

Числа

```
In [1]: a = int(input())  
        b = int(input())  
        print(a + b)
```

```
12  
13  
25
```

Строки

```
In [4]: c = 'Hello world'  
        print(c[:5]+'!')
```

```
Hello!
```

Условия

```
In [6]: d = int(input())  
        if d <= 5:  
            print('<=5')  
        else:  
            print('>5')
```

```
6  
>5
```

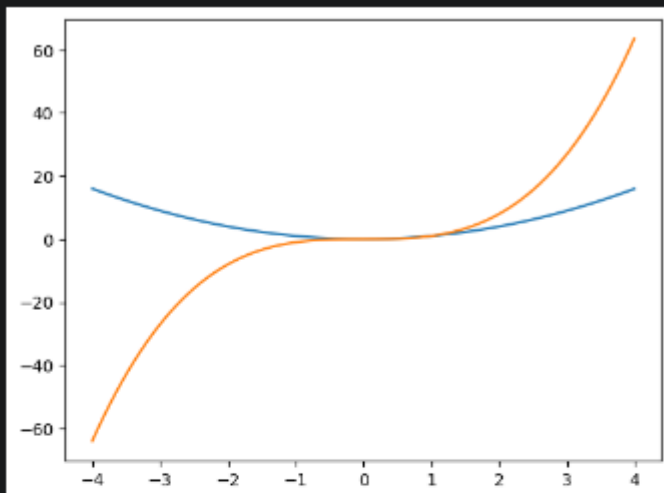
Функции, списки и циклы

```
In [7]: def print_array(num: int):  
        e = []  
        for i in range(num):  
            e.append(i)  
        return e  
        print_array(4)
```

```
Out[7]: [0, 1, 2, 3]
```

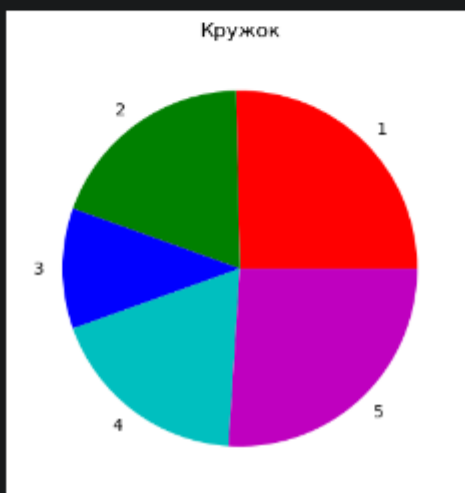
```
In [4]: import numpy as np
import matplotlib.pyplot as plt
x = np.arange(-4, 4, 0.01)
plt.plot(x, x**2)
plt.plot(x, x**3)
```

Out[4]: [<matplotlib.lines.Line2D at 0x7f99cf22d280>]



```
In [6]: from random import randint
values = []
for _ in range(5):
    values.append(randint(0, 50))
colors = ['r', 'g', 'b', 'c', 'm']
labels = ['1', '2', '3', '4', '5']
plt.title('Кружок')
plt.pie(values, colors = colors, labels = labels)
```

Out[6]: ([<matplotlib.patches.Wedge at 0x7f99cf195bb0>, <matplotlib.patches.Wedge at 0x7f99cf1a2100>, <matplotlib.patches.Wedge at 0x7f99cf1a25e0>, <matplotlib.patches.Wedge at 0x7f99cf1a2ac0>, <matplotlib.patches.Wedge at 0x7f99cf1a2fa0>], [Text(0.76940041920214937, 0.7861406930694739, '1'), Text(-0.6427279137083749, 0.8926930205507826, '2'), Text(-1.0999999999999954, 1.0298943285007232e-07, '3'), Text(-0.6617865681537195, -0.8786572359067685, '4'), Text(0.7523112371868377, -0.8025134281757595, '5')])



```
In [1]: import numpy as np
a = [1, 2, 3]
b = [0.1, 0.2, 0.3]
c = ['a', 'b', 'c']
print(np.array(a))
print(np.array(b))
print(np.array(c))
```

```
[1 2 3]
[0.1 0.2 0.3]
['a' 'b' 'c']
```

```
In [ ]: |
```

```
In [1]: import numpy as np
x = [5, 10, 15, 20, 25, 30]
a = np.array(x)
print(a.ndim, a.shape)

1 (6,)
```

```
In [2]: a
```

```
Out[2]: array([ 5, 10, 15, 20, 25, 30])
```

```
In [4]: b = a.reshape((3, 2))
```

```
In [5]: b
```

```
Out[5]: array([[ 5, 10],
               [15, 20],
               [25, 30]])
```

```
In [6]: print(b.ndim, b.shape)
```

```
2 (3, 2)
```

```
In [7]: b*2
```

```
Out[7]: array([[10, 20],
               [30, 40],
               [50, 60]])
```

```
In [9]: b = b*2
b[-2]
```

```
Out[9]: array([30, 40])
```

```
In [ ]:
```

```
In [3]: import numpy as np  
a = np.array(np.arange(10, 110, 10))
```

```
In [4]: a
```

```
Out[4]: array([ 10, 20, 30, 40, 50, 60, 70, 80, 90, 100])
```

```
In [5]: a>40
```

```
Out[5]: array([False, False, False, False,  True,  True,  True,  True,  True,  
              True])
```

```
In [6]: a[a>40]
```

```
Out[6]: array([ 50, 60, 70, 80, 90, 100])
```

```
In [7]: a.clip(30, 80)
```

```
Out[7]: array([30, 30, 30, 40, 50, 60, 70, 80, 80, 80])
```

```
In [9]: b = np.array([10, 20, np.NaN, 40, 50])
```

```
In [10]: b
```

```
Out[10]: array([10., 20., nan, 40., 50.])
```

```
In [11]: np.isnan(b)
```

```
Out[11]: array([False, False,  True, False, False])
```

```
In [12]: ~np.isnan(b)
```

```
Out[12]: array([ True,  True, False,  True,  True])
```

```
In [13]: b[~np.isnan(b)]
```

```
Out[13]: array([10., 20., 40., 50.])
```

```
In [1]: import numpy as np  
a = np.array([10, 20, 30, 40])
```

```
In [2]: a / 10
```

```
Out[2]: array([1., 2., 3., 4.])
```

```
In [3]: a * 10
```

```
Out[3]: array([100, 200, 300, 400])
```

```
In [4]: a - 5
```

```
Out[4]: array([ 5, 15, 25, 35])
```

```
In [5]: a**3
```

```
Out[5]: array([ 1000,  8000, 27000, 64000])
```

```
In [6]: a + 40
```

```
Out[6]: array([50, 60, 70, 80])
```

```
In [ ]: |
```

```
In [2]: import numpy as np
        np.zeros(10)
```

```
Out[2]: array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0.])
```

```
In [3]: np.ones(10)
```

```
Out[3]: array([1., 1., 1., 1., 1., 1., 1., 1., 1., 1.])
```

```
In [4]: np.zeros([4,4])
```

```
Out[4]: array([[0., 0., 0., 0.],
               [0., 0., 0., 0.],
               [0., 0., 0., 0.],
               [0., 0., 0., 0.]])
```

```
In [5]: np.empty(3)
```

```
Out[5]: array([5.369e-320, 0.000e+000, 1.581e-322])
```

```
In [6]: np.eye(4)
```

```
Out[6]: array([[1., 0., 0., 0.],
               [0., 1., 0., 0.],
               [0., 0., 1., 0.],
               [0., 0., 0., 1.]])
```

```
In [ ]:
```

```
In [1]: import numpy as np
a = np.arange(10, 21, 2)
```

```
In [2]: a
```

```
Out[2]: array([10, 12, 14, 16, 18, 20])
```

```
In [3]: b = a.reshape([3, 2])
b
```

```
Out[3]: array([[10, 12],
               [14, 16],
               [18, 20]])
```

```
In [4]: a[0] = 0
a
```

```
Out[4]: array([ 0, 12, 14, 16, 18, 20])
```

```
In [5]: b
```

```
Out[5]: array([[ 0, 12],
               [14, 16],
               [18, 20]])
```

```
In [6]: c = a.copy()
c
```

```
Out[6]: array([ 0, 12, 14, 16, 18, 20])
```

```
In [7]: c[0] = 10
c
```

```
Out[7]: array([10, 12, 14, 16, 18, 20])
```

```
In [8]: a
```

```
Out[8]: array([ 0, 12, 14, 16, 18, 20])
```

```
In [9]: a.reshape([2, -1])
```

```
Out[9]: array([[ 0, 12, 14],
               [16, 18, 20]])
```

```
In [ ]:
```



```
In [15]: import numpy as np
a = np.arange(2, 21, 2)
```

```
In [16]: np.sqrt(a)
```

```
Out[16]: array([1.41421356, 2.         , 2.44948974, 2.82842712, 3.16227766,
               3.46410162, 3.74165739, 4.         , 4.24264069, 4.47213595])
```

```
In [17]: np.exp(a)
```

```
Out[17]: array([7.38905610e+00, 5.45981500e+01, 4.03428793e+02, 2.98095799e+03,
               2.20264658e+04, 1.62754791e+05, 1.20260428e+06, 8.88611052e+06,
               6.56599691e+07, 4.85165195e+08])
```

```
In [18]: np.add(a[2:4], a[4:6])
```

```
Out[18]: array([16, 20])
```

```
In [19]: np.maximum(a[2:4], a[4:6])
```

```
Out[19]: array([10, 12])
```

```
In [20]: np.minimum(a[2:4], a[4:6])
```

```
Out[20]: array([6, 8])
```

```
In [26]: b = a.reshape([2, -1])
b
```

```
Out[26]: array([[ 2,  4,  6,  8, 10],
               [12, 14, 16, 18, 20]])
```

```
In [25]: b.T
```

```
Out[25]: array([[ 2, 12],
               [ 4, 14],
               [ 6, 16],
               [ 8, 18],
               [10, 20]])
```

```
In [ ]:
```

```
In [1]: import numpy as np
import pandas as pd
from pandas import DataFrame, Series

obj = Series([3, 6, 9, 12])
obj
```

```
Out[1]: 0    3
1    6
2    9
3   12
dtype: int64
```

```
In [2]: obj.values
```

```
Out[2]: array([ 3,  6,  9, 12])
```

```
In [4]: obj.index
```

```
Out[4]: RangeIndex(start=0, stop=4, step=1)
```

```
In [5]: obj2 = Series([203, 235, 6347, 547, 547], index=['first', 'second', 'third', 'forth', 'fifth'])
obj2
```

```
Out[5]: first    203
second   235
third   6347
forth    547
fifth    547
dtype: int64
```

```
In [6]: obj2['third']
```

```
Out[6]: 6347
```

```
In [7]: obj2[obj2>250]
```

```
Out[7]: third    6347
forth    547
fifth    547
dtype: int64
```

```
In [8]: obj2.to_dict()
```

```
Out[8]: {'first': 203, 'second': 235, 'third': 6347, 'forth': 547, 'fifth': 547}
```

```
In [9]: Series(obj2.to_dict())
```

```
Out[9]: first    203
second   235
third   6347
forth    547
fifth    547
dtype: int64
```

```
In [10]: obj2+obj2
```

```
Out[10]: first    406
second   470
third   12694
forth    1094
fifth    1094
dtype: int64
```