1. Take a 3X3 matrix randomly and another matrix by assigning elements. Now add the 2 matrix and store it in a separate matrix C.

In [3]:
```
import numpy as np

a = np.random.randint(1,10,(3,3))
print('a matrix = \n',a)

b_list = [[1,2,3],[4,5,6],[7,8,9]]
b = np.array(b_list)
print('b matrix = \n',b)

c = a + b
print('c matrix = \n',c)
```

```
a matrix =
 [[2 7 1]
 [4 9 1]
 [5 5 7]]
b matrix =
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
c matrix =
 [[ 3  9  4]
 [ 8 14  7]
 [12 13 16]]
```

2. Take 3X3 matrixes add it with another 3x3 of all 1 matrix and convert that to a complex datatype matrix.

In [4]:
```
import numpy as np

a_list = [[1,2,3],[4,5,6],[7,8,9]]
a = np.array(a_list)
print('a matrix = \n',a)

b = np.ones((3,3),dtype=int)
print('b matrix = \n',b)

c = np.add(a,b)
c = np.array(c,dtype=complex)
print('c matrix = \n',c)
```

```
a matrix =
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
b matrix =
 [[1 1 1]
 [1 1 1]
 [1 1 1]]
c matrix =
 [[ 2.+0.j  3.+0.j  4.+0.j]
 [ 5.+0.j  6.+0.j  7.+0.j]
 [ 8.+0.j  9.+0.j 10.+0.j]]
```

3. Take a 3X3 matrix and multiply element wise with 3X 3 another matrix.

In [5]:
```
import numpy as np

a_list = [[1,2,3],[4,5,6],[7,8,9]]
a = np.array(a_list)
print('a matrix = \n',a)

b = np.eye(3,dtype=int)
print('b matrix = \n',b)

c = a*b
print('c matrix = \n',c)
```

```
a matrix =
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
b matrix =
 [[1 0 0]
 [0 1 0]
 [0 0 1]]
c matrix =
 [[1 0 0]
 [0 5 0]
 [0 0 9]]
```

4. Multiply 2 3X3 matrixes.

In [6]:
```
import numpy as np

a_list = [[1,2,3],[4,5,6],[7,8,9]]
a = np.array(a_list)
print('a matrix = \n',a)

b = np.eye(3,dtype=int)
print('b matrix = \n',b)

c = a@b
print('c matrix = \n',c)
```

```
a matrix =
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
b matrix =
 [[1 0 0]
 [0 1 0]
 [0 0 1]]
c matrix =
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
```

5. Randomly generate 10 numbers in between 1 to 10 and convert that to a 5X2 matrix. Take a floating-point matrix and perform the addition. a= floating point matrix and b is an integer matrix of samedimension. Why a+=b is not equal to b+=a.Explain briefly. How can we resolve this problem?

In [7]:
```
import numpy as np

a = np.random.randint(1,10,(5,2))
print('a matrix = \n',a)

b = np.random.rand(5,2)
print('b matrix = \n',b)

c = a + b
print('c matrix = \n',c)
```

```
a matrix =
 [[9 2]
 [6 2]
 [9 2]
 [9 2]
 [1 7]]
b matrix =
 [[0.48888854 0.47300106]
 [0.40917909 0.46955895]
 [0.78753055 0.17115505]
 [0.10822792 0.42962789]
 [0.41604198 0.16222556]]
c matrix =
 [[9.48888854 2.47300106]
 [6.40917909 2.46955895]
 [9.78753055 2.17115505]
 [9.10822792 2.42962789]
 [1.41604198 7.16222556]]
```

In [8]:
```
a.dtype
```

Out[8]:
```
dtype('int32')
```

In [9]:
```
b.dtype
```

Out[9]:
```
dtype('float64')
```

In [10]:
```
b += a
b
```

Out[10]:
```
array([[9.48888854, 2.47300106],
       [6.40917909, 2.46955895],
       [9.78753055, 2.17115505],
       [9.10822792, 2.42962789],
       [1.41604198, 7.16222556]])
```

