

```

> s:=[1,4,25,9,16,25];
                                s:= [1, 4, 25, 9, 16, 25]
<=
> [seq(i^2, i=1..5)];
                                [1, 4, 9, 16, 25]
<=
> nops(s);
                                6
<=
> L:= [seq(rand(0..10)(), i=1..10)];
                                L:= [6, 9, 5, 1, 10, 3, 5, 4, 10, 0]
<=
> select(x->x<5, L);
                                [1, 3, 4, 0]
<=
> M1:={b,a,c};
                                M1:= {a, b, c}
<=
> M3:=[1,1,2,2,3,3];
                                M3:= [1, 1, 2, 2, 3, 3]
<=
> M4:=convert(M3, set);
                                M4:= {1, 2, 3}
<=
> convert(M4, list);
                                [1, 2, 3]
<=
> M2:={a,b};
                                M2:= {a, b}
<=
> M1 union M2;
                                {a, b, c}
<=
> M1 intersect M2;
                                {a, b}
<=
> M1 minus M2;
                                {c}
<=
> with(LinearAlgebra):
> d:=Matrix([[1,2,3], [1,4,9], [1,16,27]]);
                                d:=  $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 9 \\ 1 & 16 & 27 \end{bmatrix}$ 
<=
> h:=(i,j)->1/(i+j-x):
> h4:=Matrix(4,4,h);

```

$$h4:= \begin{bmatrix} \frac{1}{2-x} & \frac{1}{3-x} & \frac{1}{4-x} & \frac{1}{5-x} \\ \frac{1}{3-x} & \frac{1}{4-x} & \frac{1}{5-x} & \frac{1}{6-x} \\ \frac{1}{4-x} & \frac{1}{5-x} & \frac{1}{6-x} & \frac{1}{7-x} \\ \frac{1}{5-x} & \frac{1}{6-x} & \frac{1}{7-x} & \frac{1}{8-x} \end{bmatrix}$$

> C:=Transpose(d);

$$C:= \begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 16 \\ 3 & 9 & 27 \end{bmatrix}$$

> d.C;

$$\begin{bmatrix} 14 & 36 & 114 \\ 36 & 98 & 308 \\ 114 & 308 & 986 \end{bmatrix}$$

> E:=MatrixInverse(d);

$$E:= \begin{bmatrix} 1 & \frac{1}{6} & -\frac{1}{6} \\ \frac{1}{2} & -\frac{2}{3} & \frac{1}{6} \\ -\frac{1}{3} & \frac{7}{18} & -\frac{1}{18} \end{bmatrix}$$

> d.E;

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

> Rank(d);

3

> Determinant(d);

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```
%typeset_mode True
```

```
s=[1,4,25,9,16,25]
```

```
[i^2 for i in range (1,6)]  
[1, 4, 9, 16, 25]
```

```
len(s)  
6
```

```
def random_between(j,k) :  
    a=int(random()*(k-j+1))+j  
    return a
```

```
L=[random_between(-10,10) for i in range(1,11)];L  
[3, 10, 1, 2, -3, -7, -10, 10, -3, 2]
```

```
[j for j in L if j< 5]  
[3, 1, 2, -3, -7, -10, -3, 2]
```

```
reset()
```

```
var('a,b,c');M1={b,a,c}  
(a, b, c)
```

```
M3=[1,1,2,2,3,3];M3  
[1, 1, 2, 2, 3, 3]
```

```
M4=set(M3);M4  
set([1, 2, 3])
```

```
list(M4)  
[1, 2, 3]
```

```
M2={a,b};M2  
set([b, a])
```

```
M1.union(M2)  
set([c, b, a])
```

```
M1.intersection(M2)  
set([b, a])
```

```
M1.difference(M2)  
set([c])
```

```
d=matrix([[1,2,3],[1,4,9],[1,16,27]]);d
```

$$\begin{pmatrix} 1 & 2 & 3 \\ 1 & 4 & 9 \\ 1 & 16 & 27 \end{pmatrix}$$

```
h4=matrix(4,4, lambda i,j: 1/(i+1+j+1-x));h4
```

$$\begin{pmatrix} -\frac{1}{x-2} & -\frac{1}{x-3} & -\frac{1}{x-4} & -\frac{1}{x-5} \\ -\frac{1}{x-3} & -\frac{1}{x-4} & -\frac{1}{x-5} & -\frac{1}{x-6} \\ -\frac{1}{x-4} & -\frac{1}{x-5} & -\frac{1}{x-6} & -\frac{1}{x-7} \\ -\frac{1}{x-5} & -\frac{1}{x-6} & -\frac{1}{x-7} & -\frac{1}{x-8} \end{pmatrix}$$

```
c=d.transpose();c
```

$$\begin{pmatrix} 1 & 1 & 1 \\ 2 & 4 & 16 \\ 3 & 9 & 27 \end{pmatrix}$$

```
d*c
```

$$\begin{pmatrix} 14 & 36 & 114 \\ 36 & 98 & 308 \\ 114 & 308 & 986 \end{pmatrix}$$

```
e=d.inverse();e
```

$$\begin{pmatrix} 1 & \frac{1}{6} & -\frac{1}{6} \\ \frac{1}{2} & -\frac{2}{3} & \frac{1}{6} \\ -\frac{1}{3} & \frac{7}{18} & -\frac{1}{18} \end{pmatrix}$$

```
d*e
```

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

```
d.rank()
```

3

```
d.det()
```

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