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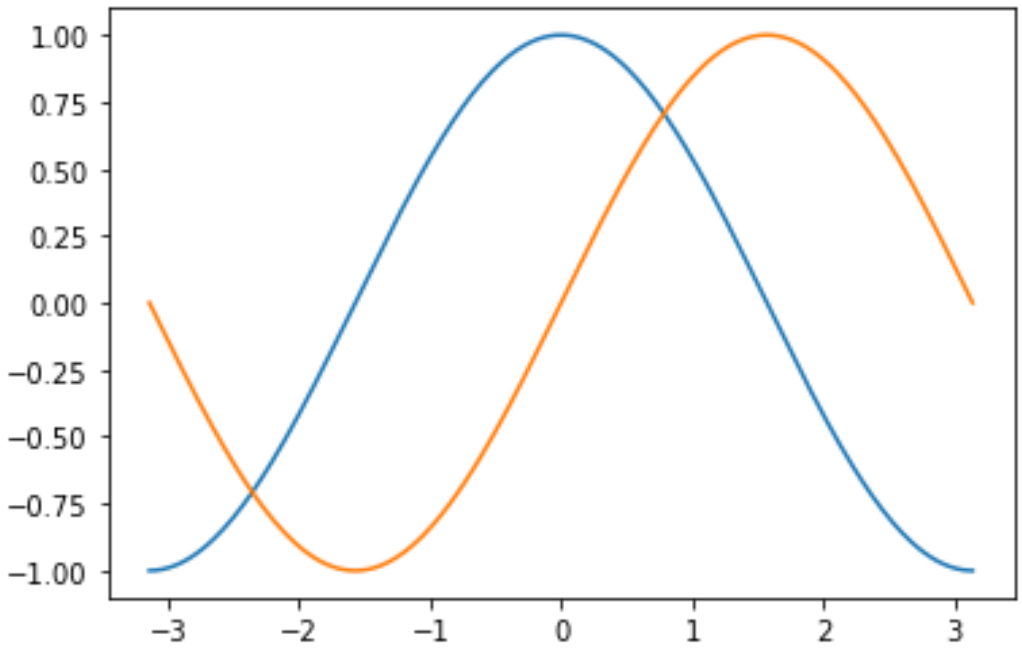
B9

OSS Lab Assignment 4

1.

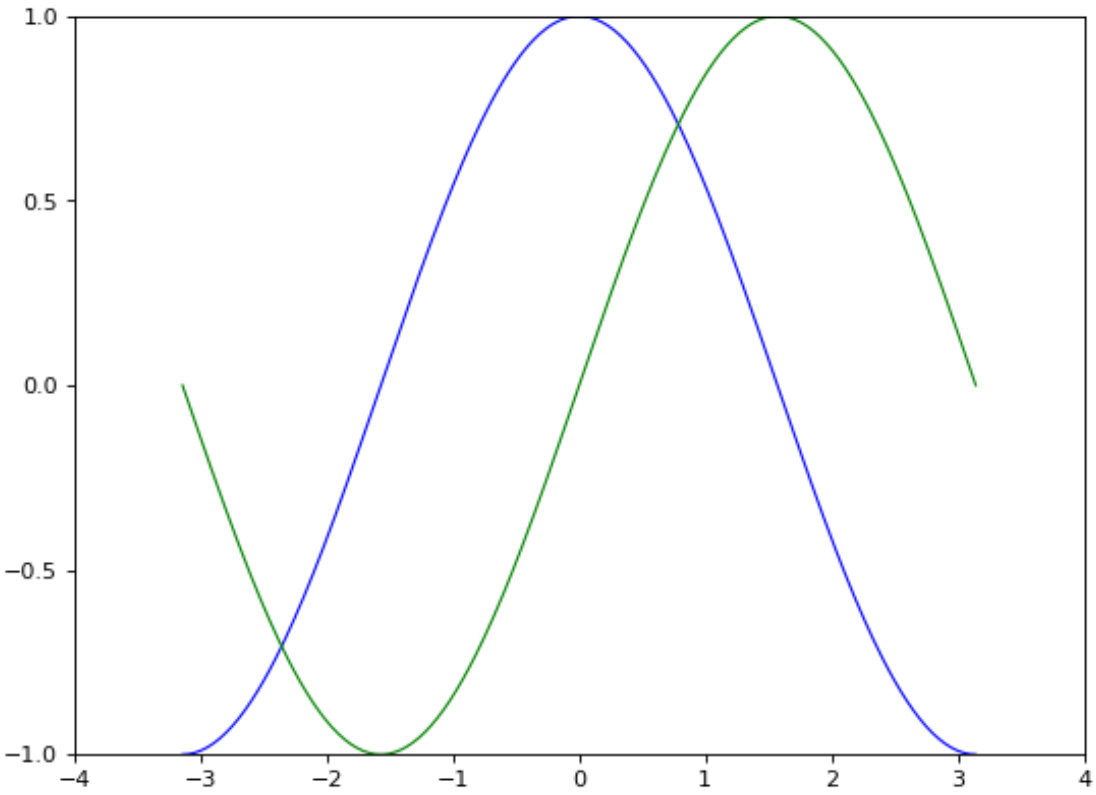
```
import numpy as np
X = np.linspace(-np.pi, np.pi, 256, endpoint=True)
C, S = np.cos(X), np.sin(X)
import matplotlib.pyplot as plt
plt.plot(X, C)
plt.plot(X, S)
plt.show()
```



2.

```
plt.figure(figsize=(8, 6), dpi=80)
plt.subplot(1, 1, 1)
plt.plot(X, C, color="blue", linewidth=1.0, linestyle="-")
plt.plot(X, S, color="green", linewidth=1.0, linestyle="-")
plt.xlim(-4.0, 4.0)
plt.xticks(np.linspace(-4, 4, 9, endpoint=True))
plt.ylim(-1.0, 1.0)
```

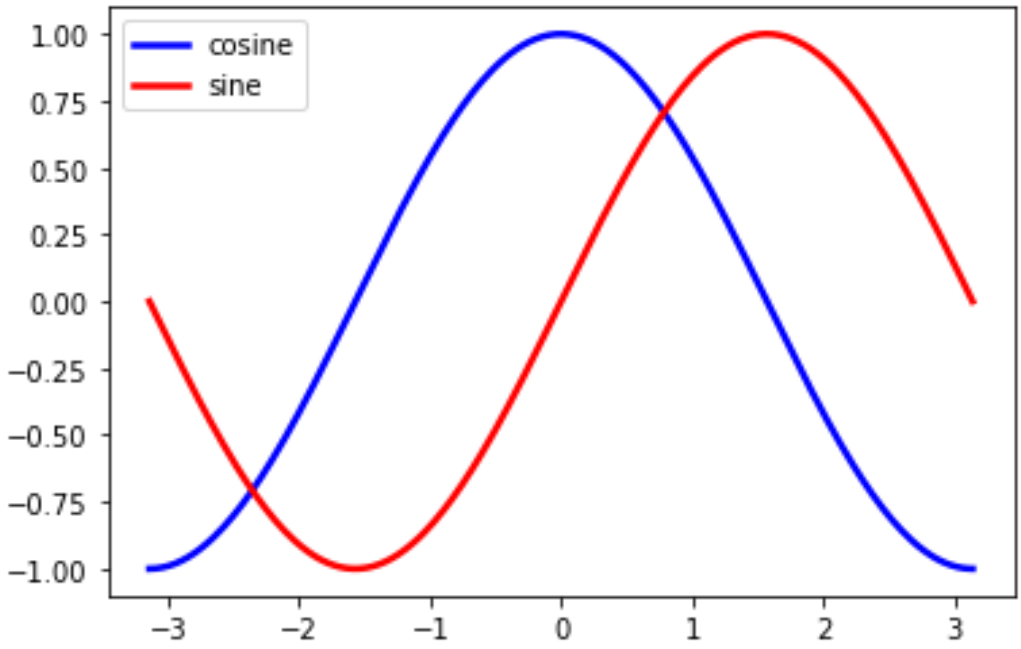
```
plt.yticks(np.linspace(-1, 1, 5, endpoint=True))
plt.savefig("exercise_2.png", dpi=72)
```



3.

```
plt.plot(X, C, color="blue", linewidth=2.5, linestyle="-", label="cosine")
plt.plot(X, S, color="red", linewidth=2.5, linestyle="-", label="sine")
plt.legend(loc='upper left')
```

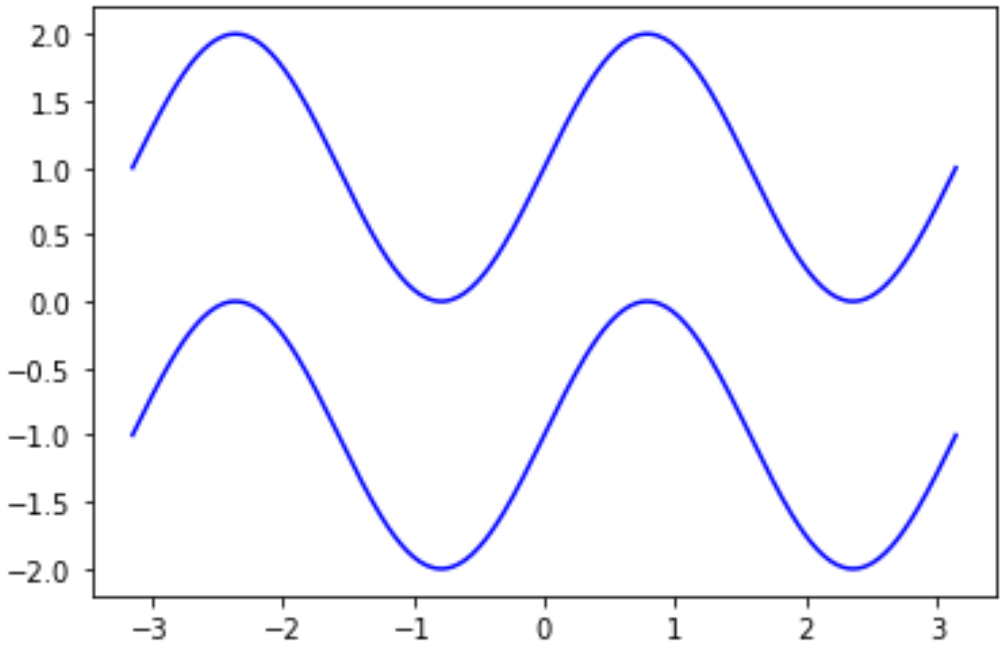
```
<matplotlib.legend.Legend at 0x7f0d3931e590>
```



4.

```
n = 256
X = np.linspace(-np.pi, np.pi, n, endpoint=True)
Y = np.sin(2 * X)
plt.plot(X, Y + 1, color='blue', alpha=1.00)
plt.plot(X, Y - 1, color='blue', alpha=1.00)
```

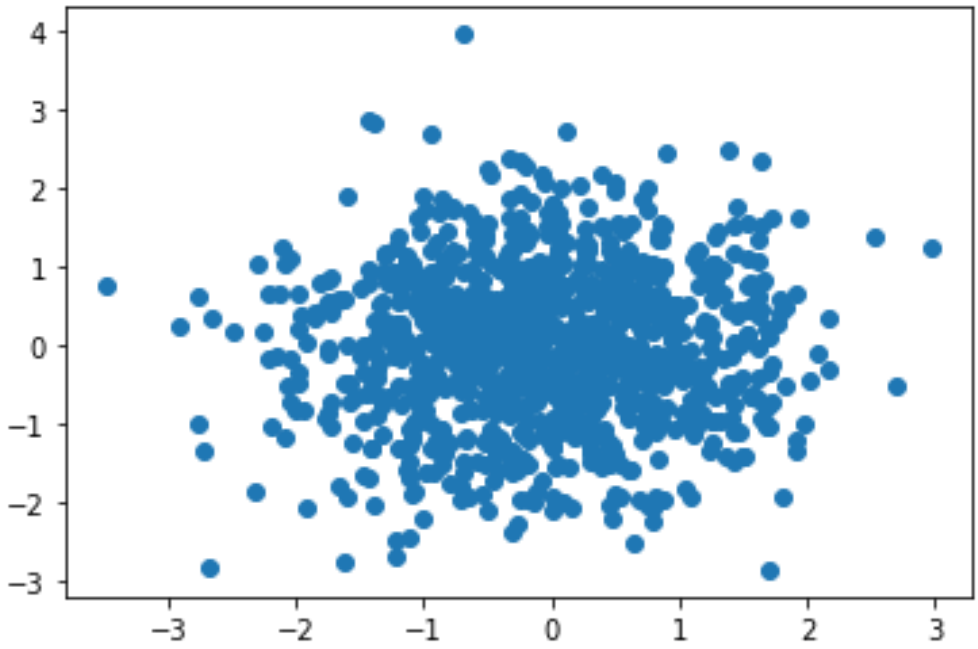
```
[<matplotlib.lines.Line2D at 0x7f0d392b3290>]
```



5.

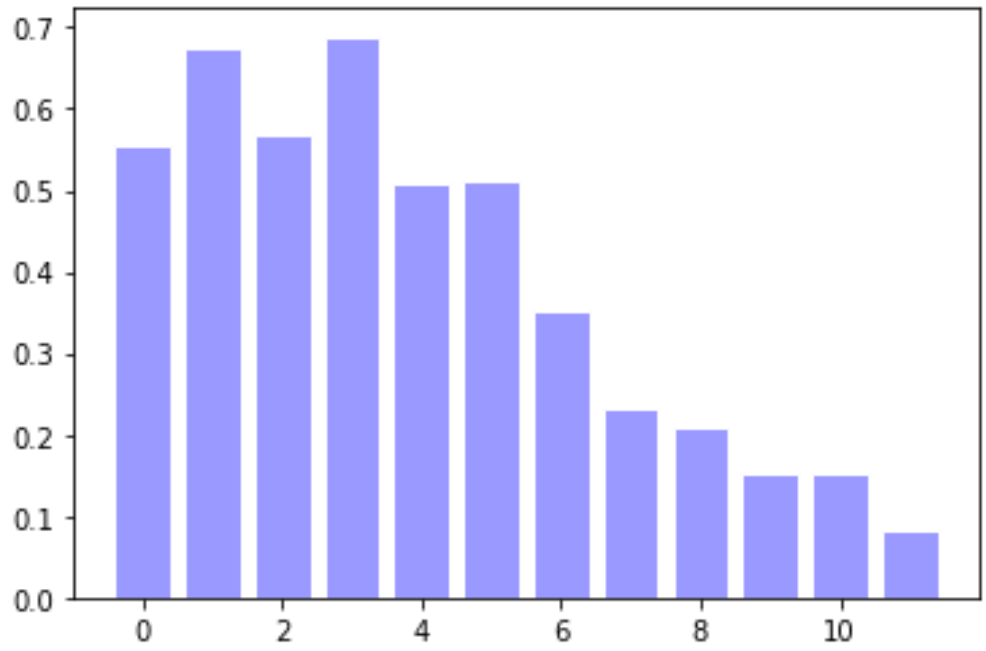
```
n = 1024
X = np.random.normal(0,1,n)
Y = np.random.normal(0,1,n)
plt.scatter(X,Y)
```

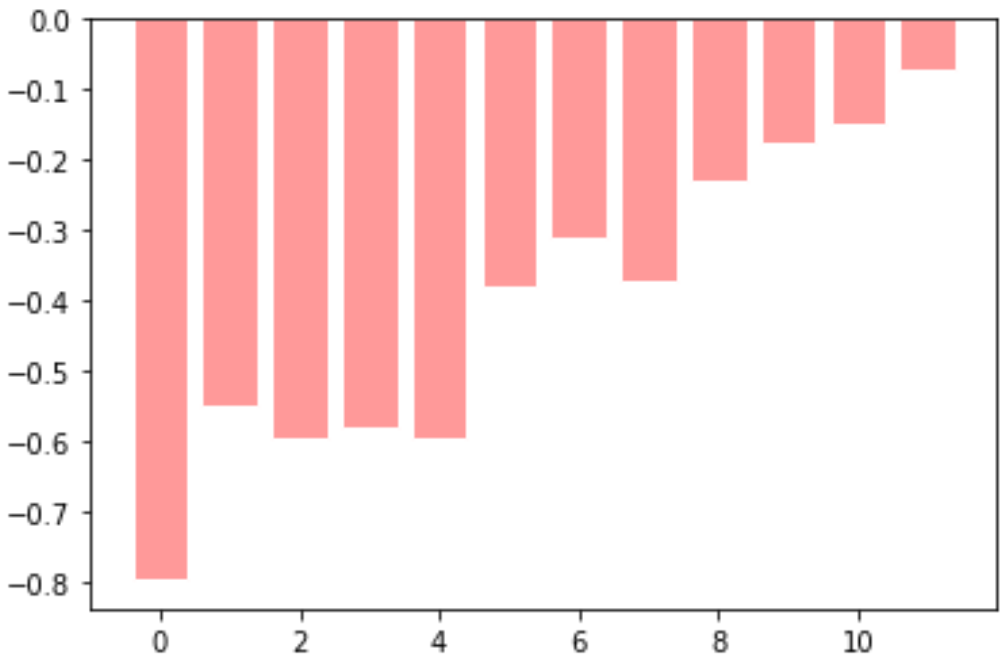
```
<matplotlib.collections.PathCollection at 0x7f0d392b6990>
```



6.

```
n = 12
X = np.arange(n)
Y1 = (1 - X / float(n)) * np.random.uniform(0.5, 1.0, n)
plt.bar(X, +Y1, facecolor='#9999ff', edgecolor='white')
plt.show()
Y2 = (1 - X / float(n)) * np.random.uniform(0.5, 1.0, n)
plt.bar(X, -Y2, facecolor='#ff9999', edgecolor='white')
plt.show()
```



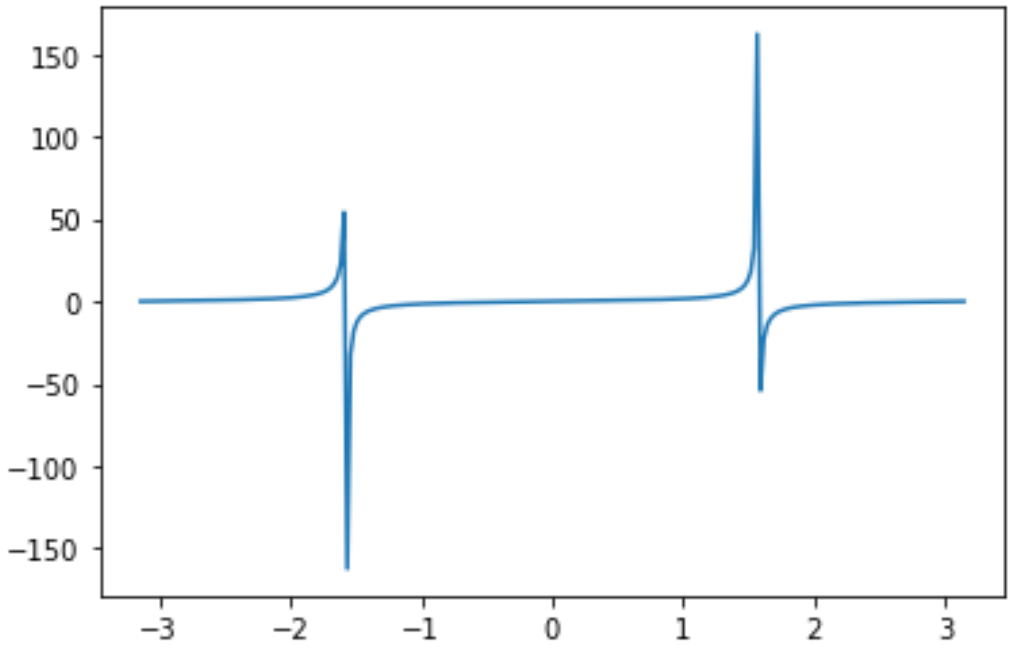


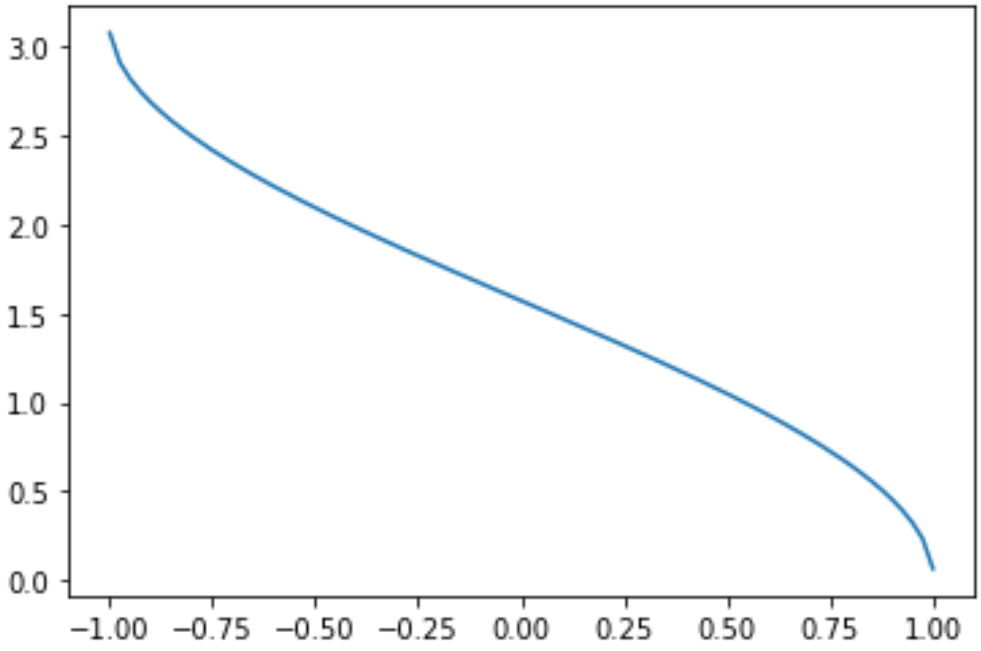
Practice Question

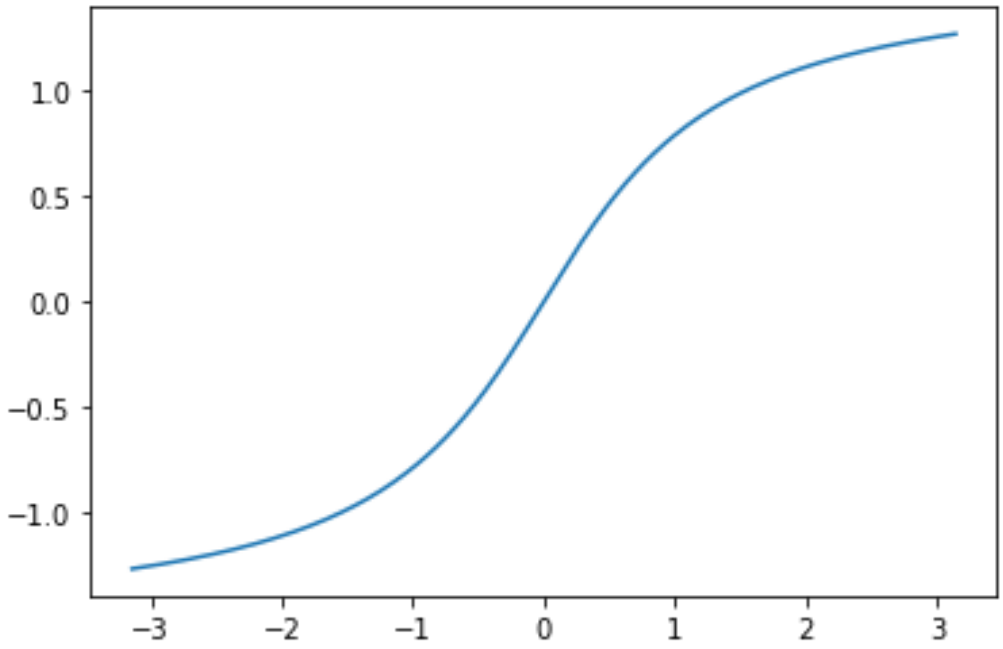
1.

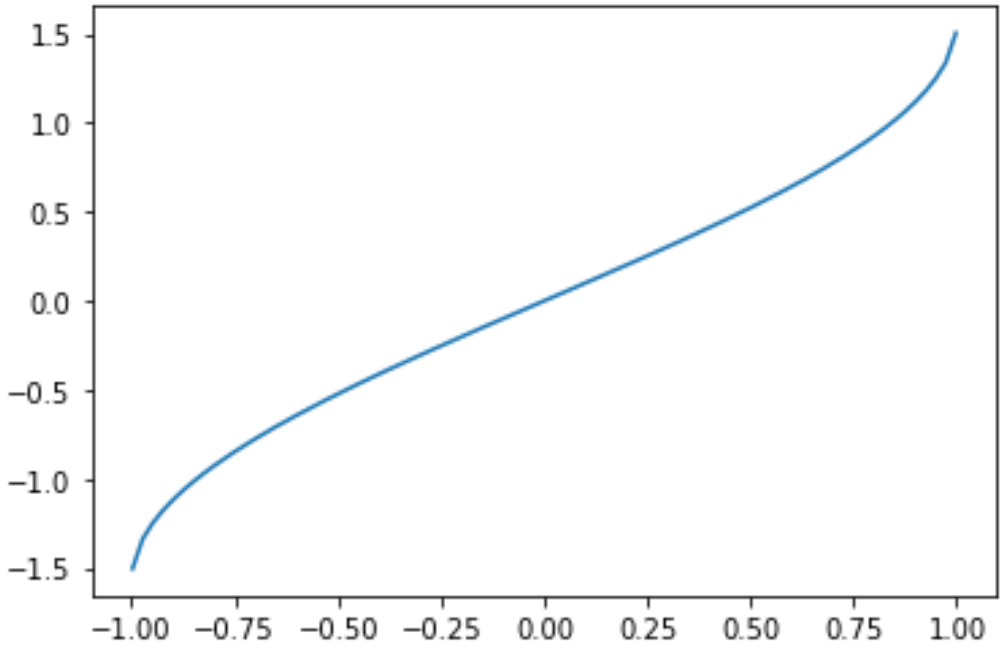
```
X = np.linspace(-np.pi, np.pi, 256, endpoint=True)
T=np.tan(X)
SEC=np.arccos(X)
COT=np.arctan(X)
COSEC=np.arcsin(X)
plt.plot(X, T)
plt.show()
plt.plot(X,SEC)
plt.show()
plt.plot(X,COT)
plt.show()
plt.plot(X,COSEC)
plt.show()
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3:
RuntimeWarning: invalid value encountered in arccos
  This is separate from the ipykernel package so we can avoid doing imports
until
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:5:
RuntimeWarning: invalid value encountered in arcsin
  """
```


150
100
50
0
−50
−100
−150
−3
−2
−1
0
1
2
3


3.0
2.5
2.0
1.5
1.0
0.5
0.0
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00





2.

```
x=['A','B','C','D']
result1=[2,5,8,5]
result2=[3,2,5,7]
x_axis=np.arange(len(x))
plt.bar(x_axis-0.2,result1,0.4,color='r',label='Result1')
plt.bar(x_axis+0.2,result2,0.4,color='b',label='Result2')
```

```
plt.xticks(x_axis,x)
plt.xlabel('Methods')
plt.ylabel('Results')
plt.legend()
plt.show()
```