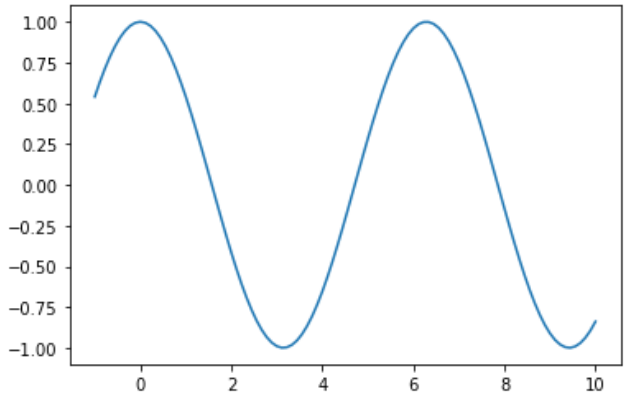
In [11]:
```
a += b
a
```

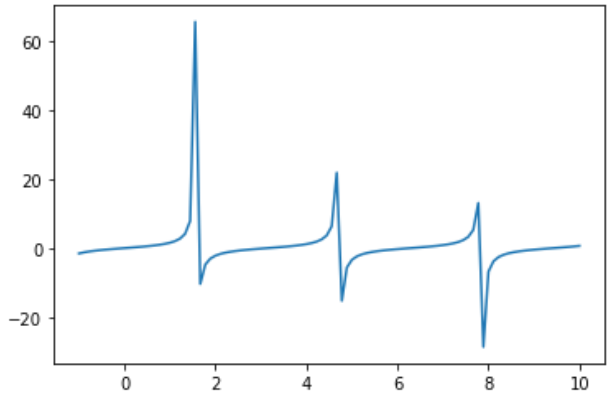
```
---------------------------------------------------------------------------
UFuncTypeError                            Traceback (most recent call last)
Input In [11], in <cell line: 1>()
----> 1 a += b
      2 a

UFuncTypeError: Cannot cast ufunc 'add' output from dtype('float64') to dtype('int32') with casti
ng rule 'same_kind'
```

In [ ]:
```

```

6. Take x values and plot the cos(x) and tan(x) in a graph using matplotlib.

In [12]:
```
import matplotlib.pyplot as plt
import numpy as np

x = np.linspace(-1,10,100)

y = np.cos(x)

z = np.tan(x)

plt.plot(x,y)
plt.show()

plt.plot(x,z)
plt.show()
```





7. Take a multidimensional array (3, 3, 3) and print the last column.

In [13]:
```
import numpy as np

a = np.random.randint(1,10,(3,3,3))
print('a matrix = \n',a)

print('last column = \n',a[2])
```

```
a matrix =
 [[[5 2 5]
  [8 6 6]
  [7 2 2]]

 [[2 1 6]
  [1 1 9]
  [4 6 6]]

 [[6 5 8]
  [1 5 8]
  [3 3 9]]]
last column =
 [[6 5 8]
 [1 5 8]
 [3 3 9]]
```

8. Take a function f(x) =x^3 + 5*y* +*4*z and determine the values and store them in a (3,3,3) matrix.

In [ ]:

9. Using axis add the column values of a 3X3 matrix and then add it with the maximum values of rows taken in a 3X3 matrix

In [ ]:

10. f(x) = x^3 + 5y and store it in (3,3) matrix.

In [ ]:

11. Take a function array 'a' cube with a range of 20 and find out what will be the value of a [[7,8], [9,11]].If we take values a [[7, 8], [9, 21]] will it take if not why?

In [ ]:

12. Take a random number from 0 to 19 and make a 4X5 matrix then find the values of (i) 3rd row and 4th column only and (ii) only 4th column values.

In [ ]:

13. Take a matrix of 5X4 randomly and create 2 3x3 values i and j respectively and take a tuple named mwith i and j as an argument and generate the values of the matrix for the specified tuple. i<=4 and j<=3.

In [ ]:

14. Take a matrix of 3x3 and find out the Eigen vector and Eigen values of that matrix.

In [ ]:

15. Take a matrix and by taking the i, j or x, y values implement the hstack and vstack methods.

In [ ]: