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
```

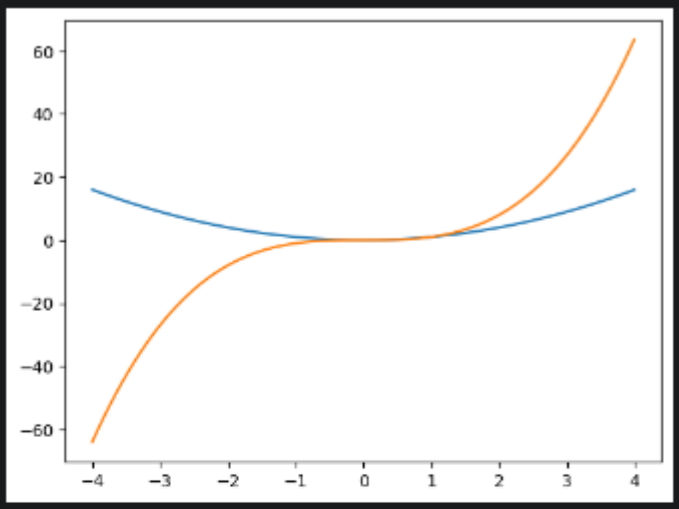
Функции, списки и циклы

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]
```

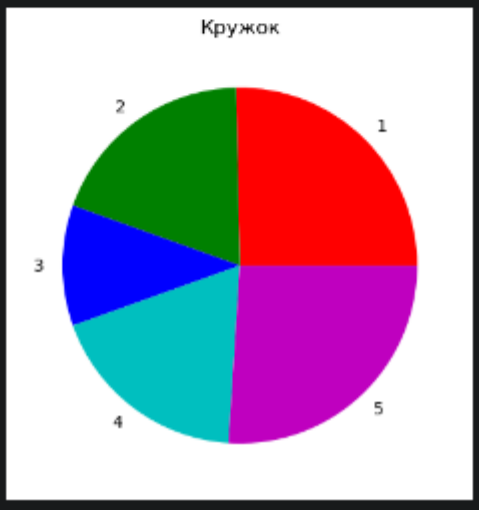
In [4]:
```
import numpy as np
import matplotlib.pyplot as plt
x = np.arange(-4, 4, 0.01)
plt.plot(x, x**2)
plt.plot(x, x**3)
```

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(0.7694041920214937, 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
```

In [5]:
```
import numpy as np
import pandas as pd
from pandas import Series, DataFrame

df = DataFrame(np.random.randn(25).reshape(5, 5))
```

In [6]:
```
df
```

Out[6]:

	0	1	2	3	4
0	-0.179807	-0.985673	-0.396145	0.331505	0.203006
1	-1.206945	1.876214	0.571089	-0.876941	0.652712
2	0.679187	-0.448856	0.997168	0.628437	-0.871653
3	1.433266	-0.853461	0.136924	-0.361149	0.117744
4	-0.824503	0.716870	0.808790	0.608333	0.109799

In [7]:
```
del df[4]
```

In [8]:
```
df
```

Out[8]:

	0	1	2	3
0	-0.179807	-0.985673	-0.396145	0.331505
1	-1.206945	1.876214	0.571089	-0.876941
2	0.679187	-0.448856	0.997168	0.628437
3	1.433266	-0.853461	0.136924	-0.361149
4	-0.824503	0.716870	0.808790	0.608333