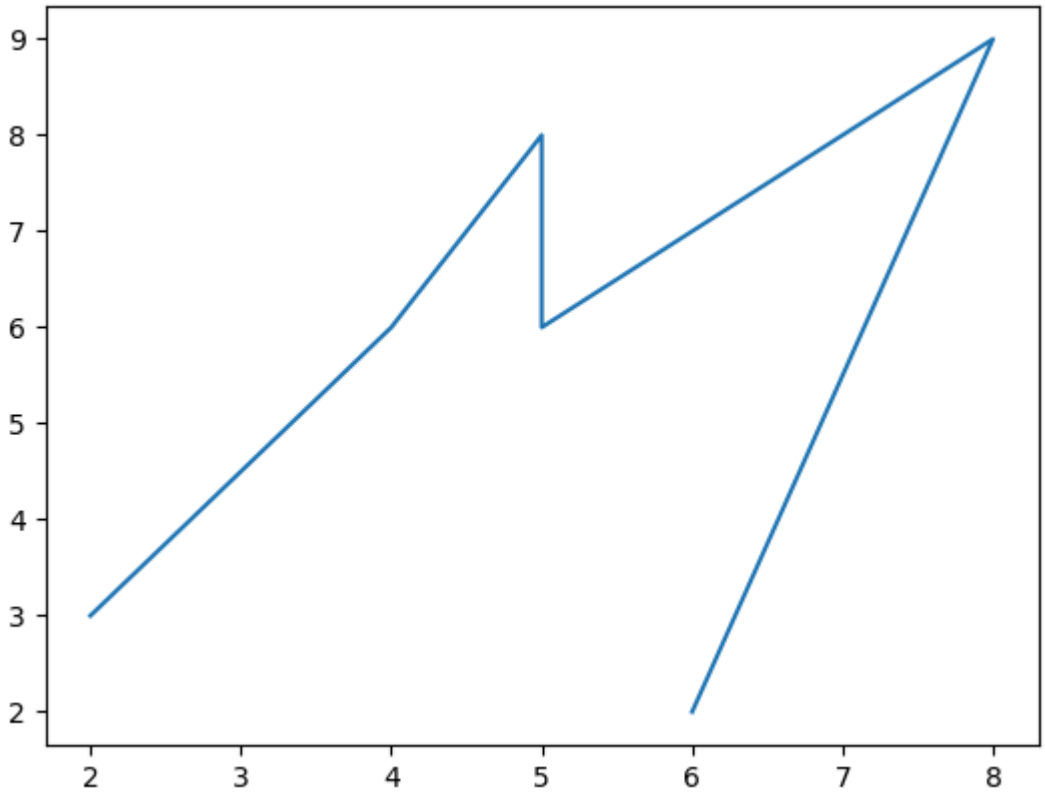
In [ ]:
```
Matplotlib is a 2D Plotting library.
Originally Matplotlib created by John Hunter in 2003.
It supports different format PNG,PDF,SVG
```

In [2]:
```
# install matplotlib  as package
!pip install matplotlib
```

```
Requirement already satisfied: matplotlib in c:\users\jitud\appdata\local\program
s\python\python313\lib\site-packages (3.10.3)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\jitud\appdata\local\p
rograms\python\python313\lib\site-packages (from matplotlib) (1.3.2)
Requirement already satisfied: cycler>=0.10 in c:\users\jitud\appdata\local\progr
ams\python\python313\lib\site-packages (from matplotlib) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\jitud\appdata\local
\programs\python\python313\lib\site-packages (from matplotlib) (4.58.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\jitud\appdata\local
\programs\python\python313\lib\site-packages (from matplotlib) (1.4.8)
Requirement already satisfied: numpy>=1.23 in c:\users\jitud\appdata\local\progra
ms\python\python313\lib\site-packages (from matplotlib) (2.2.6)
Requirement already satisfied: packaging>=20.0 in c:\users\jitud\appdata\local\pr
ograms\python\python313\lib\site-packages (from matplotlib) (24.2)
Requirement already satisfied: pillow>=8 in c:\users\jitud\appdata\local\programs
\python\python313\lib\site-packages (from matplotlib) (11.2.1)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\jitud\appdata\local\p
rograms\python\python313\lib\site-packages (from matplotlib) (3.2.3)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\jitud\appdata\loc
al\programs\python\python313\lib\site-packages (from matplotlib) (2.9.0.post0)
Requirement already satisfied: six>=1.5 in c:\users\jitud\appdata\local\programs
\python\python313\lib\site-packages (from python-dateutil>=2.7->matplotlib) (1.1
7.0)
[notice] A new release of pip is available: 25.1.1 -> 25.2
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In [3]:
```
import matplotlib.pyplot as plt
```

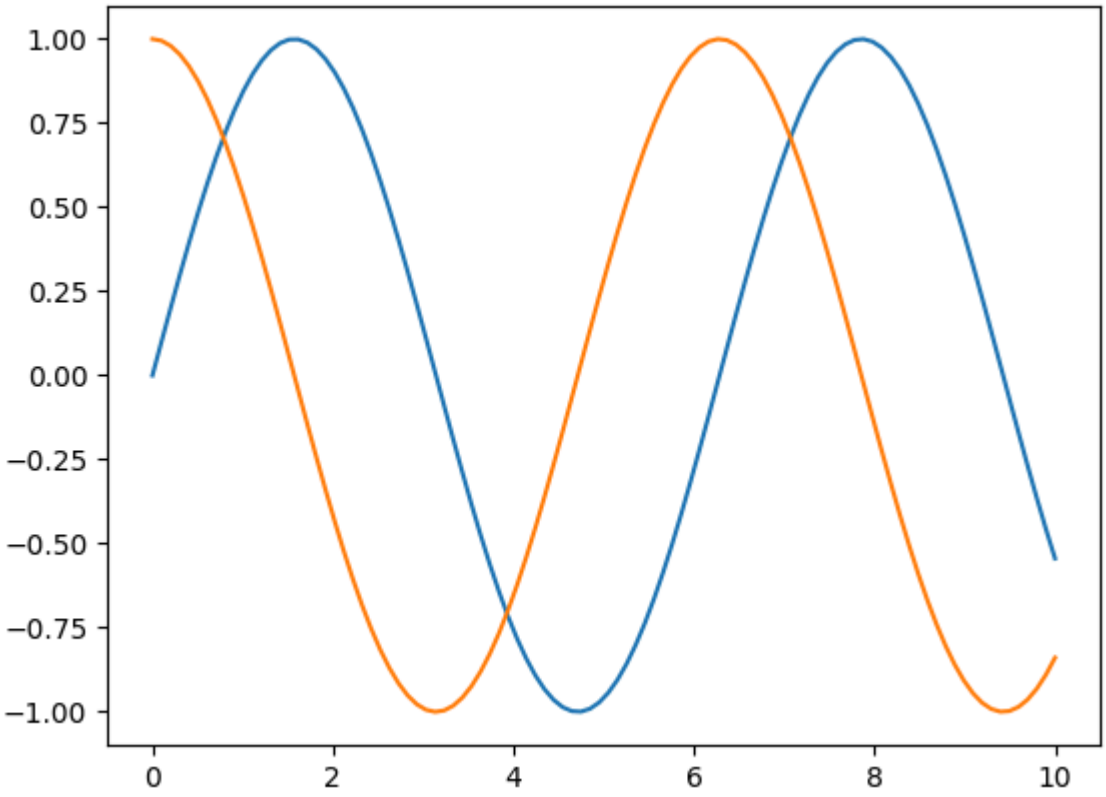
In [8]:
```
x = [2,4,5,5,8,6]
y = [3,6,8,6,9,2]

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



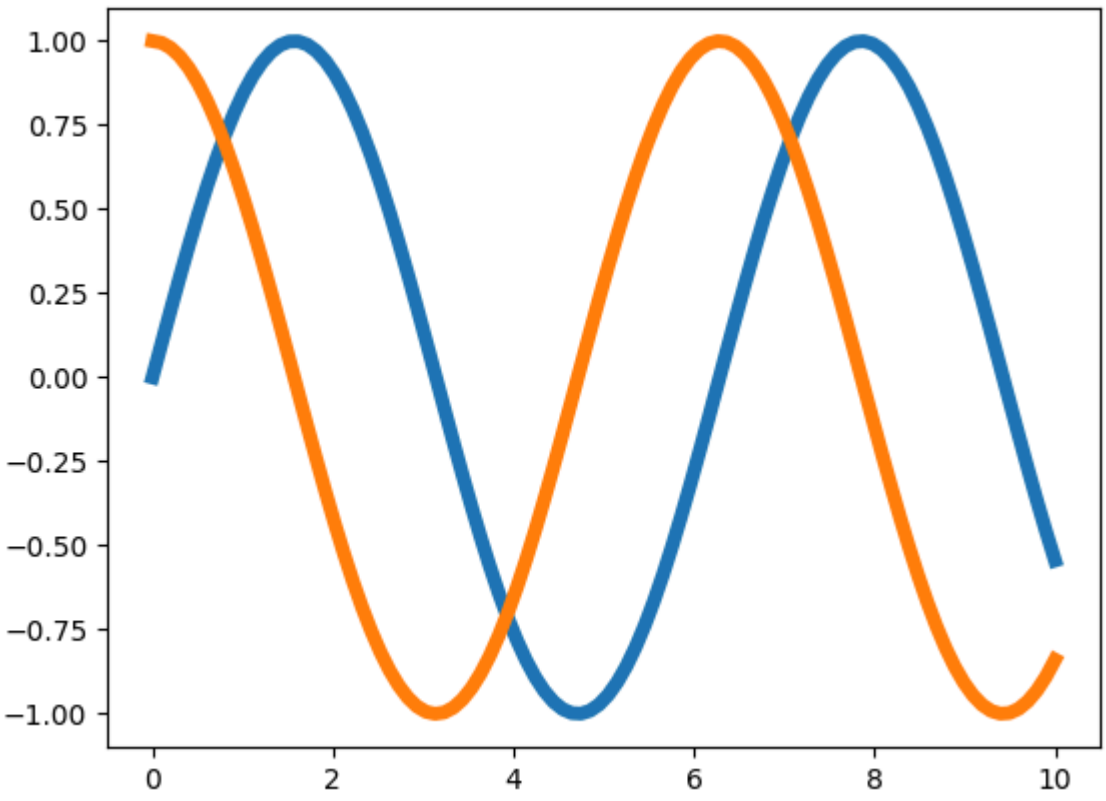
In [14]:
```
import numpy as np
x1 = np.linspace(0,10,10)
x1
```

Out[14]:
```
array([ 0.        ,  1.11111111,  2.22222222,  3.33333333,  4.44444444,
        5.55555556,  6.66666667,  7.77777778,  8.88888889, 10.        ])
```

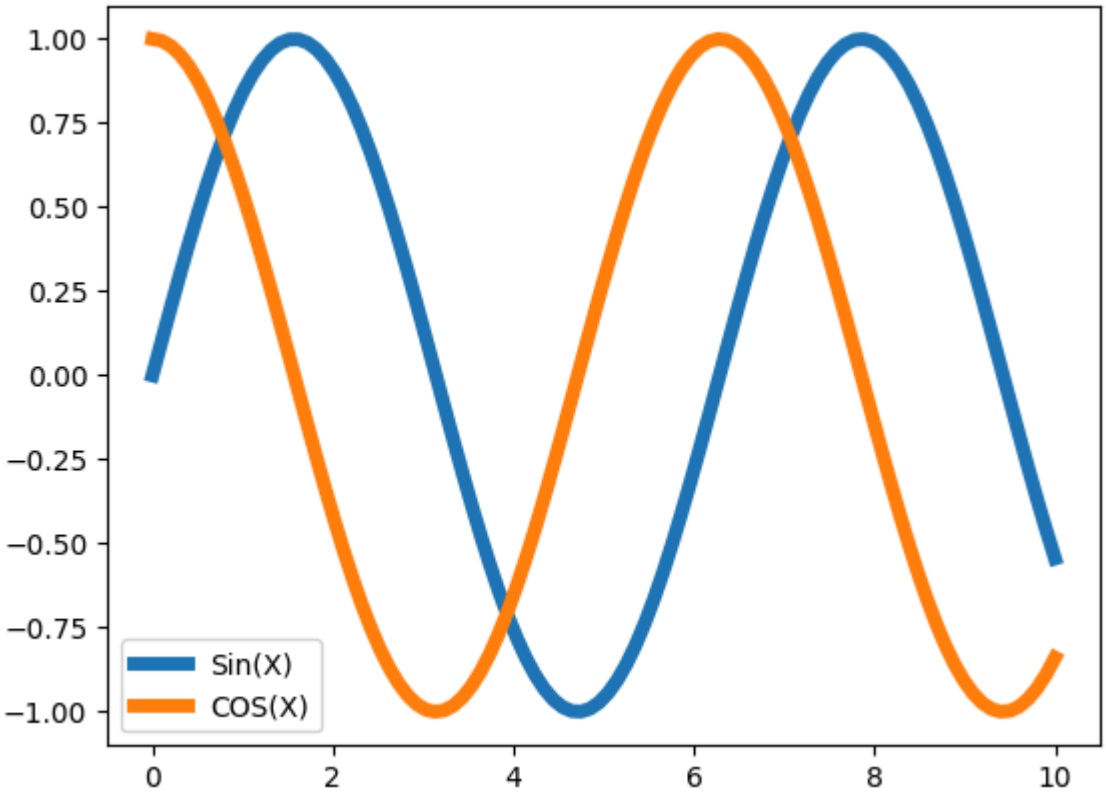
In [11]:
```
# 2
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1)
plt.plot(x1,y2)
plt.show()
```



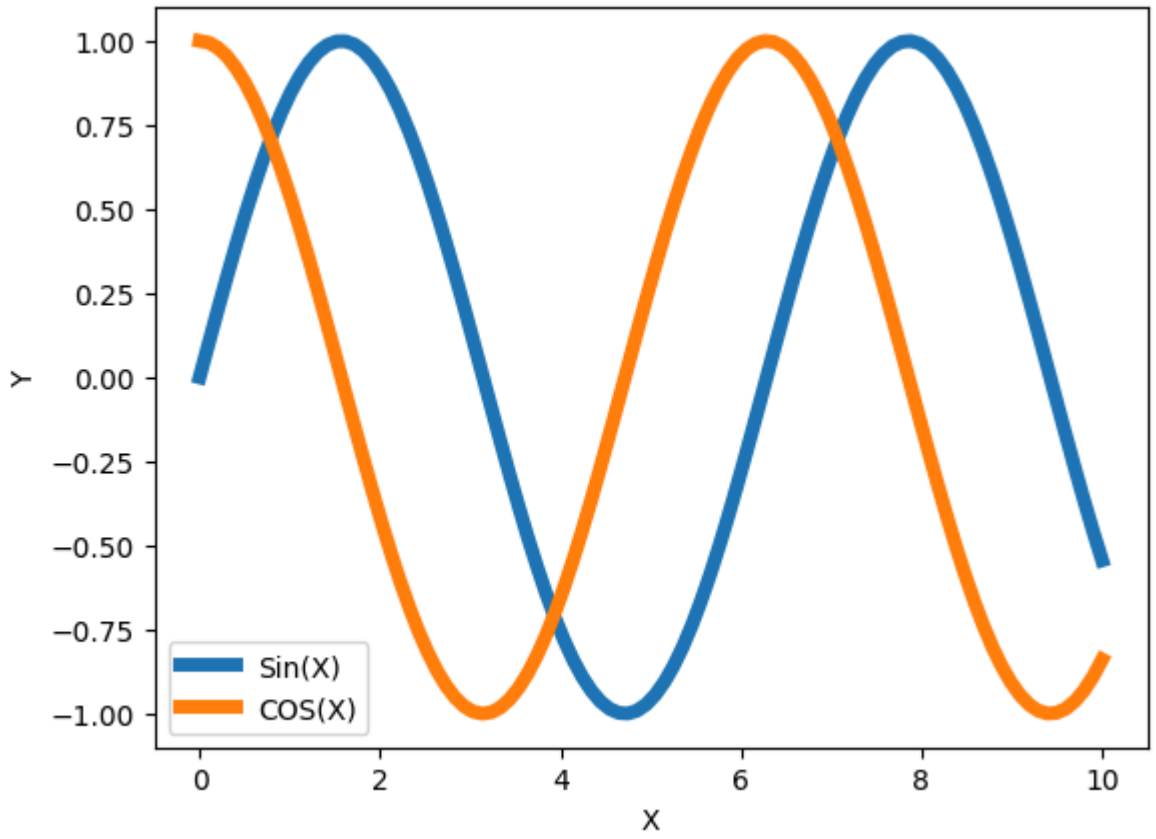
In [17]:
```
# LINEWIDTH
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=5)
plt.plot(x1,y2,linewidth=5)
plt.show()
```



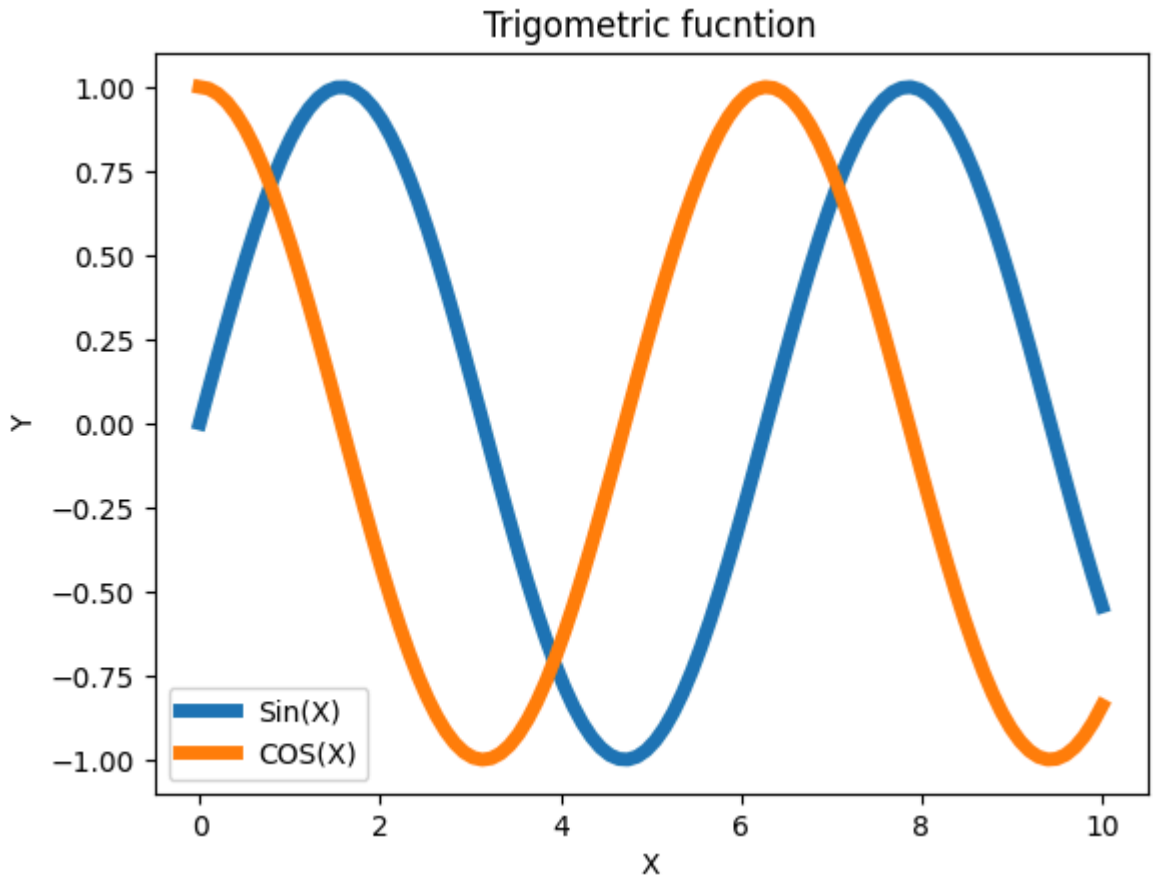
In [18]:
```
# LEGEND
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=5,label="Sin(X)")
plt.plot(x1,y2,linewidth=5,label="COS(X)")
plt.legend()
plt.show()
```



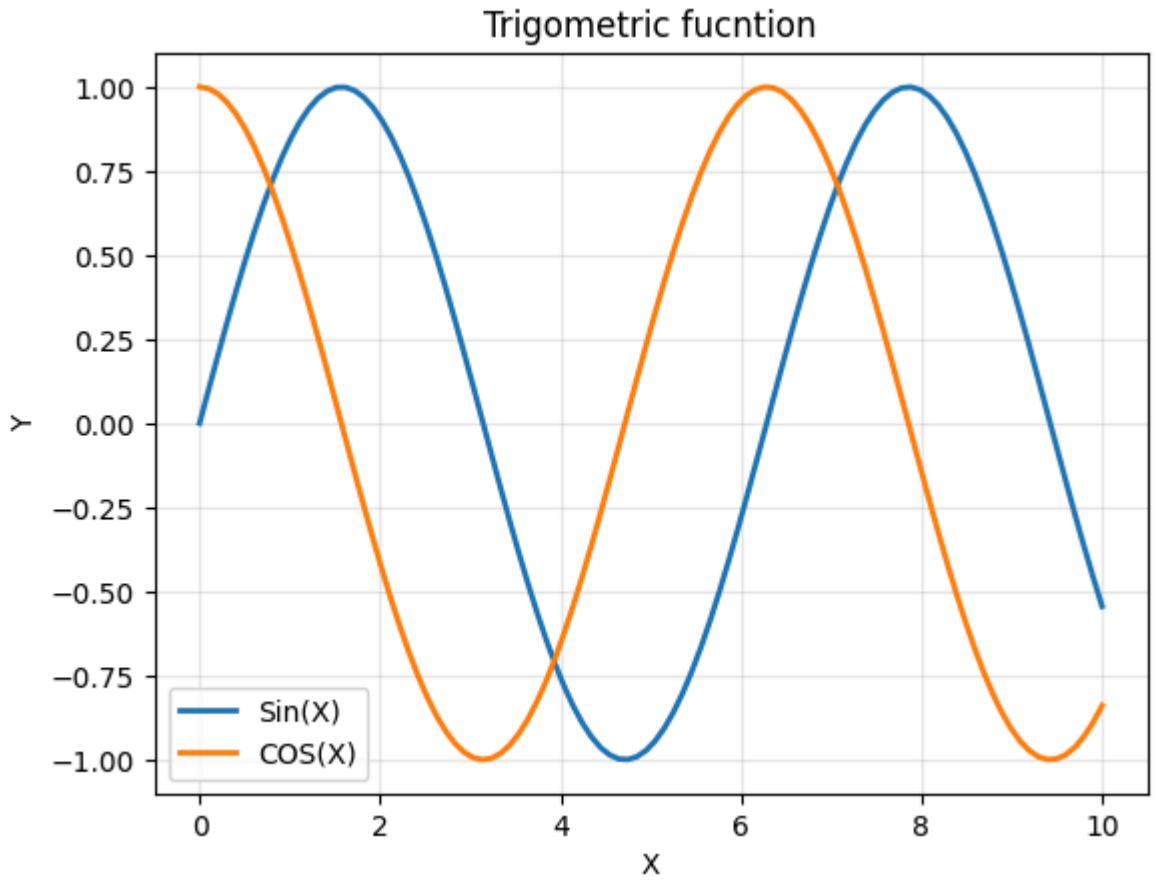
In [20]:
```
# AXIS- X and Y
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=5,label="Sin(X)")
plt.plot(x1,y2,linewidth=5,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.legend()
plt.show()
```



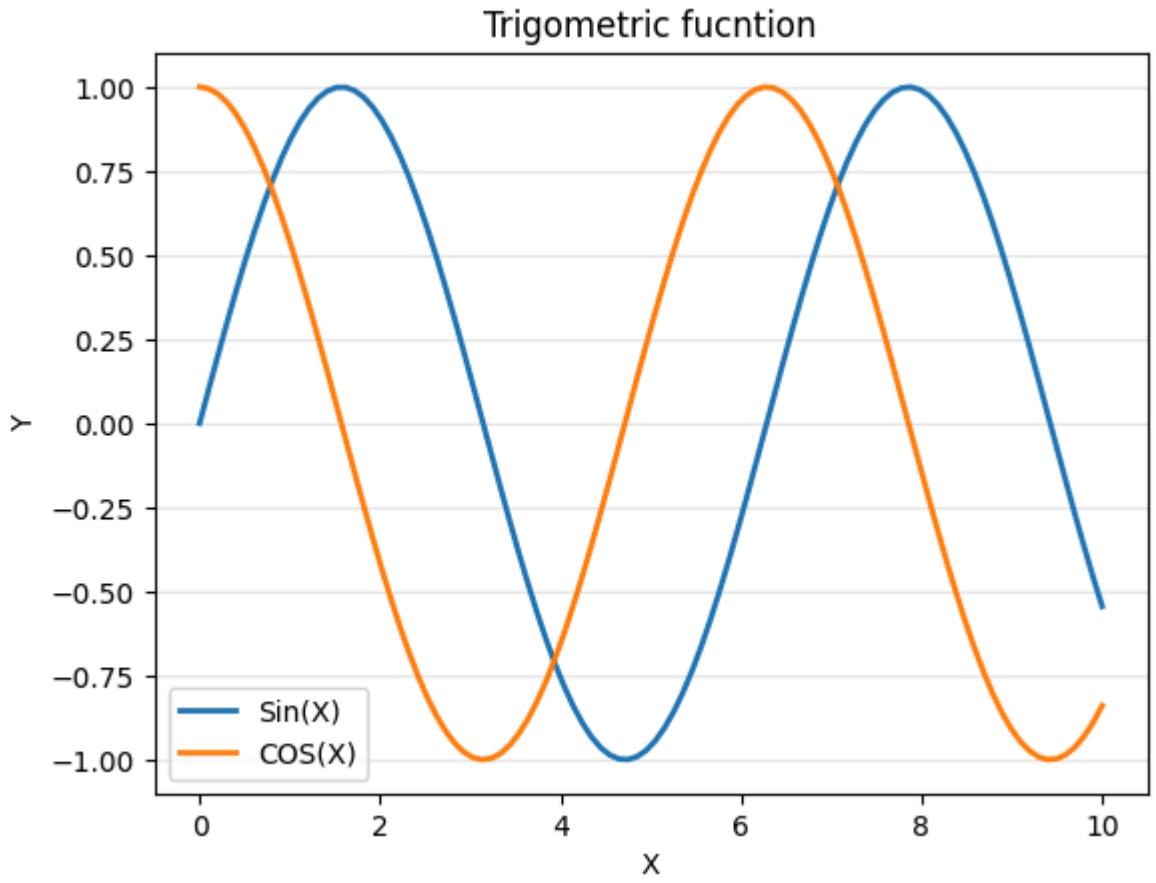
In [21]:
```
# Add the Title
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=5,label="Sin(X)")
plt.plot(x1,y2,linewidth=5,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.show()
```



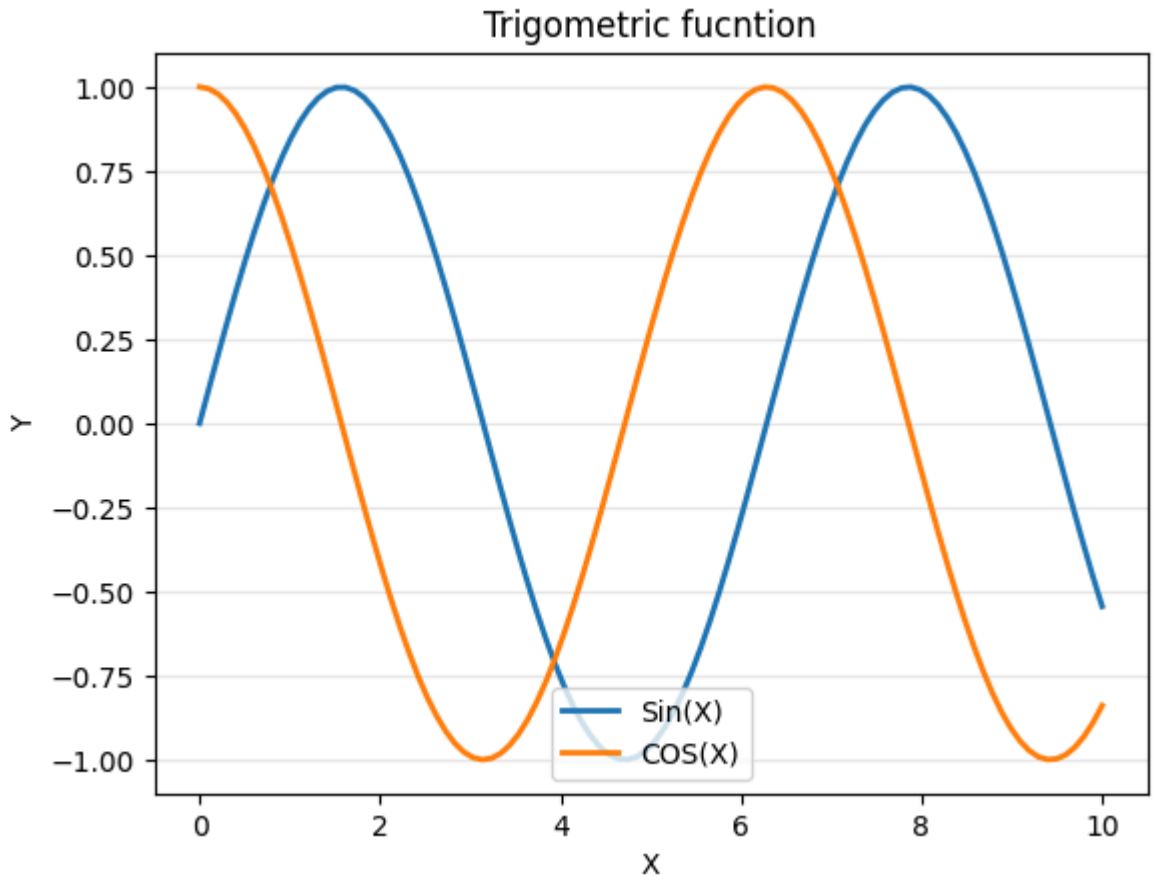
In [30]:
```
# GRID
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=2,label="Sin(X)")
plt.plot(x1,y2,linewidth=2,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3)
plt.show()
```



In [32]:
```
#GRID X- Y
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=2,label="Sin(X)")
plt.plot(x1,y2,linewidth=2,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```



In [37]:
```
#GRID X- Y
import numpy as np
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
plt.plot(x1,y1,linewidth=2,label="Sin(X)")
plt.plot(x1,y2,linewidth=2,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend(loc="lower center") # "upper right", "upper left" ,"best","lower righ
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```



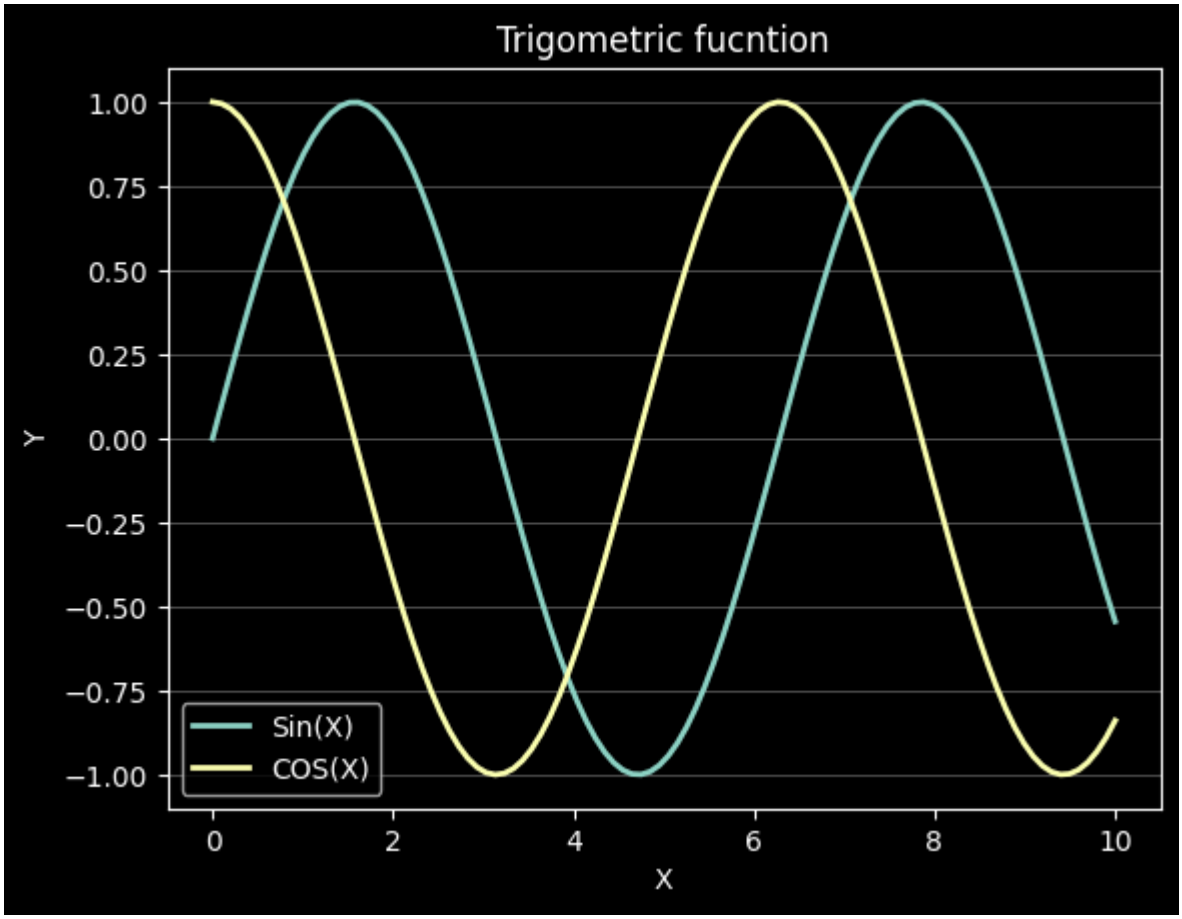
In [38]:
```
import matplotlib
```

In [41]:
```
print(matplotlib.style.available)
```

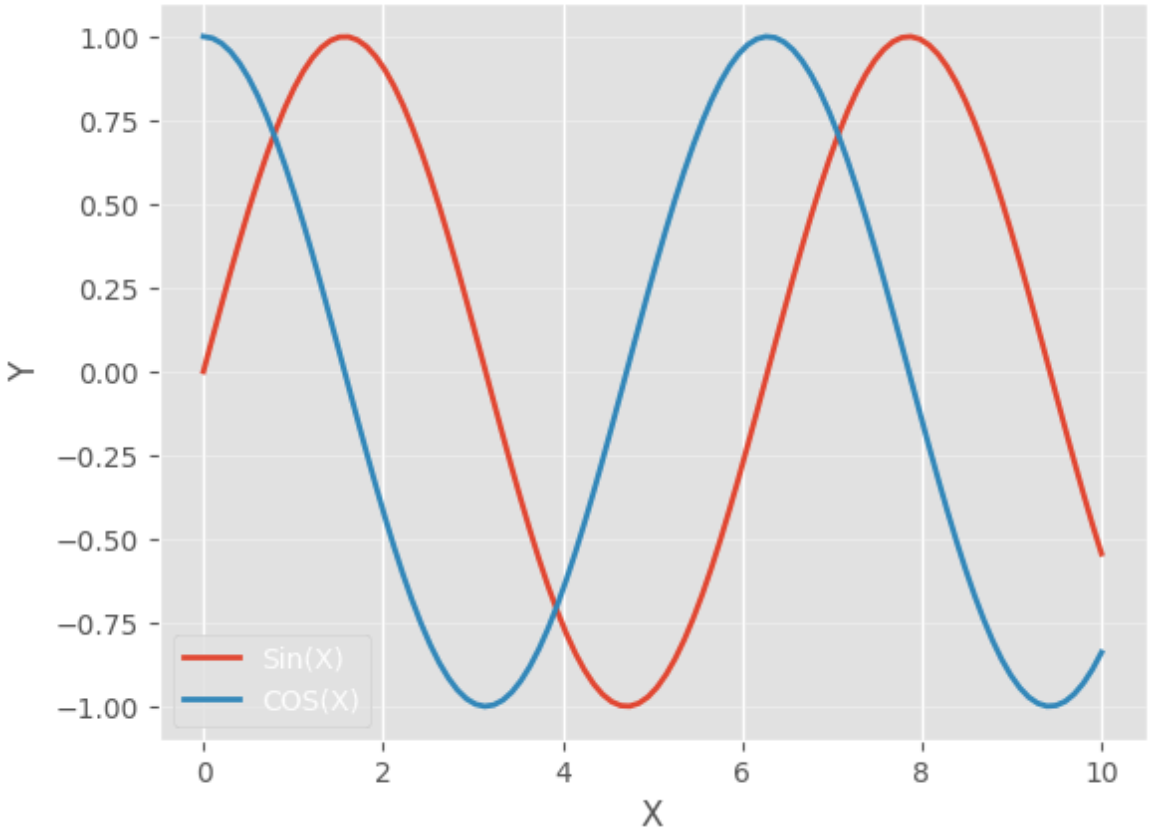
```
['Solarize_Light2', '_classic_test_patch', '_mpl-gallery', '_mpl-gallery-nogrid',
'bmh', 'classic', 'dark_background', 'fast', 'fivethirtyeight', 'ggplot', 'graysc
ale', 'petroff10', 'seaborn-v0_8', 'seaborn-v0_8-bright', 'seaborn-v0_8-colorblin
d', 'seaborn-v0_8-dark', 'seaborn-v0_8-dark-palette', 'seaborn-v0_8-darkgrid', 's
eaborn-v0_8-deep', 'seaborn-v0_8-muted', 'seaborn-v0_8-notebook', 'seaborn-v0_8-p
aper', 'seaborn-v0_8-pastel', 'seaborn-v0_8-poster', 'seaborn-v0_8-talk', 'seabor
n-v0_8-ticks', 'seaborn-v0_8-white', 'seaborn-v0_8-whitegrid', 'tableau-colorblin
d10']
```

