

```
ID = 316098052;  
disp(ID)
```

316098052

1. Scalar Arithmetic 1

```
3*2^4  
% 2  
(3*2)^4  
% 3  
3-2^4  
% 4  
3^4-3  
% 5  
8/2^4  
% 6  
2^4\8  
% 7  
8^4/2
```

```
ans =  
  
48
```

```
ans =  
  
1296
```

```
ans =  
  
-13
```

```
ans =  
  
78
```

```
ans =  
  
0.5000
```

```
ans =  
  
0.5000
```

```
ans =  
  
2048
```

2. Vector 1

```
x = [3 4 7 11]  
% 2  
x = 3:8  
% 3  
x = 8:-1:0  
% 4  
xx = [8 7 6 5 4 3 2 1 0];  
% 5  
xx  
% 6  
x = linspace(0,1,11)  
% 7  
x = 0:0.1:1  
% 8  
y = linspace(0,1);  
% 9  
length(x)  
% 10  
length(y)  
% 11  
size(x)  
% 12  
size(y)  
% 13  
y(3)  
% 14  
y(1:12)  
% 15  
y([3 6 9 12])  
% 16  
x'  
% 17  
z = [1+2j 4-3j]  
% 18  
z'  
% 19  
z.'  
% 20  
3*[1 2 5]
```

```
x =
    3    4    7   11

x =
    3    4    5    6    7    8

x =
    8    7    6    5    4    3    2    1    0

xx =
    8    7    6    5    4    3    2    1    0

x =
Columns 1 through 7
    0    0.1000    0.2000    0.3000    0.4000    0.5000    0.6000
Columns 8 through 11
    0.7000    0.8000    0.9000    1.0000

x =
Columns 1 through 7
    0    0.1000    0.2000    0.3000    0.4000    0.5000    0.6000
Columns 8 through 11
    0.7000    0.8000    0.9000    1.0000

ans =
    11

ans =
    100

ans =
    1    11

ans =
    1    100

ans =
    0.0202

ans =
Columns 1 through 7
    0    0.0101    0.0202    0.0303    0.0404    0.0505    0.0606
Columns 8 through 12
    0.0707    0.0808    0.0909    0.1010    0.1111

ans =
    0.0202    0.0505    0.0808    0.1111

ans =
    0
    0.1000
    0.2000
    0.3000
    0.4000
    0.5000
    0.6000
    0.7000
    0.8000
    0.9000
    1.0000

z =
    1.0000 + 2.0000i    4.0000 - 3.0000i

ans =
    1.0000 - 2.0000i
    4.0000 + 3.0000i
```

```
ans =  
  
1.0000 + 2.0000i  
4.0000 - 3.0000i
```

```
ans =  
  
3      6      15
```

3. Matrix arithmetic

```
A = [3 1 5; 7 4 2; 7 6 8]  
b = [1;2;3]  
C = [1 0 0]  
  
% 1  
A^-1  
% 2  
transpose(A)  
A.'  
% 3  
A*b  
% 4  
b.'*A  
% 5  
A.'*b  
% 6  
Ct = [b A*b A^2*b]  
% 7  
Ot = [C ; C*A; C*A^2]  
% 8  
exp(A)  
% 9  
rank(Ot)  
% 10  
rank(Ct)  
% 11  
eig(A)  
% 12  
[V, D] = eig(A) % V - eigen-vectors of A  
% 13  
eig(Ct)  
% 14  
[V, D] = eig(Ct) % V - eigen-vectors of Ct  
% 15  
eig(Ot)  
% 16  
[V, D] = eig(Ot) % V - eigen-vectors of Ct  
% 17  
Ot.*Ct
```

```
A =  
  
3      1      5  
7      4      2  
7      6      8
```

```
b =  
  
1  
2  
3
```

```
C =  
  
1      0      0
```

```
ans =  
  
0.2273    0.2500   -0.2045  
-0.4773   -0.1250    0.3295  
0.1591   -0.1250    0.0568
```

```
ans =  
  
3      7      7  
1      4      6  
5      2      8
```

```
ans =  
  
3      7      7  
1      4      6  
5      2      8
```

```
ans =  
  
20  
21  
43
```

```
ans =  
  
38      27      33
```

ans =

38
27
33

Ct =

1 20 296
2 21 310
3 43 610

Ot =

1 0 0
3 1 5
51 37 57

ans =

1.0e+03 *

0.0201 0.0027 0.1484
1.0966 0.0546 0.0074
1.0966 0.4034 2.9810

ans =

3

ans =

3

ans =

14.4526 + 0.0000i
0.2737 + 2.4523i
0.2737 - 2.4523i

V =

0.3937 + 0.0000i -0.3620 + 0.3725i -0.3620 - 0.3725i
0.4201 + 0.0000i 0.7529 + 0.0000i 0.7529 + 0.0000i
0.8177 + 0.0000i -0.1359 - 0.3806i -0.1359 + 0.3806i

D =

14.4526 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
0.0000 + 0.0000i 0.2737 + 2.4523i 0.0000 + 0.0000i
0.0000 + 0.0000i 0.0000 + 0.0000i 0.2737 - 2.4523i

ans =

1.0e+02 *

6.3329 + 0.0000i
-0.0065 + 0.0059i
-0.0065 - 0.0059i

V =

-0.3964 + 0.0000i 0.8023 + 0.0000i 0.8023 + 0.0000i
-0.4157 + 0.0000i 0.1684 - 0.5711i 0.1684 + 0.5711i
-0.8186 + 0.0000i -0.0158 + 0.0402i -0.0158 - 0.0402i

D =

1.0e+02 *

6.3329 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
0.0000 + 0.0000i -0.0065 + 0.0059i 0.0000 + 0.0000i
0.0000 + 0.0000i 0.0000 + 0.0000i -0.0065 - 0.0059i

ans =

60.1288
-2.1288
1.0000

V =

0 0 0.7953
0.0843 0.8477 -0.3740
0.9964 -0.5305 -0.4772

D =

60.1288 0 0
0 -2.1288 0
0 0 1.0000

ans =

1	0	0
6	21	1550
153	1591	34770

4.1 Orthogonal Matrix Function

```
A = eye(3)
Ort_mat(A)

% 4.2 Replace values in a matrix
M = Replace_mat(A,1,2)
```

```
A =

     1     0     0
     0     1     0
     0     0     1
```

```
ans =

     1
```

```
M =

     2     0     0
     0     2     0
     0     0     2
```

5. Polynomials

```
p = [1 0 -12 0 39 2 -28];
x = -3:0.1:3;
y = polyval(p,x);
% 1
plot(x,y)
% 2
r = roots(p)
% 3
TF = islocalmin(y);
% 4
plot(x,y,x(TF),y(TF),'r*')

function ans = Ort_mat(x)
    if x' == x^-1
        ans = 1;
    else
        ans = 0;
    end
end

function B = Replace_mat(A,u,v)
    Mask = A==u;
    B = A.*not(Mask)+ Mask*v;
end
```

```
r =

-2.6951
 2.5800
 2.1173
-1.8898
-1.0610
 0.9485
```



