

OC EXPERIMENT LAB 9

TITLE: Writing MATLAB programs

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Q1. Determine the value of the expression $a(b + c(c + d))$ using MATLAB, where $a = 2$, $b = 3$, $c = -4$ and $d = -3$.

The MATLAB R2020b interface is shown with the following components:

- Toolbar:** Includes tabs for HOME, PLOTS, APPS, EDITOR, PUBLISH, and VIEW. The EDITOR tab is active, showing icons for New, Open, Save, Find Files, Compare, Print, Go To, Find, Insert, Comment, Indent, Breakpoints, Run, Run and Advance, Run Section, Advance, and Run and Time.
- Current Folder:** Displays a list of files in the current folder, including q1.m, q2.m, q3.m, q4.m, q5.m, q6.m, q7.m, and q8.m.
- Editor:** Shows the script q1.m with the following code:

```
1 - a = 2; b = 3; c = -4; d = -3;  
2 - a*(b + c*(c + d)) * a  
3  
4  
5
```
- Command Window:** Displays the output of the script execution:

```
>> q1  
  
ans =  
  
    124
```
- Workspace:** Displays a table of variables in the workspace:

Name	Value
a	2
ans	124
b	3
c	-4
d	-3

Q2. Evaluate the MATLAB expressions by hand and then check answers with MATLAB.

$1+2/3*4-5$

$1/2/3/4$

$1/2+3/4*5$

$5-2*3*(2+7)$

$(1+3)*(2-3)/3*4$

$(2-3*(4-3))*4/5$

The image shows the MATLAB R2020b interface. The top menu bar includes HOME, PLOTS, APPS, EDITOR, PUBLISH, and VIEW. The EDITOR tab is active, showing a script editor with the following code:

```
1 - a = 1+2/3*4-5
2 - b = 1/2/3/4
3 - c = 1/2+3/4*5
4 - d = 5-2*3*(2+7)
5 - e = (1+3)*(2-3)/3*4
6 - f = (2-3*(4-3))*4/5
7
8
```

The Command Window displays the results of the script execution:

```
-49
e =
-5.3333
f =
-0.8000
fx >>
```

The Workspace window shows the following variables and their values:

Name	Value
a	-1.3333
b	0.0417
c	4.2500
d	-49
e	-5.3333
f	-0.8000

Q3. Use MATLAB to calculate the expression where $a = 3$, $b = 5$ and $c = -3$.

$$b - \frac{a}{b + \frac{b+a}{ca}}$$

MATLAB R2020b - academic use

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Pranjal

C:\Users\Admin\OneDrive\Documents\college related\MATLAB College\Lab9

Current Folder

- q1.m
- q2.m
- q3.m
- q4.m
- q5.m
- q6.m
- q7.m
- q8.m

Editor - C:\Users\Admin\OneDrive\Documents\college related\MATLAB College\Lab9\q3.m

```
1 - a = 3; b = 5; c = -3;  
2 - b (a / (b + ((b+a) / (c*a))))  
3
```

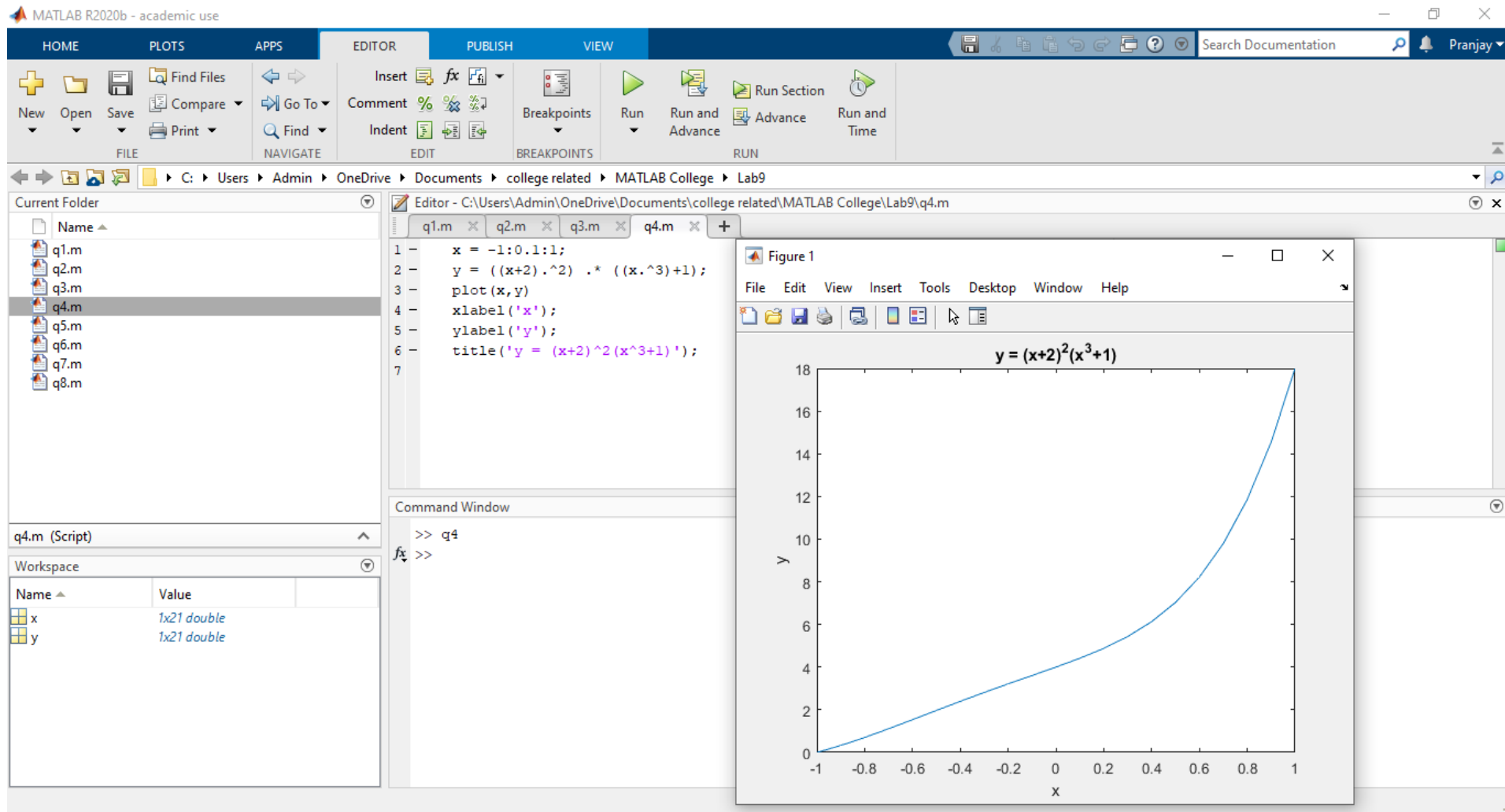
Command Window

```
>> q3  
  
ans =  
  
4.2703  
  
fx >> |
```

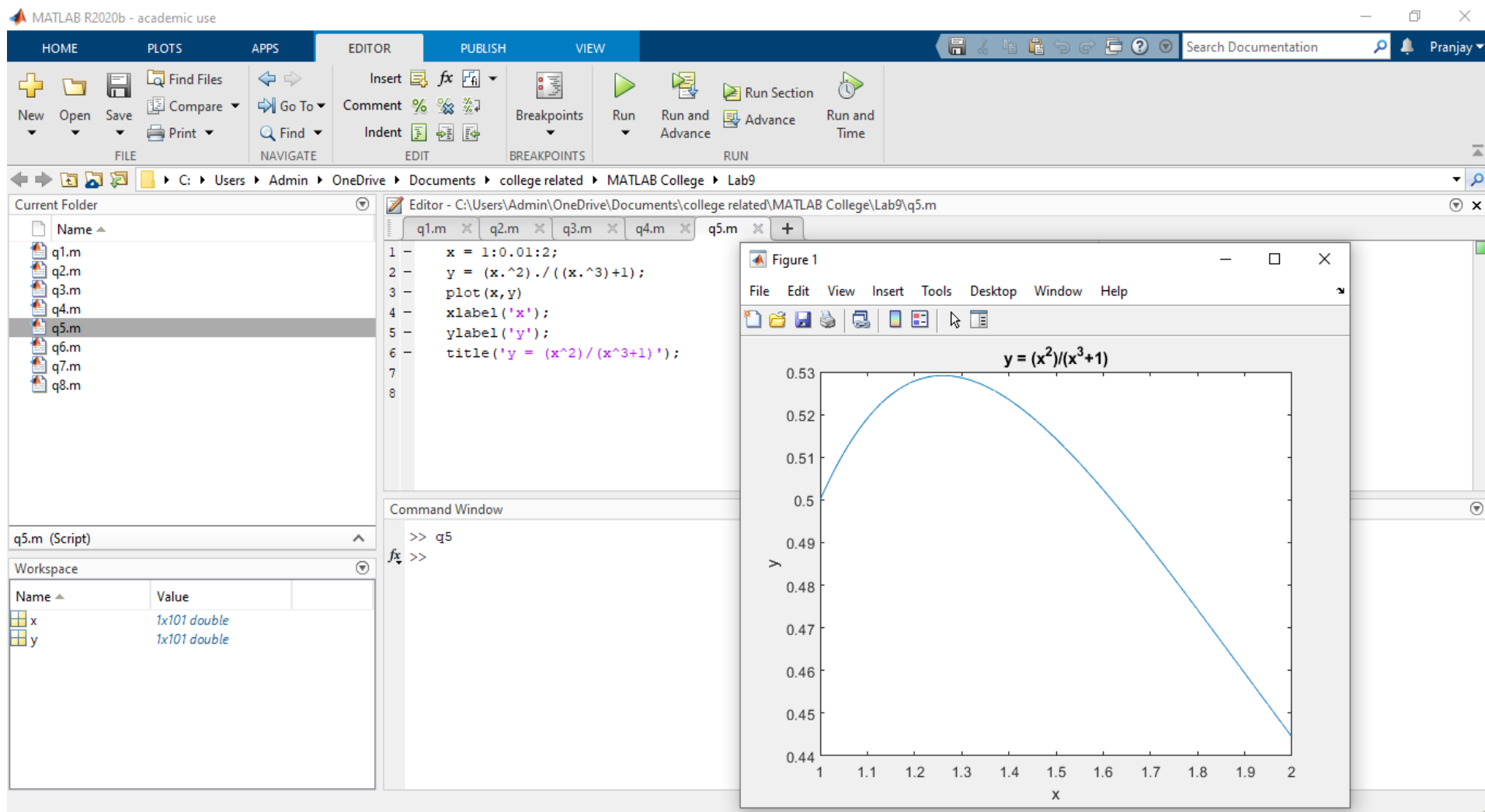
Workspace

Name	Value
a	3
ans	4.2703
b	5
c	-3

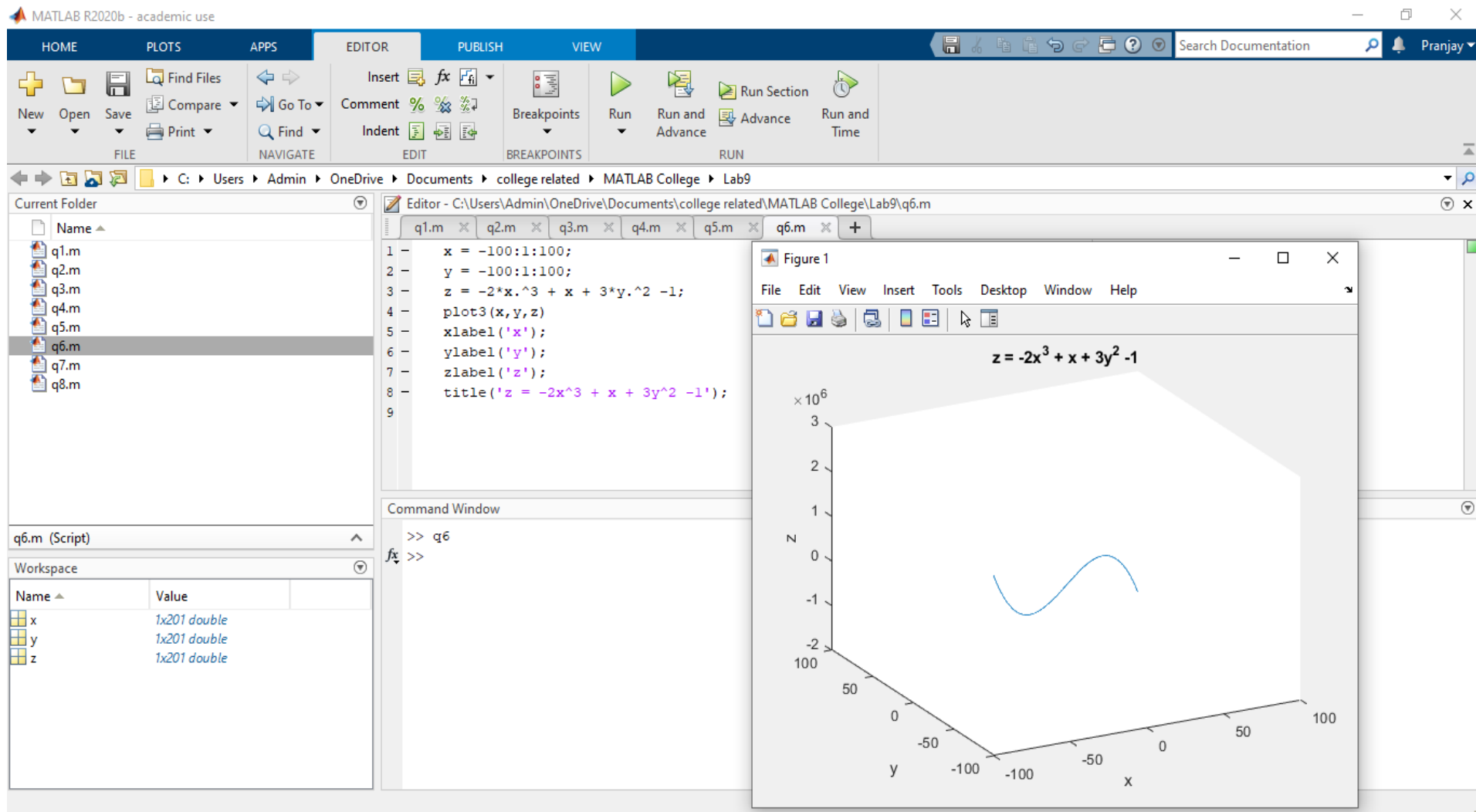
Q4. Construct the polynomial $y = (x + 2)^2(x^3 + 1)$ for values of x from minus one to one in steps of 0.1.



Q5. Construct the function $y = \frac{x^2}{x^3 + 1}$ for values of x from one to two in steps of 0.01



Q6. Plot the function $z = -2x^3 + x + 3y^2 - 1$



$$\mathbf{A} = \begin{pmatrix} \frac{\pi}{4} & \frac{\pi}{2} \\ \frac{\pi}{3} & \frac{\pi}{6} \end{pmatrix}.$$

Q7. Consider the matrix

We wish to determine the matrix whose elements take the values $\sin x/x$ where x corresponds to the elements of the matrix \mathbf{A} . In other words, we want to calculate the matrix

$$\begin{pmatrix} \frac{4}{\pi} \sin \frac{\pi}{4} & \frac{2}{\pi} \sin \frac{\pi}{2} \\ \frac{3}{\pi} \sin \frac{\pi}{3} & \frac{6}{\pi} \sin \frac{\pi}{6} \end{pmatrix}.$$

The image shows the MATLAB R2020b interface. The top menu bar includes HOME, PLOTS, APPS, EDITOR, PUBLISH, and VIEW. The EDITOR tab is active, showing a script editor with the following code:

```
1 - a = [pi/4, pi/2; pi/3, pi/6];  
2 - sin(a) ./ a  
3  
4
```

The Command Window shows the execution results:

```
>> q7  
  
ans =  
  
    0.9003    0.6366  
    0.8270    0.9549  
  
fx >> |
```

The left sidebar shows the Current Folder and Workspace. The Current Folder is C:\Users\Admin\OneDrive\Documents\college related\MATLAB College\Lab9. The Workspace shows the following variables:

Name	Value
a	[0.7854, 1.5708; 1.0472, ...]
ans	[0.9003, 0.6366; 0.8270, ...]

Q8. Determine the eigenvalues and eigenvectors of the matrix $\begin{pmatrix} 1 & 2 \\ 3 & 2 \end{pmatrix}$

MATLAB R2020b - academic use

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FILE NAVIGATE EDIT BREAKPOINTS RUN

C:\Users\Admin\OneDrive\Documents\college related\MATLAB College\Lab9

Current Folder

Name
q1.m
q2.m
q3.m
q4.m
q5.m
q6.m
q7.m
q8.asv
q8.m

q8.m (Script)

Workspace

Name	Value
A	[1,2;3,2]
Eigenvalues	[-1;4]
Eigenvector1	[-0.7071;0.7071]
Eigenvector2	[-0.5547;-0.8321]
X	[-0.7071,-0.5547;0.7071,-0.8321]
Y	[-1;0;4]

Editor - C:\Users\Admin\OneDrive\Documents\college related\MATLAB College\Lab9\q8.m

```

1 - A=[1 2;3 2];
2 - Eigenvalues = eig(A)
3 - [X,Y] = eig(A);
4 - Eigenvector1 = X(:,1)
5 - Eigenvector2 = X(:,2)

```

Command Window

```

>> q8

Eigenvalues =

    -1
     4

Eigenvector1 =

   -0.7071
    0.7071

Eigenvector2 =

   -0.5547
   -0.8321

```

fx >> |