In [ ]:
```
# STYLE
```

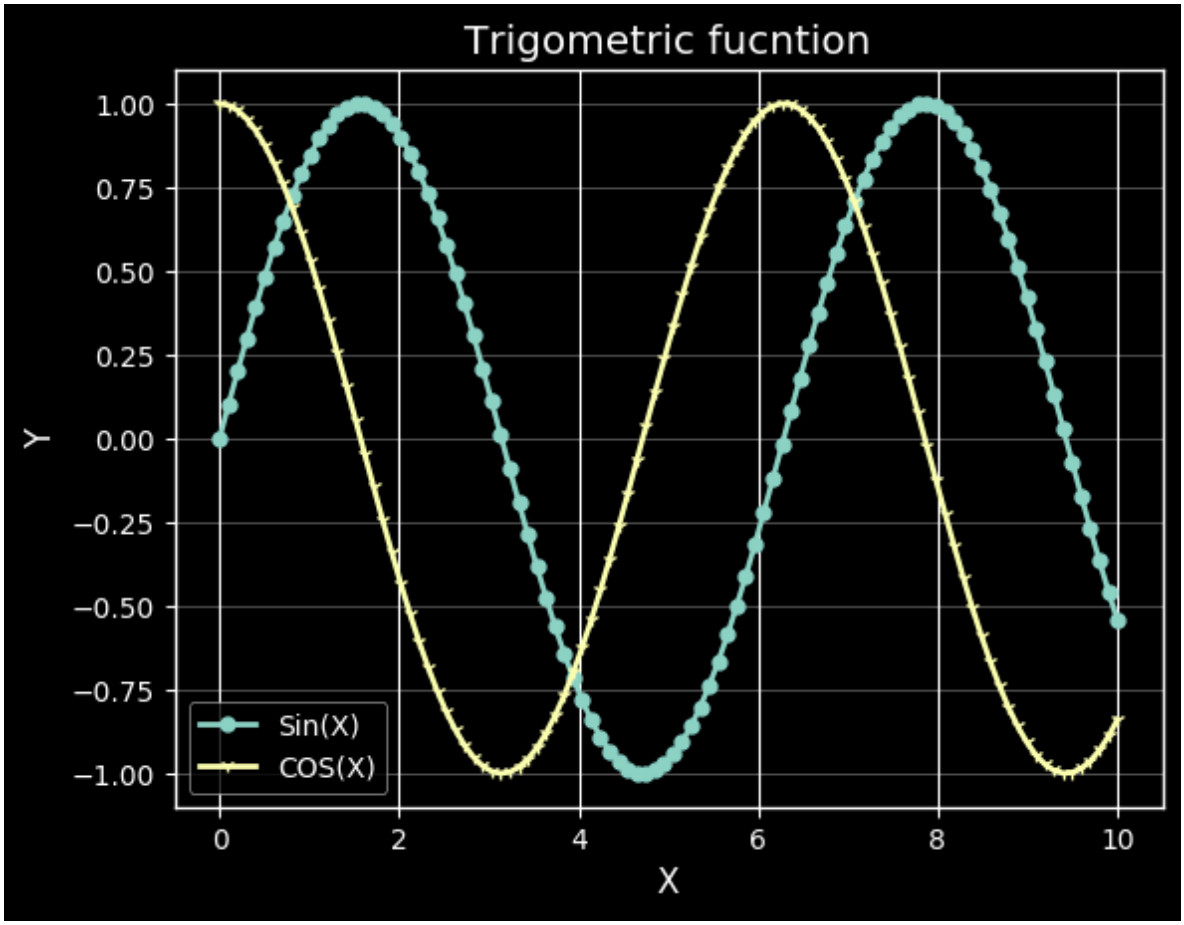
In [43]:
```
import numpy as np
from matplotlib import style
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
style.use('dark_background')
plt.plot(x1,y1,linewidth=2,label="Sin(X)")
plt.plot(x1,y2,linewidth=2,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```



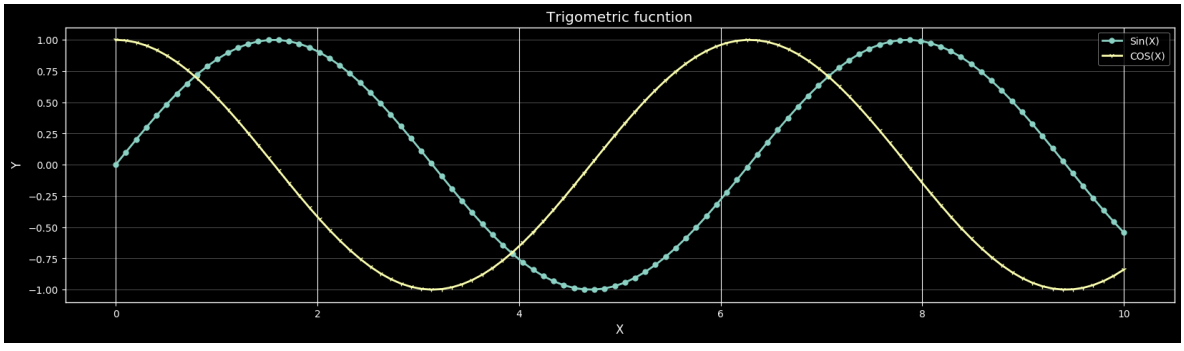
In [49]:
```
# Color
import numpy as np
from matplotlib import style
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
style.use('fast')
plt.plot(x1,y1,linewidth=2,label="Sin(X)")
plt.plot(x1,y2,linewidth=2,label="COS(X)")
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```



In [50]:
```
# Marker

# https://matplotlib.org/stable/api/markers_api.html

import numpy as np
from matplotlib import style
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
style.use('dark_background')
plt.plot(x1,y1,linewidth=2,label="Sin(X)",marker='o', markersize=5)
plt.plot(x1,y2,linewidth=2,label="COS(X)",marker='1', markersize=5)
