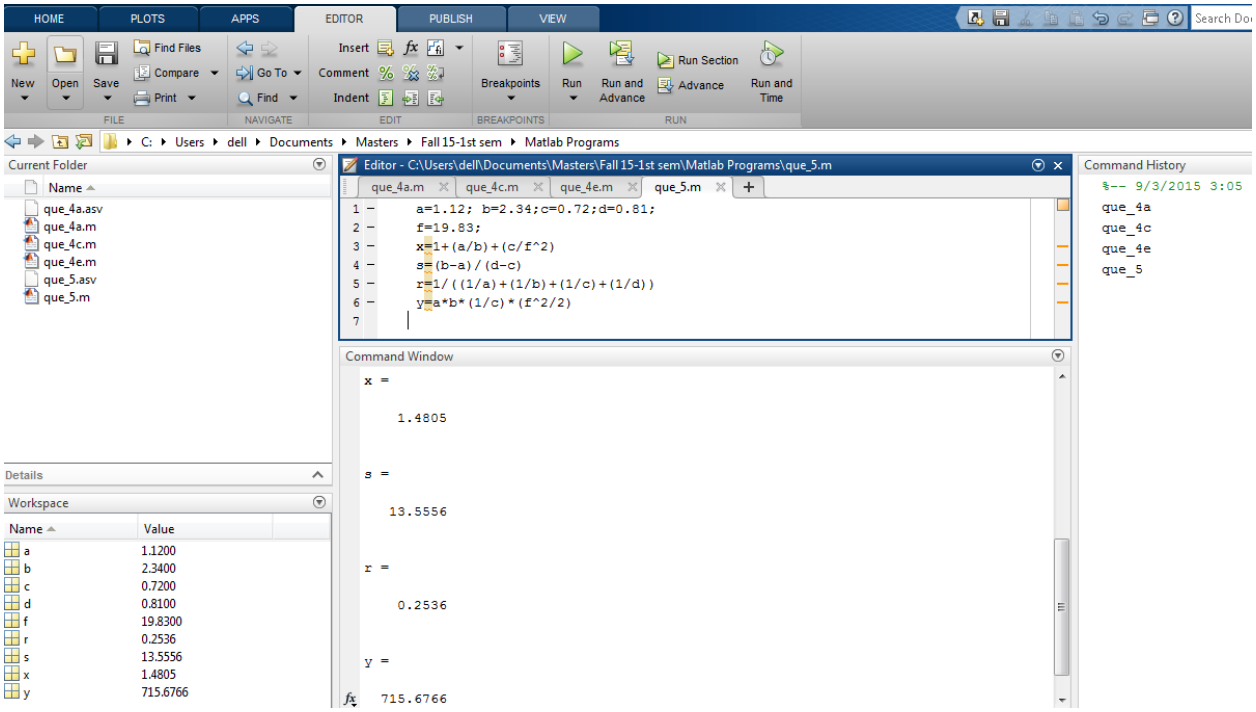
r =

0.2536

>> y=a*b*(1/c)*(f^2/2)

y =

715.6766



10.Evaluate the following expressions in MATLAB, for the values of x=5+8i ,y=-6+7i.

a.u=x+y

Solution:

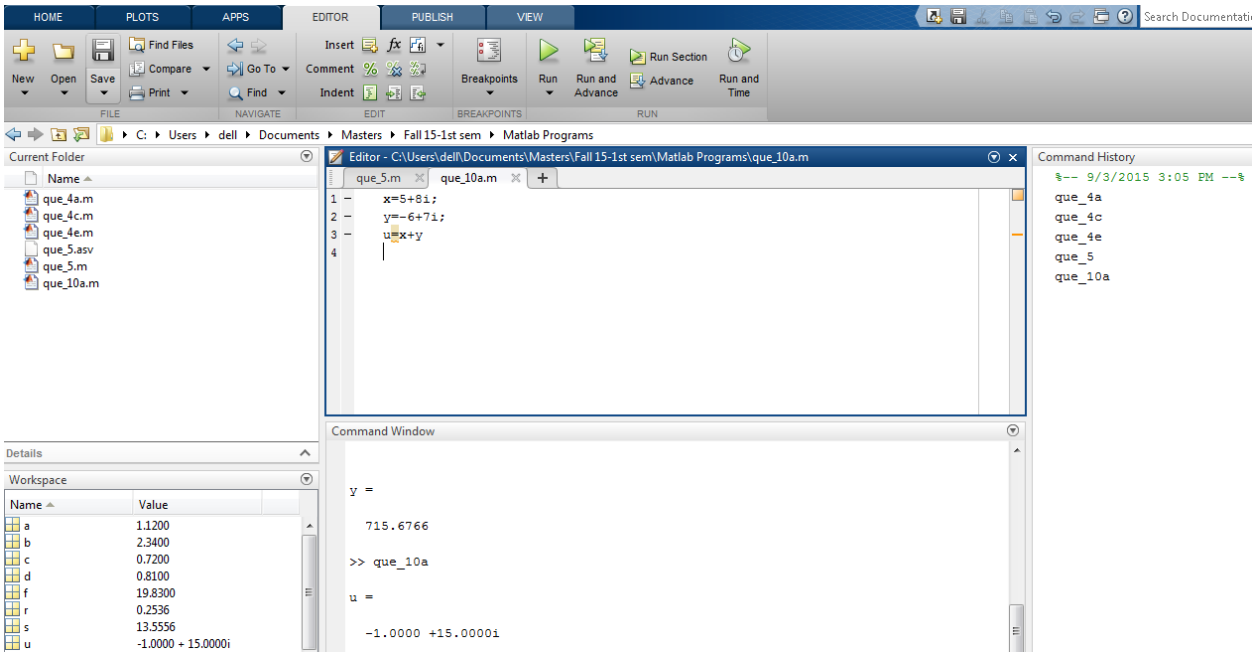
>> x=5+8i;

>> y=-6+7i;

>> u=x+y

u =

-1.0000 +15.0000i



10c. w=x/y

Solution:

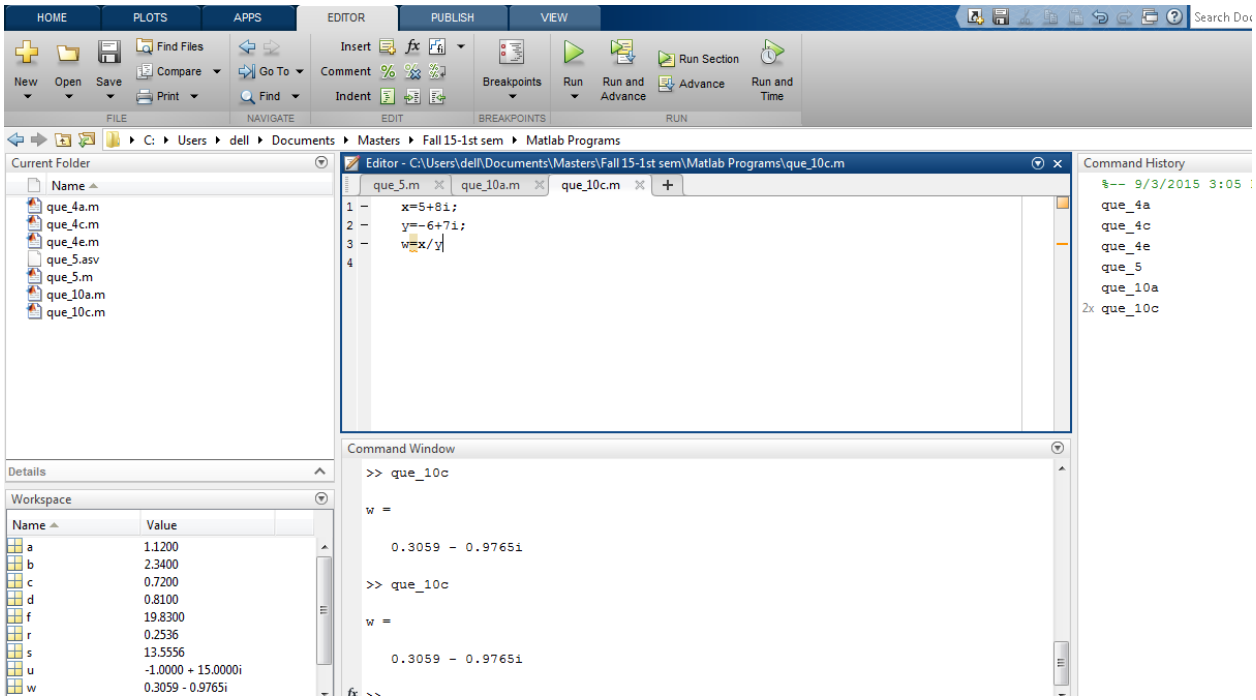
>> x=5+8i;

>> y=-6+7i;

>> w=x/y

w =

0.3059 - 0.9765i



10e. r=√y

Solution:

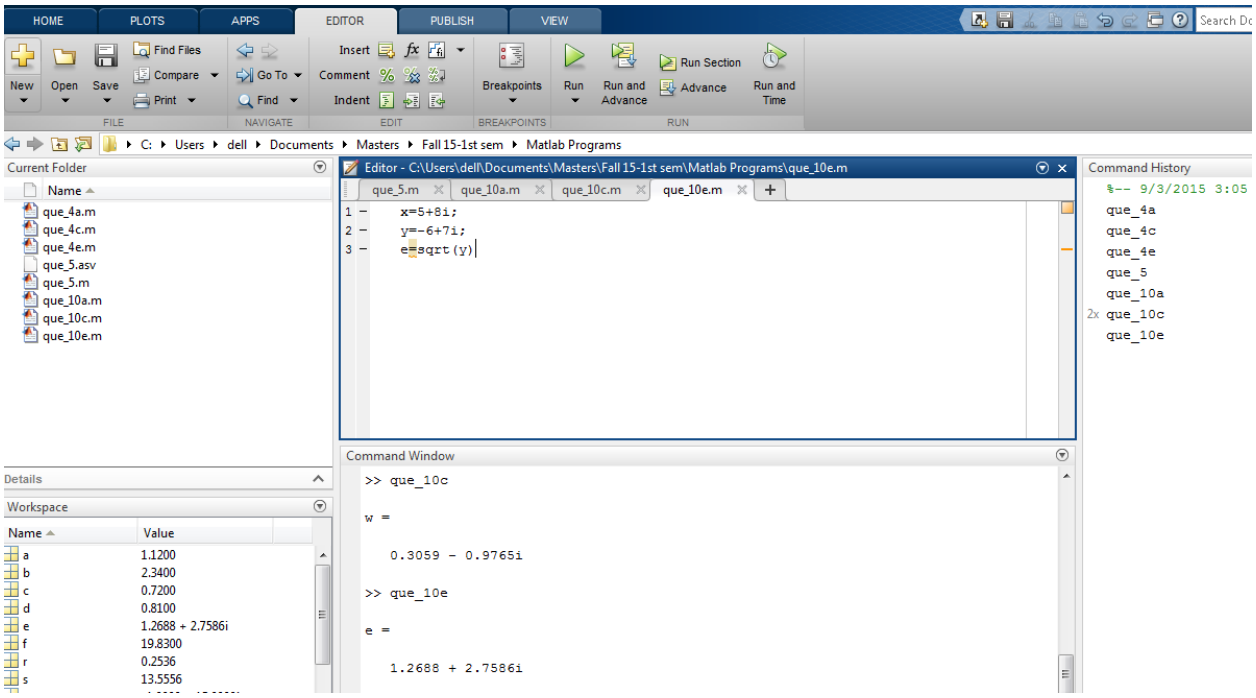
>> x=5+8i;

>> y=-6+7i;

>> e=sqrt(y)

e =

1.2688 + 2.7586i



4. Use MATLAB to calculate

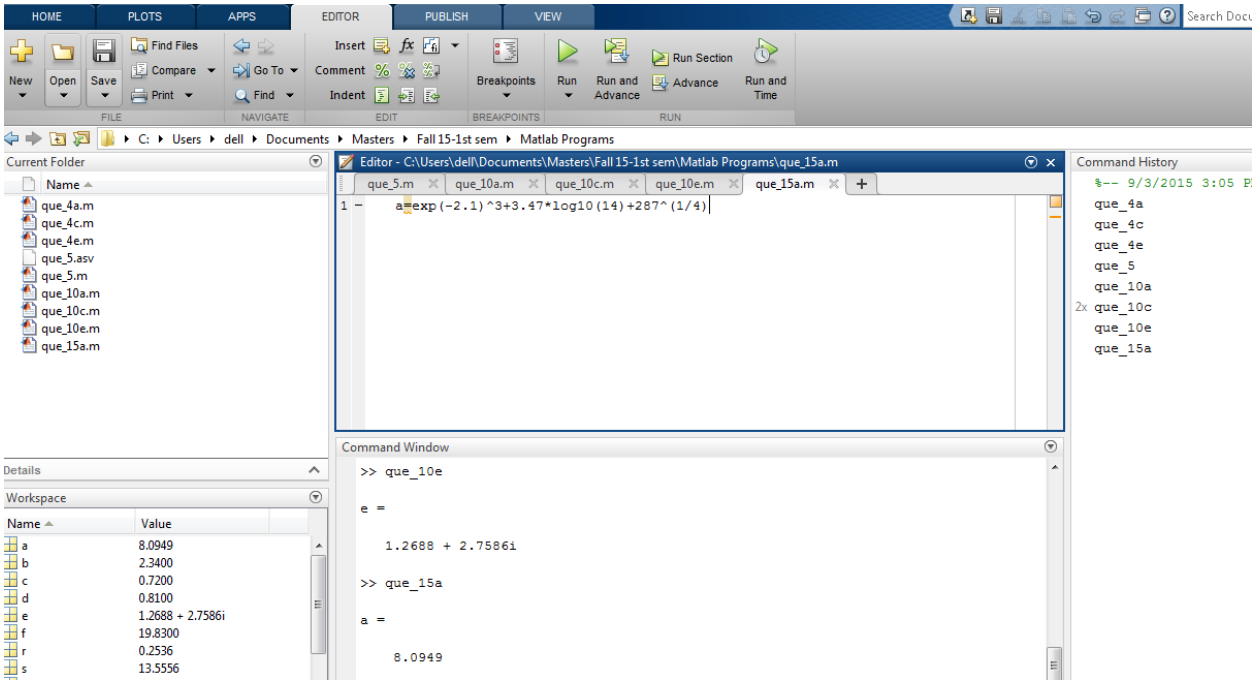
15a. $e^{(-2.1)^3}$ +3.47log(14)+287^1/4

Solution:

>> a=exp(-2.1)^3+3.47*log10(14)+287^(1/4)

a =

8.0949

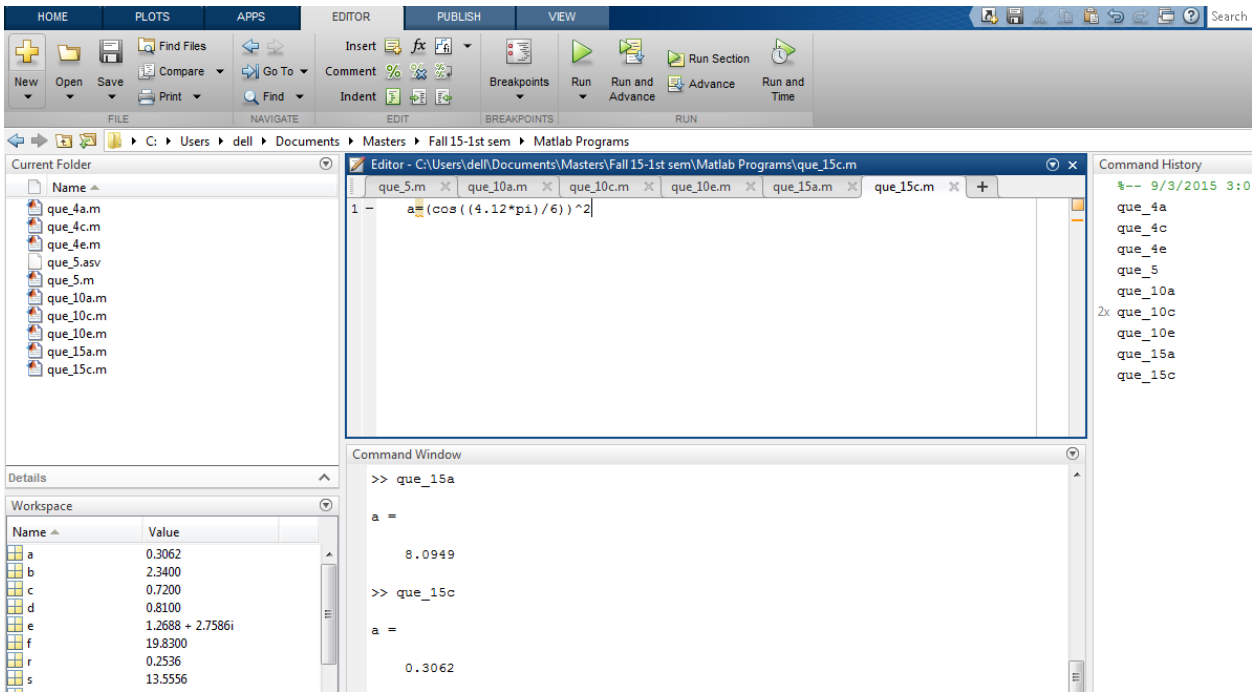


15c. $\cos^2(4.12\pi/6)$

Solution:

>> a=(cos((4.12*pi)/6))^2

a = 0.3062



15d.cos $(4.12\pi/6)^2$

Solution:

>> x=(4.12*pi)/6

x =

2.1572

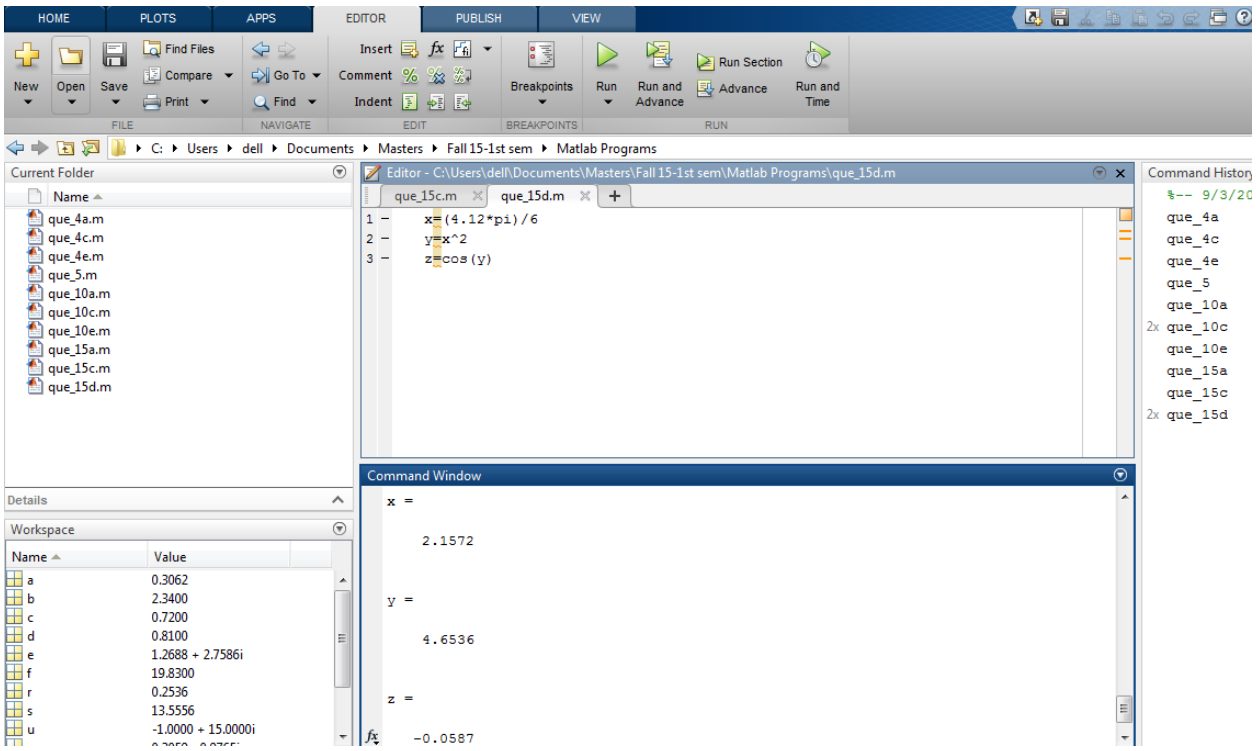
>> y=x^2

y =

4.6536

>> z=cos(y)

z = -0.0587



5. Use MATLAB to find roots of

18. $13x^3+182x^2-184x+2503=0$

SOLUTION:

>> a=[13, 182, -184, 2503];

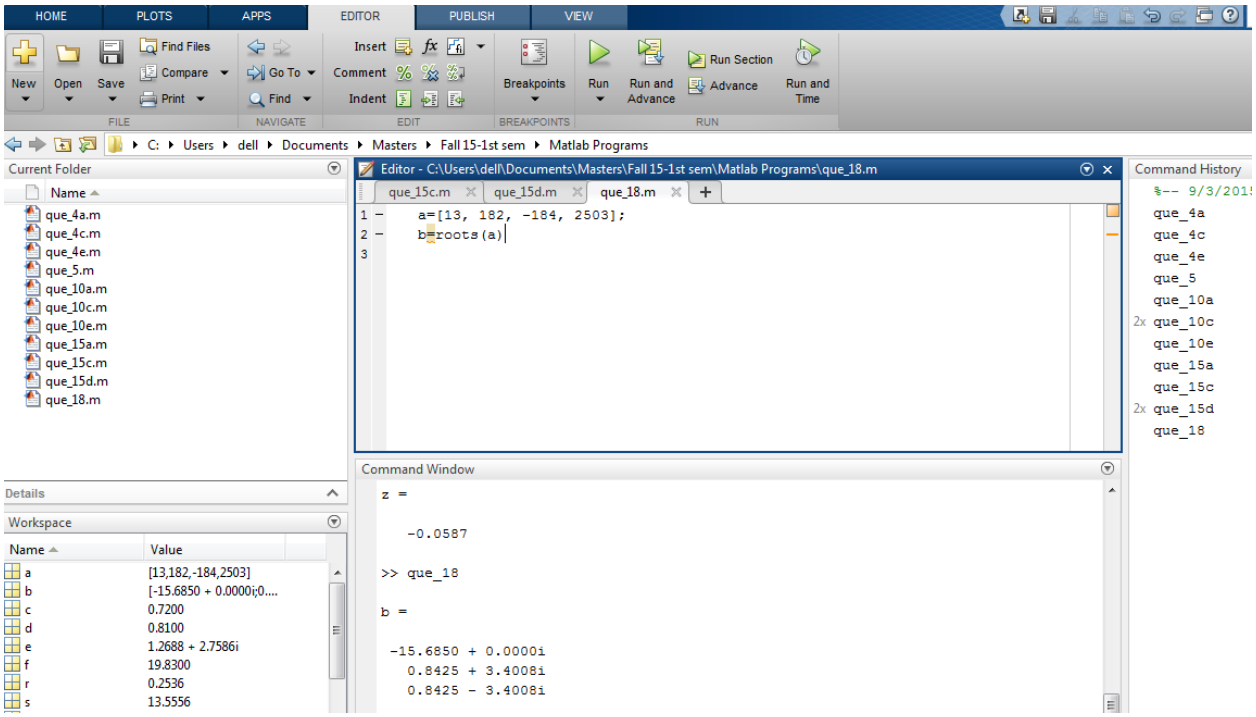
>> b=roots(a)

b =

-15.6850 + 0.0000i

0.8425 + 3.4008i

0.8425 - 3.4008i



6. Use MATLAB to plot function

21. $T=6 \ln t-7e^{0.2t}$, interval $1 \leq t \geq 3$

Solution:

>> t=1:0.2:3;

>> T=6*log(t)-7*exp(0.2*t)

T =

Columns 1 through 8

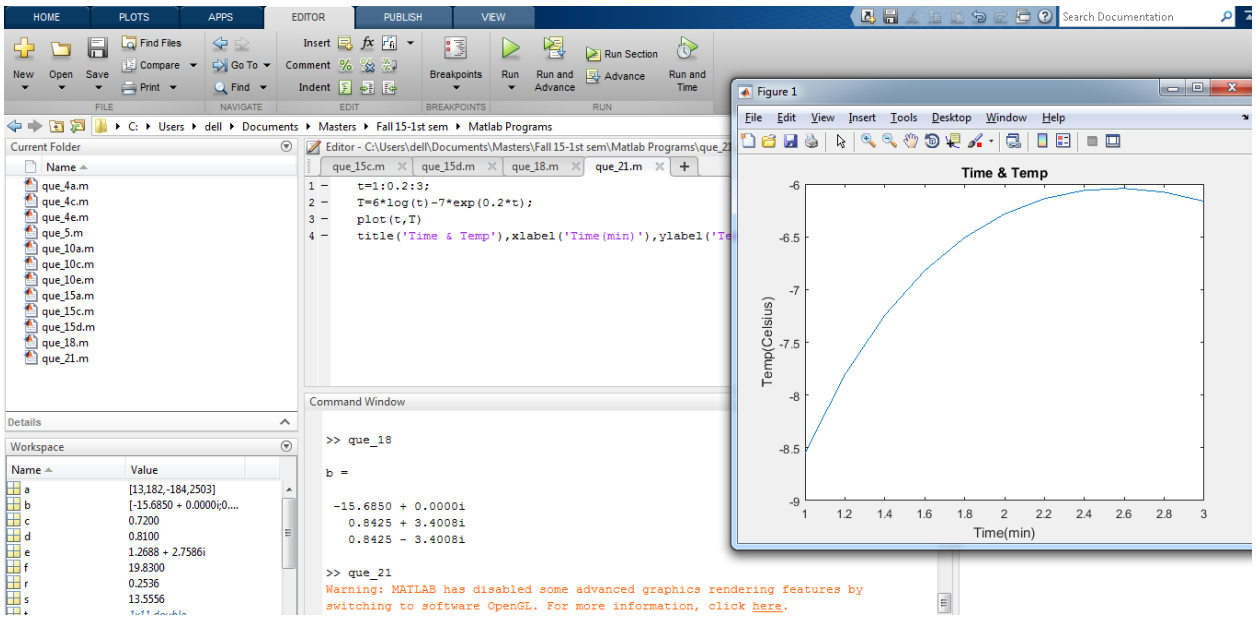
-8.5498 -7.8048 -7.2431 -6.8199 -6.5066 -6.2839 -6.1382 -6.0597

Columns 9 through 11

-6.0411 -6.0770 -6.1632

>> plot(t,T)

>> title('Time & Temp'),xlabel('Time(min)'),ylabel('Temp(Celsius)')



7. Fourier Series Representation

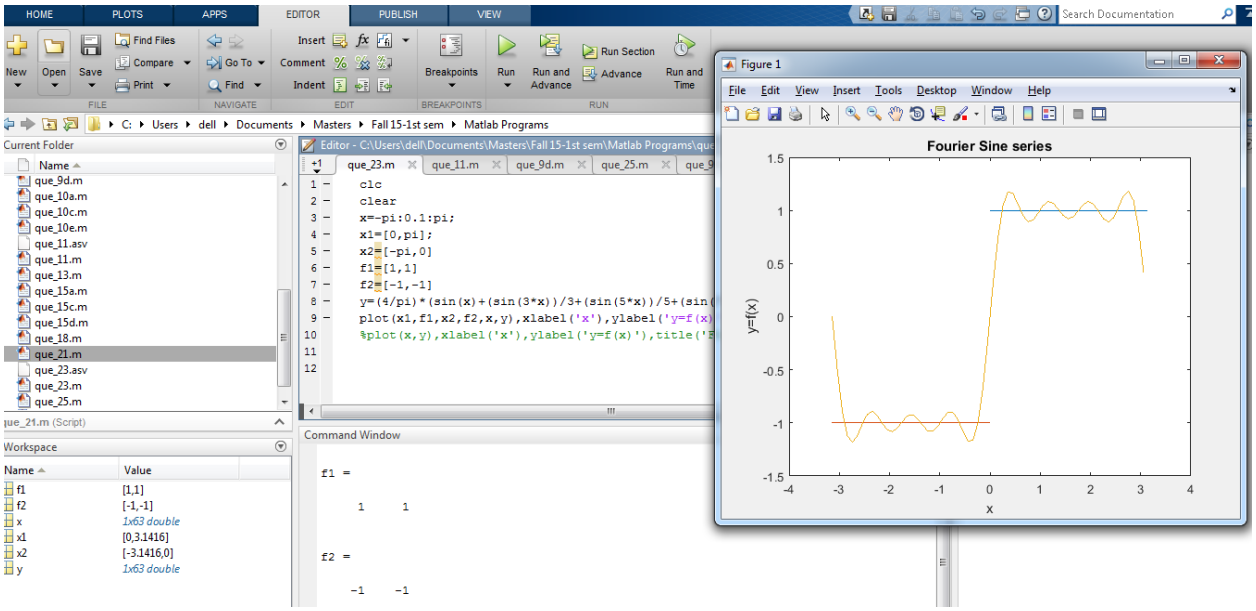
23. f(x)={1 , 0<x<π

{-1, -π<x<0

4/π(sin x+sin 3x/3+sin5x/5+sin7x/7)

Solution:

```
x=-pi:0.1:pi;
x1=[0,pi];
x2=[-pi,0]
f1=[1,1]
f2=[-1,-1]
y=(4/pi)*(sin(x)+(sin(3*x))/3+(sin(5*x))/5+(sin(7*x))/7);
plot(x1,f1,x2,f2,x,y), xlabel('x'),ylabel('y=f(x)'),title('Fourier Sine series')
%plot(x,y),xlabel('x'),ylabel('y=f(x)'),title('Fourier Sine series')
```



8.

25.Find the Length ‘ L’ and total length of fence. W=6m and A=80m^2.

Solution:

```
W=6;
A=80;
% By pythagoras theorem,W^2=D^2+D^2;
D=sqrt(W^2/2)  %Side of right triangle
%Total area=Area of Rectangle+Area of Right angle Triangle
%A=(L*W)+((1/2)*D^2)
Length=(A-(D^2/2))/6  %length of rectangle
%Total length of fence=L+L+W+D+D
TotalLength=L+L+W+D+D
disp('Total length of fence is ')
disp(TotalLength)
```

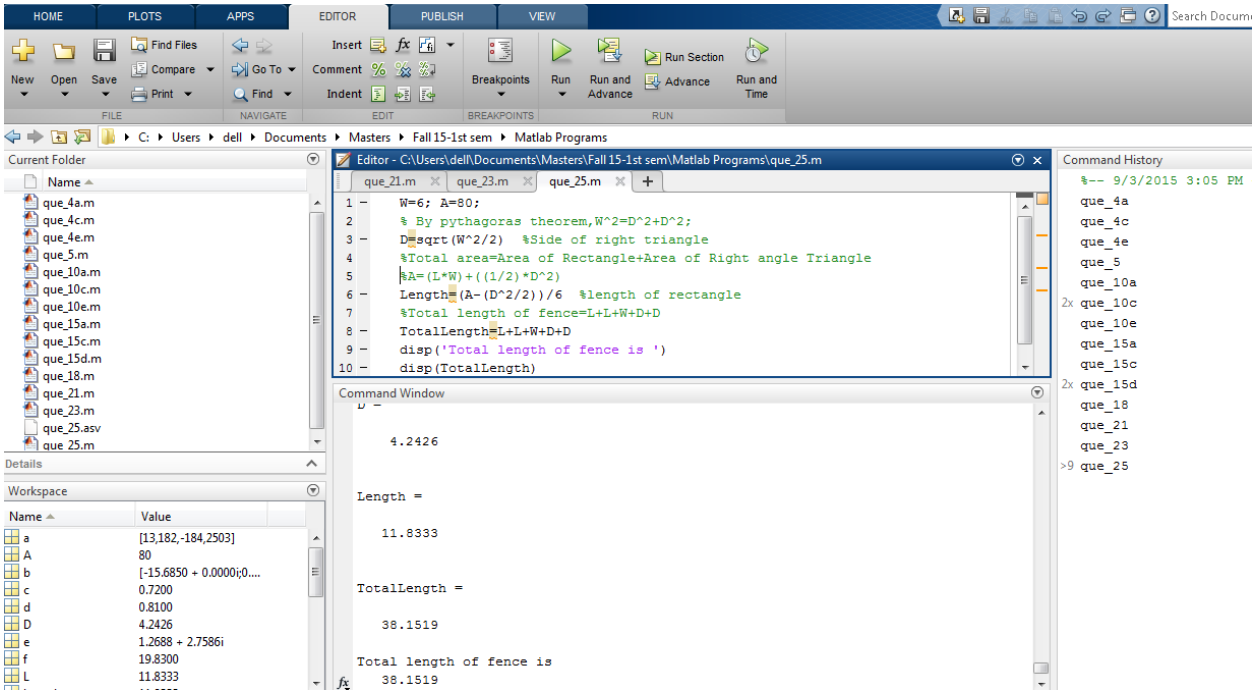
```
D =

    4.2426


Length =

   11.8333
```

TotalLength =

38.1519

Total length of fence is

38.1519



Chapter-2:

6a.4 by 3 array consisting of elements from second through fourth column

Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]

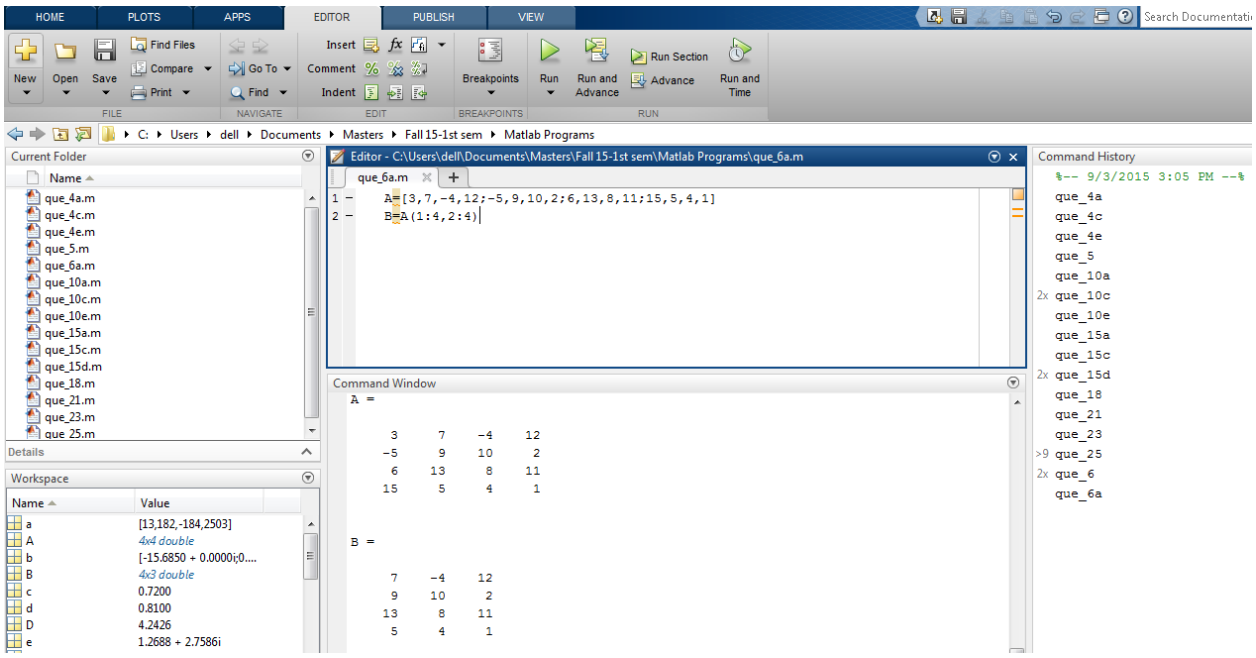
B=A(1:4,2:4)

A =

3	**7**	**-4**	**12**
-5	**9**	**10**	**2**
6	**13**	**8**	**11**
15	**5**	**4**	**1**

B =

7	**-4**	**12**
9	**10**	**2**
13	**8**	**11**
5	**4**	**1**



6b.3 by 4 array consisting of elements from second through fourth rows

Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]

C=A(2:4,1:4)

A =

3 7 -4 12

-5 9 10 2

6 13 8 11

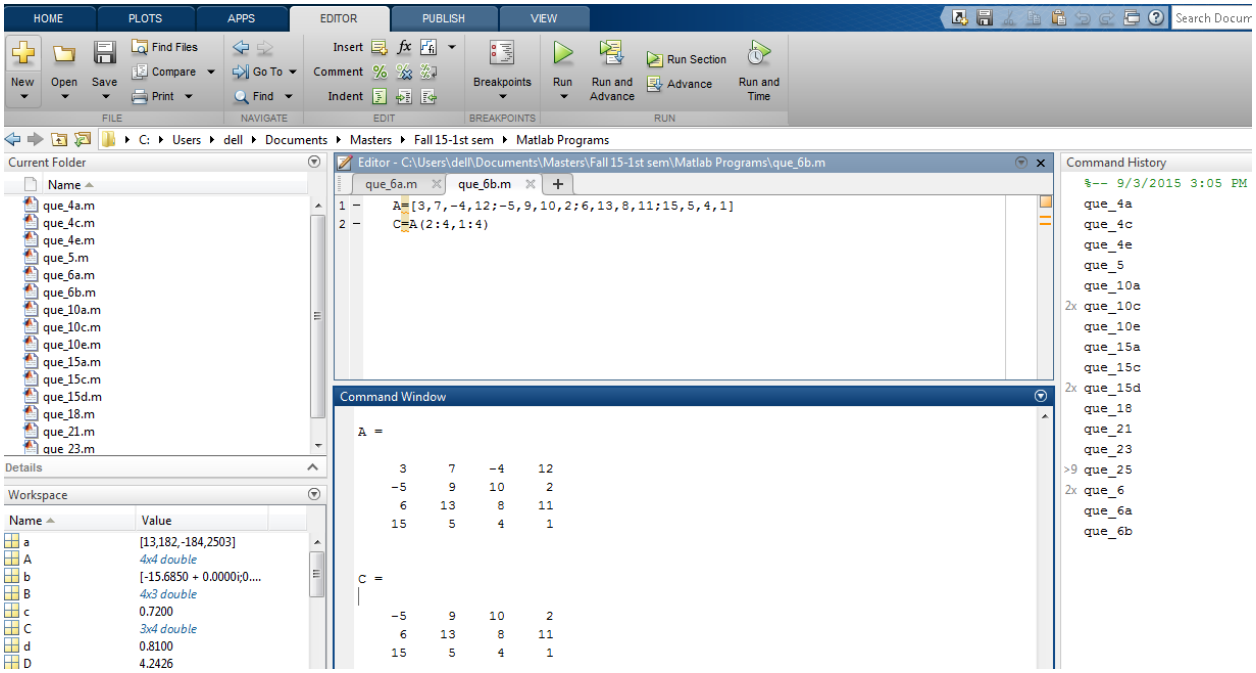
15 5 4 1

C =

-5 9 10 2

6 13 8 11

15 5 4 1



6c. 2 by 3 array consisting of elements from first two rows and last three columns

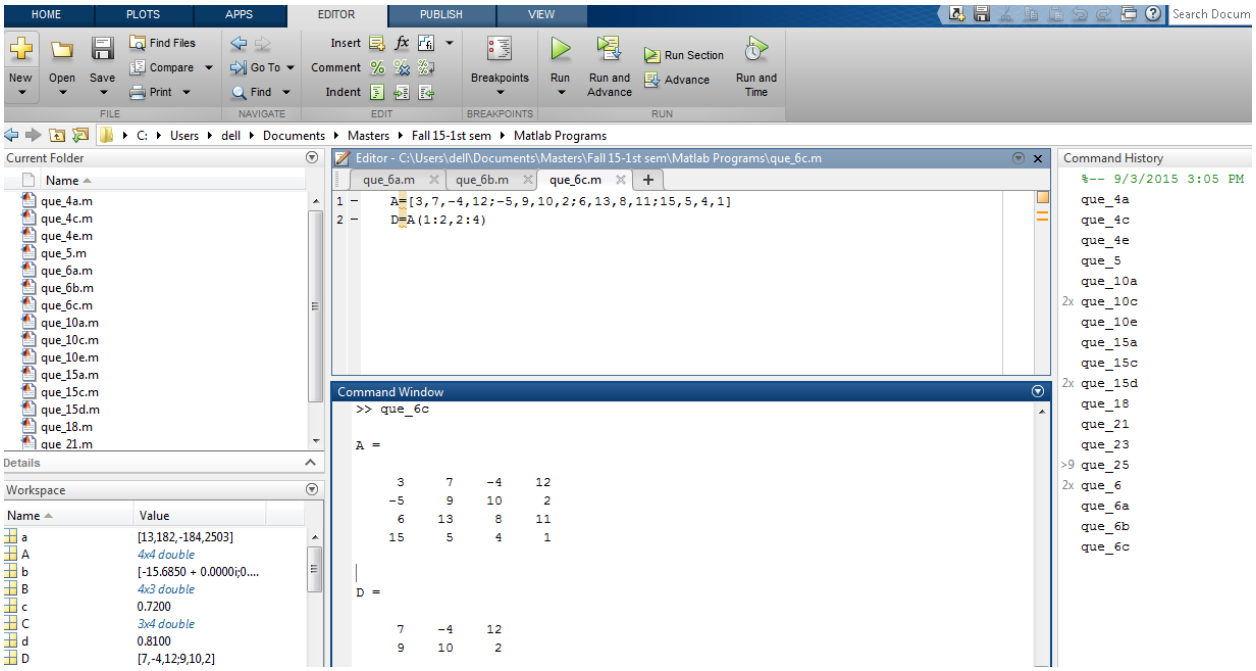
Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]
D=A(1:2,2:4)
A =

3	**7**	**-4**	**12**
-5	**9**	**10**	**2**
6	**13**	**8**	**11**
15	**5**	**4**	**1**

D =

7	**-4**	**12**
9	**10**	**2**



9a. Sort each columns of A and store it in B

Solution:

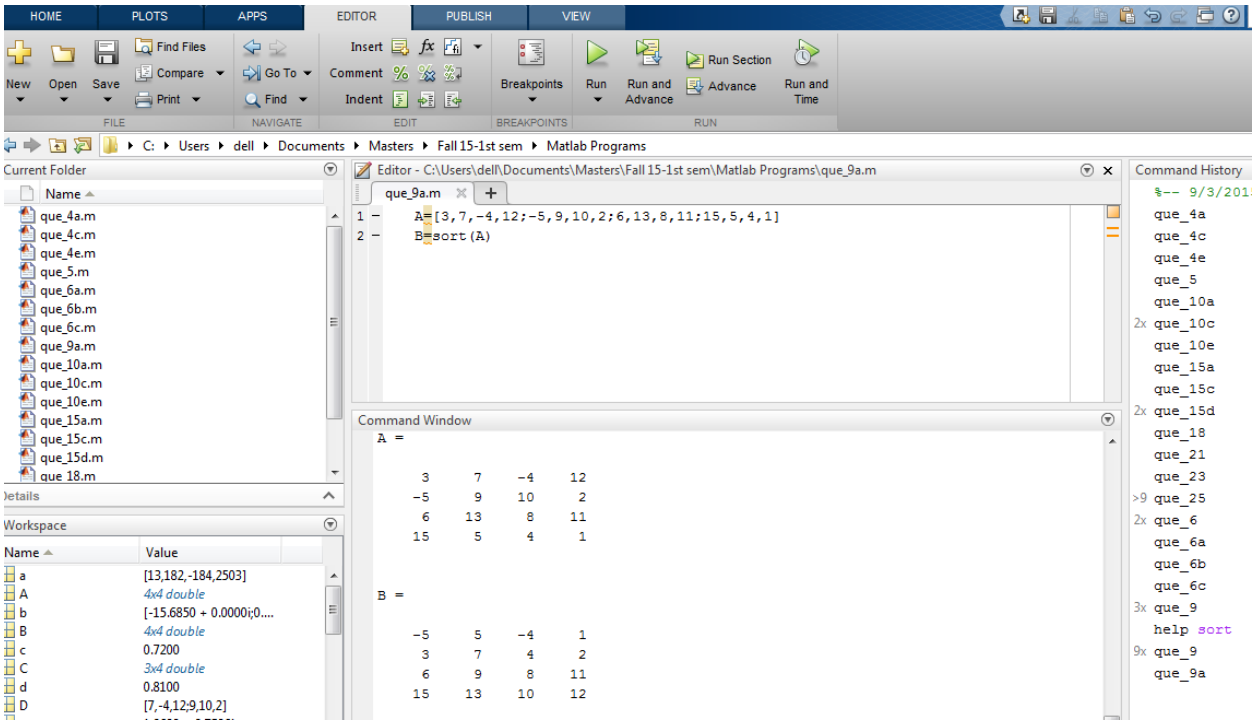
A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]
B=sort(A)

A =

3	7	-4	12
-5	9	10	2
6	13	8	11
15	5	4	1

B =

-5	5	-4	1
3	7	4	2
6	9	8	11
15	13	10	12



9b. Sort each row of A and store it in C

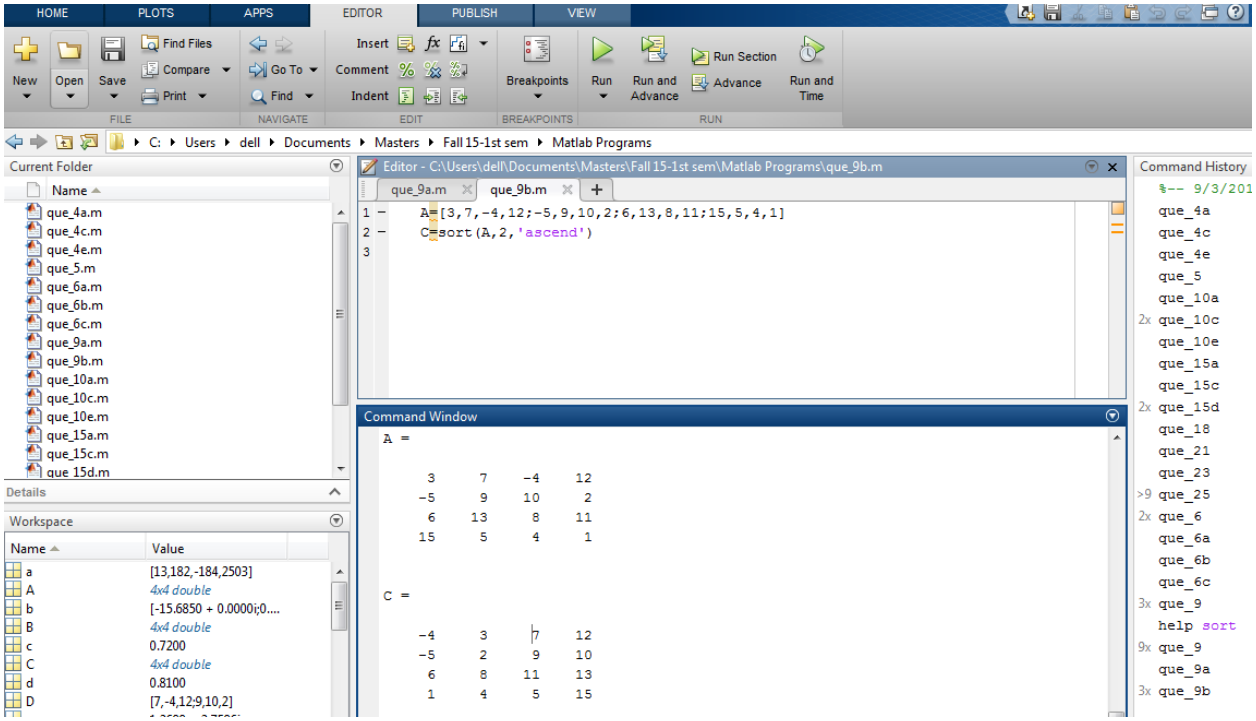
Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]
C=sort(A,2,'ascend')
A =

3	7	-4	12
-5	9	10	2
6	13	8	11
15	5	4	1

C =

-4	3	7	12
-5	2	9	10
6	8	11	13
1	4	5	15



9c.Add each column and store it in D

Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]

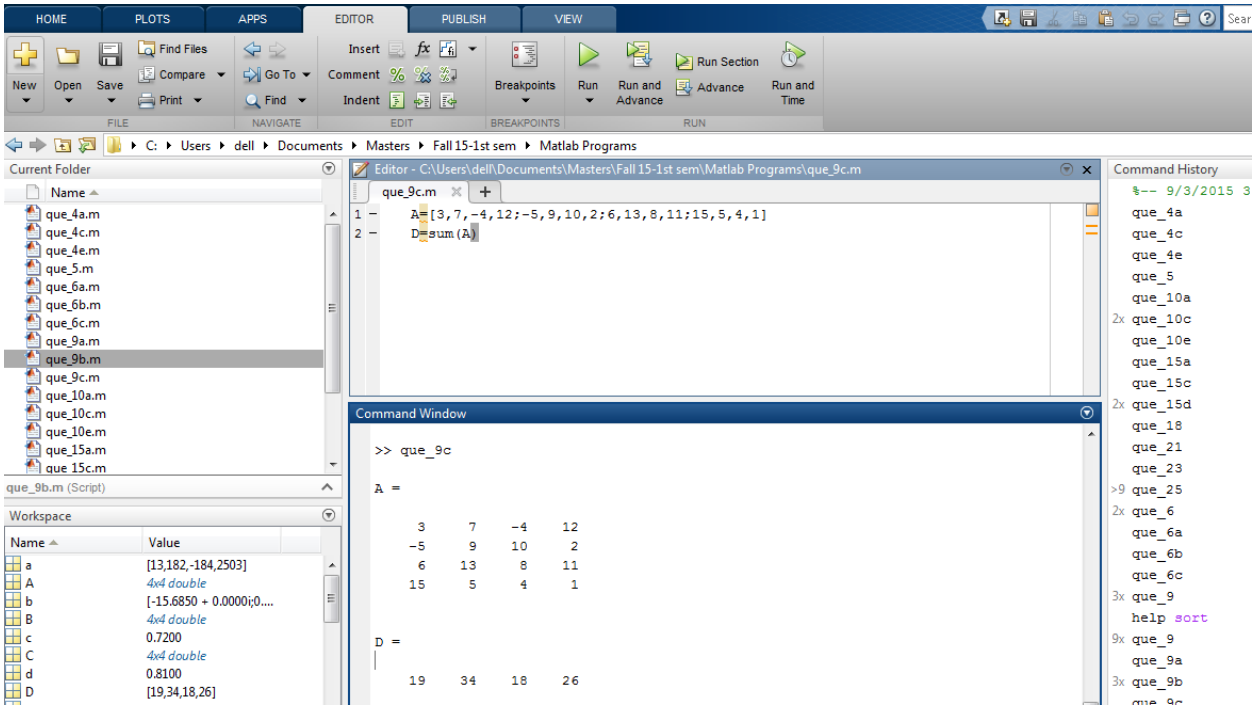
D=sum(A)

A =

3	7	-4	12
-5	9	10	2
6	13	8	11
15	5	4	1

D =

19	34	18	26



9d. Add each row and store it in E

Solution:

A=[3,7,-4,12;-5,9,10,2;6,13,8,11;15,5,4,1]

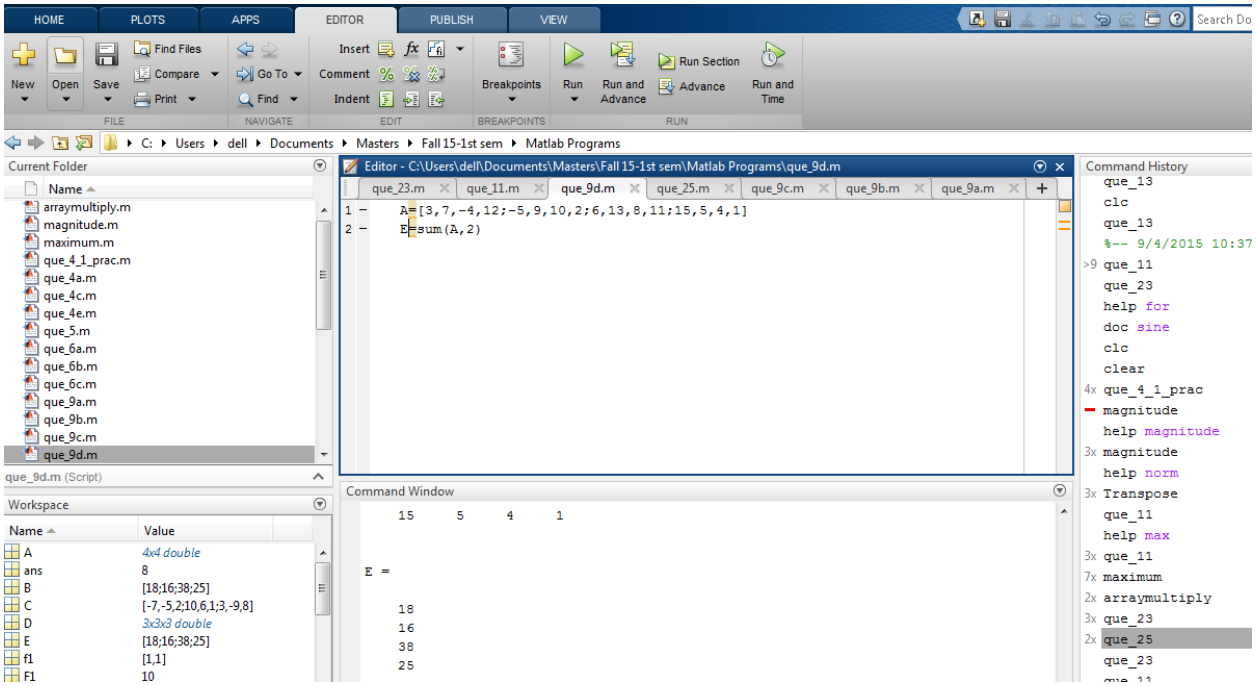
B=sum(A,2)

A =

3	**7**	**-4**	**12**
-5	**9**	**10**	**2**
6	**13**	**8**	**11**
15	**5**	**4**	**1**

E =

18
16
38
25



11. Create 3-D array D

Solution:

```
A=[3,-2,1;6,8,-5;7,9,10]
B=[6,9,-4;7,5,3;-8,2,1]
C=[-7,-5,2;10,6,1;3,-9,8]
D=cat(3,A,B,C)
F1=max(A(:)),disp('largest element in first layer'),disp(F1)
F2=max(B(:)),disp('largest element in second layer'),disp(F2)
F3=max(C(:)),disp('largest element in third layer'),disp(F3)
E=max(D(:)),disp('largest element in D'),disp(E)
```

D(:,:,1) =

```
 3  -2   1
 6   8  -5
 7   9  10
```

D(:,:,2) =

```
 6   9  -4
 7   5   3
-8   2   1
```

D(:,:,3) =

```
   -7    -5     2
   10     6     1
    3    -9     8
```

F1 =10

largest element in first layer

```
   10
```

F2 = 9

largest element in second layer

```
    9
```

F3 = 10

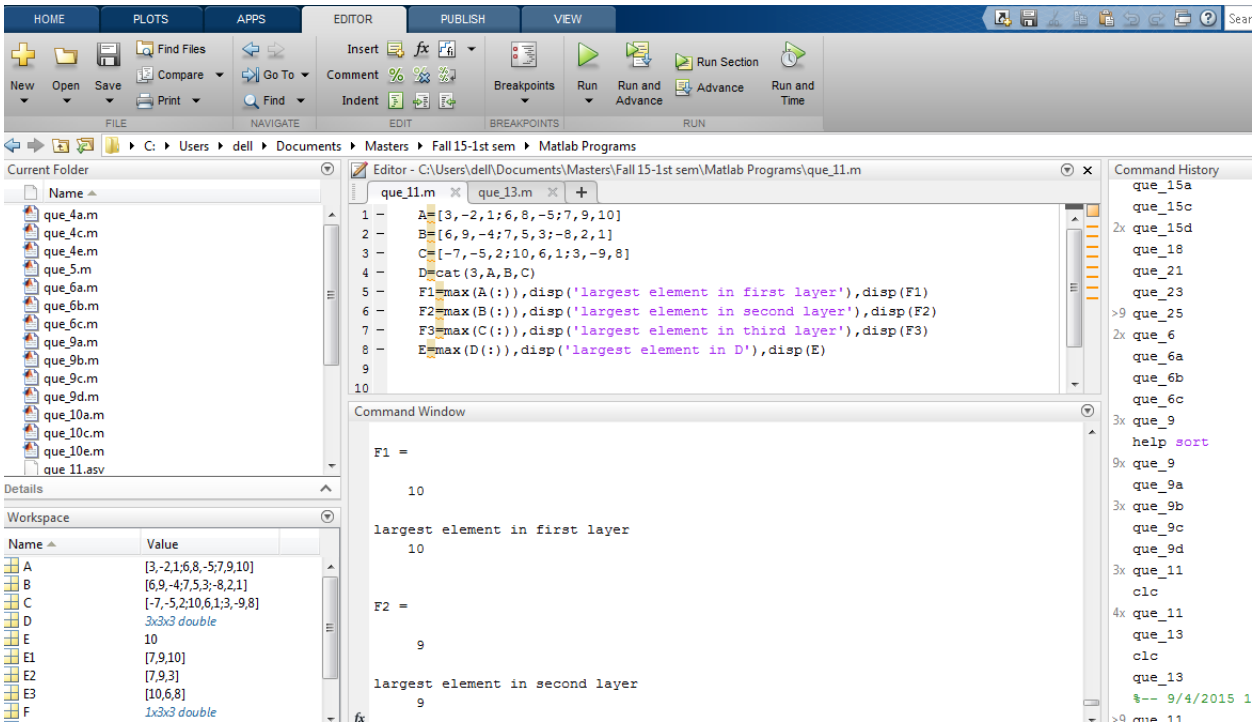
largest element in third layer

```
   10
```

E = 10

largest element in D

```
   10
```



12.Array product, right division and power

Solution:

A=[56,32;24,-16]

B=[14,-4;6,-2]

C=A.*B

D=A./B

E=B.^3

A =

56 32

24 -16

B =

14 -4

6 -2

C =

784 -128

144 32

D =

4 -8
4 8

E =

2744 -64
216 -8