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MAT LAB

Colon Notations:

```
>> y=[] %empty matrix
```

```
y =
```

```
    []  
>>f
```

```
f =
```

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

```
>>f(2,2:3)
```

```
ans =
```

```
    0    1
```

```
>>f(2:3,2)
```

```
ans =
```

```
    0  
    0
```

```
>> f(1:2,3:4)
```

```
ans =
```

```
    0    0  
    1    0
```

Array Building Functions

Command	Meaning
ones(m,n)	Build m×n matrix of 1's
zeros(m,n)	Build m×n matrix of 0's
eye(n)	Identity matrix
diag(vec)	Create diagonal matrix
diag(A)	Diagonal elements of A
rand(m,n)	Uniform random number array
randn(m,n)	Gaussian Random number array
magic(m)	Magic square matrix

```
>>ones(3,4)
```

```
ans =
```

```
1     1     1     1
1     1     1     1
1     1     1     1
```

```
>>zeros(3,4)
```

```
ans =
```

```
0     0     0     0
0     0     0     0
0     0     0     0
```

```
>>rand(3,4)
```

```
ans =
```

```
0.8147    0.9134    0.2785    0.9649
```

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```
0.9058    0.6324    0.5469    0.1576
0.1270    0.0975    0.9575    0.9706
```

```
>>magic(3)
```

```
ans =
```

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

Basic Mathematical Expressions

“Scalar” Operations

- log, exp
- power, sqrt
- sin, cos, tan
- asin, acos, atan
- rem, round, ceil, floor

```
>>a
```

```
a =
```

```
1     2     3
```

```
>>b
```

```
b =
```

```
4
3
2
```

```
>>a*b
```

Matrix Operations

- + - * / ^
- logm, expm
- mpower, sqrtm
- sum,prod,cumsum,cumprod
- min, max, mean, std
- length, size, eig

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```
ans =
```

```
    16  
>>a^2
```

```
Error using ^
```

Incorrect dimensions for raising a matrix to a power. Check that the matrix is square and the power is a scalar. To operate on each element of the matrix individually, use POWER (.^) for elementwise power.

```
>>a*a
```

```
Error using *
```

Incorrect dimensions for matrix multiplication. Check that the number of columns in the first matrix matches the number of rows in the second matrix. To operate on each element of the matrix individually, use TIMES (.*) for elementwise multiplication.

Related documentation

```
>>r=rand(3,3)
```

```
r =
```

0.9572	0.1419	0.7922
0.4854	0.4218	0.9595
0.8003	0.9157	0.6557

```
>>r^2
```

```
ans =
```

1.6190	0.9211	1.4139
1.4372	1.1254	1.4184
1.7353	1.1003	1.9426

```
>>r*r
```

```
ans =
```

1.6190	0.9211	1.4139
1.4372	1.1254	1.4184
1.7353	1.1003	1.9426

```
>>g=[1 0;2 1]
```

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```
g =
```

```
    1    0  
    2    1
```

```
>>exp(g)
```

```
ans =
```

```
    2.7183    1.0000  
    7.3891    2.7183
```

```
>>expm(g) %matrix exponential
```

```
ans =
```

```
    2.7183    0  
    5.4366    2.7183
```

```
>>a
```

```
a =
```

```
    1    2    3
```

```
>>sum(a)
```

```
ans =
```

```
    6
```

```
>>cumsum(a) %cumulative sum
```

```
ans =
```

```
    1    3    6
```

```
>>prod(a)
```

```
ans =
```

```
    6
```

```
>>cumprod(a) %cumulative product
```

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```
ans =
```

```
1    2    6
```

```
>>g
```

```
g =
```

```
1    0
2    1
```

```
>>g*g
```

```
ans =
```

```
1    0
4    1
```

```
>>g.*g    % each element multiply by itself
```

```
ans =
```

```
1    0
4    1
```

```
>>g^2
```

```
ans =
```

```
1    0
4    1
```

```
>>g.^2
```

```
ans =
```

```
1    0
4    1
```