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```

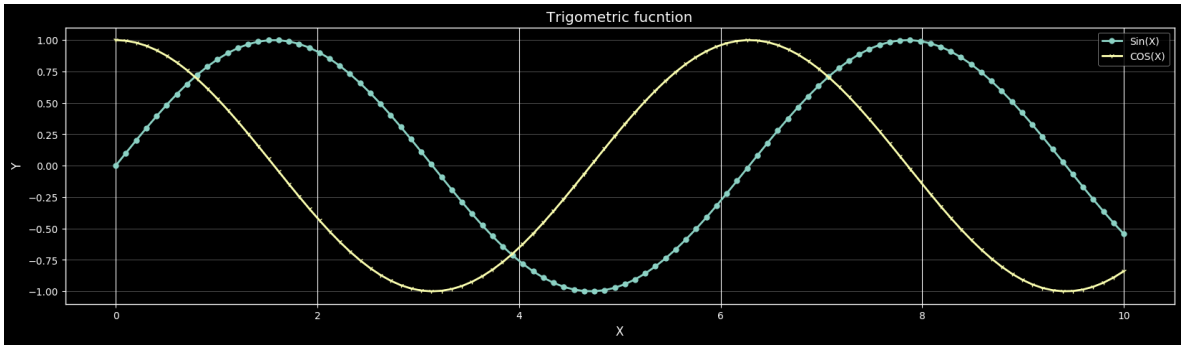


In [55]:
```
# Figure

import numpy as np
from matplotlib import style
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
style.use('dark_background')
plt.figure(figsize=(20,5)) # (width, height)
plt.plot(x1,y1,linewidth=2,label="Sin(X)",marker='o', markersize=5)
plt.plot(x1,y2,linewidth=2,label="COS(X)",marker='1', markersize=5)
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.show()
```



In [57]:
```
# savefig

import numpy as np
```

```
from matplotlib import style
x1 = np.linspace(0,10,100)
y1 = np.sin(x1)
y2 = np.cos(x1)
style.use('dark_background')
plt.figure(figsize=(20,5)) # (width, height)
plt.plot(x1,y1,linewidth=2,label="Sin(X)",marker='o', markersize=5)
plt.plot(x1,y2,linewidth=2,label="COS(X)",marker='1', markersize=5)
plt.xlabel("X")
plt.ylabel("Y")
plt.title("Trigometric fucntion")
plt.legend()
plt.grid(True,alpha=0.3,axis="y")
plt.savefig("test.pdf")
plt.show()
```



In [ ]: