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MAT LAB

Matrices:

```
>>A=[1 1 3;1 5 1;3 1 1]
```

A =

```
1    1    3
1    5    1
3    1    1
```

```
>>A=[1 1 3;1 5 1;3 1 1]
```

A =

```
1    1    3
1    5    1
3    1    1
```

```
>>m= size(A)      % Assigns dimension to m
```

m =

```
3    3
```

```
>>det(A)      % Calculates the determinant of A
```

ans =

```
-36
```

```
>>rank(A)      % Calculates the rank of A
```

ans =

```
3
```

```
>>diag(A)      %Displays the principal diagonal elements of A
```

ans =

```
1
5
1
```

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```
>>trace(A)           % Displays the sum of the principal diagonal elements of A
```

```
ans =
```

```
7
```

```
>> A'               % Displays the transpose of A
```

```
ans =
```

```
1    1    3
1    5    1
3    1    1
```

```
>>B=A^2
```

```
B =
```

```
11    9    7
9    27    9
7    9    11
```

```
>>A^-1              %Displays the inverse of A
```

```
ans =
```

```
-0.1111   -0.0556    0.3889
-0.0556    0.2222   -0.0556
0.3889   -0.0556   -0.1111
```

```
>>C=A+B
```

```
C =
```

```
12    10    10
10    32    10
10    10    12
```

```
>>D=A*B
```

```
D =
```

```
41    63    49
63   153    63
49    63    41
```

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```
>>E=A.*B           % Element wise multiplication of A and B
```

```
E =
```

11	9	21
9	135	9
21	9	11

```
>>A+2
```

```
ans =
```

3	3	5
3	7	3
5	3	3

```
>>3*A
```

```
ans =
```

3	3	9
3	15	3
9	3	3

```
>>A/4
```

```
ans =
```

0.2500	0.2500	0.7500
0.2500	1.2500	0.2500
0.7500	0.2500	0.2500

```
>> 1./A
```

```
ans =
```

1.0000	1.0000	0.3333
1.0000	0.2000	1.0000
0.3333	1.0000	1.0000

```
>>A./B           % Element wise division
```

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ans =

0.0909	0.1111	0.4286
0.1111	0.1852	0.1111
0.4286	0.1111	0.0909

>> X=[A B] % Horizontal concatenation

X =

1	1	3	11	9	7
1	5	1	9	27	9
3	1	1	7	9	11

>> Y=[A;B] % Vertical concatenation

Y =

1	1	3
1	5	1
3	1	1
11	9	7
9	27	9
7	9	11

>>poly(A) % Displays the coefficients of characteristic polynomial

ans =

1.0000	-7.0000	-0.0000	36.0000
--------	---------	---------	---------

>>roots(poly(A)) % Displays the roots of the characteristic equation

ans =

6.0000
3.0000
-2.0000

>>eig(A) % Displays the Eigen Values of A

ans =

-2.0000

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3.0000

6.0000

Building array:

```
>> a=[1,2,3]    % row vector
```

a =

1	2	3
---	---	---

```
>>b=[4;3;2]      %column vector
```

b =

4
3
2

```
>>c=eye(4)    %identity matrix
```

c =

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

```
>>c=eye(3)
```

c =

1	0	0
0	1	0
0	0	1

```
>>d=[a;c]
```

d =

1	2	3
1	0	0
0	1	0
0	0	1

```
e=[b;c]
```

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Error using **vertcat**

Dimensions of arrays being concatenated are not consistent.

```
>>e=[b,c]
```

e =

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

```
>>a' %transpose of a
```

ans =

1
2
3

```
>>f=[a',c]
```

f =

1	1	0	0
2	0	1	0
3	0	0	1

```
>>f(2,1)
```

ans =

2

```
>>f
```

f =

1	1	0	0
2	0	1	0
3	0	0	1

```
>>f(3,4)
```

ans =

1

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```
>>f(5,5)
```

```
Index in position 1 exceeds array bounds. Index must not exceed 3.
```

```
>>size(f)
```

```
ans =
```

```
3    4
```