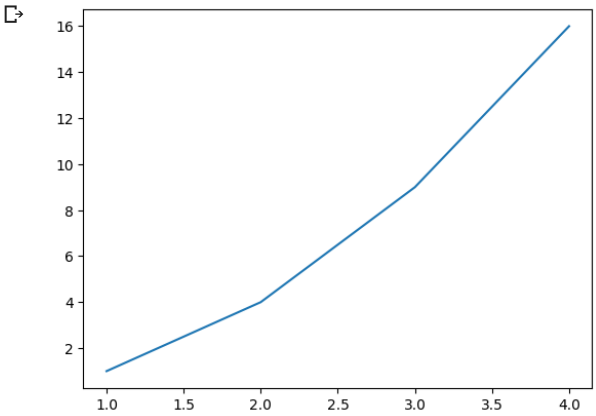
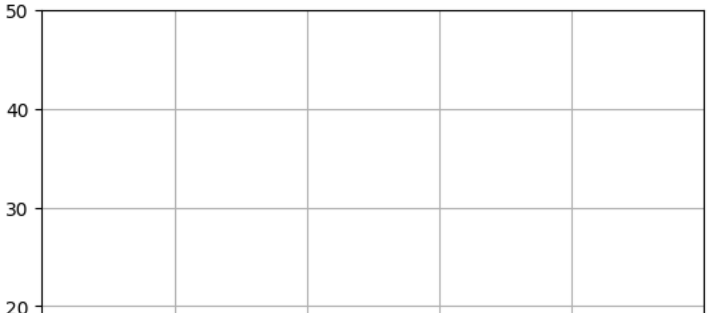
Example 1:

```
#we need to improt matplotlib sub library pyplotlib
import matplotlib.pyplot as plt
# Then we need to have some x and y coordinate, for example we use lists
x=[1, 2, 3, 4]
y=[1, 4, 9, 16]
# we then tell python function to use plt to plot the graph
plt.plot(x,y)
# finally much like "print" we need to tell python to print the current graph.
plt.show()
```



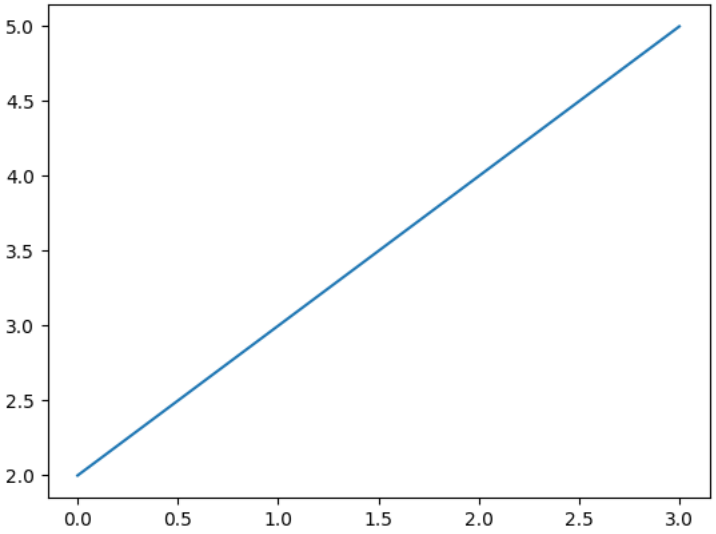
Task 1:

```
import matplotlib.pyplot as plt
plt.xlim(0,50)
plt.ylim(0,50)
plt.grid()
```



Example 2:

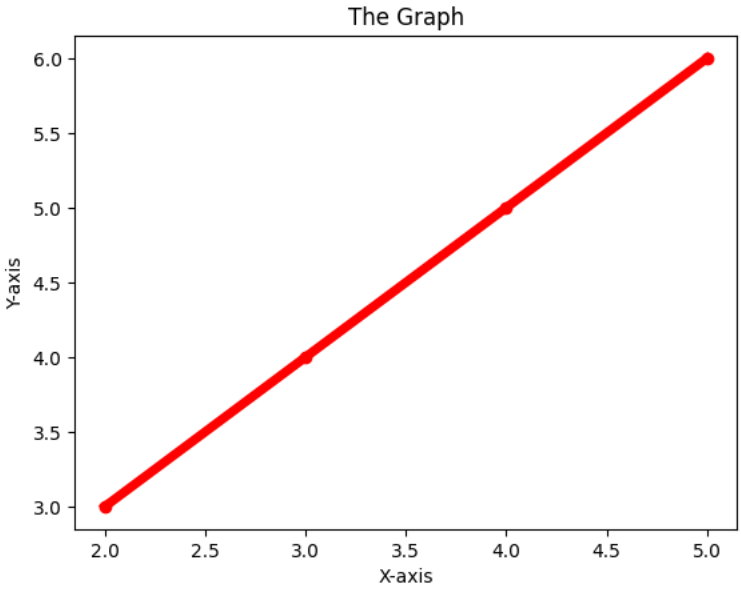
```
import matplotlib.pyplot as plt
x=[2, 3, 4, 5]
plt.plot(x)
plt.show()
```



Example 2: What could be the output and why? Answer: The provided code uses the matplotlib library to create a line plot. It plots the values [2, 3, 4, 5] by default, with the x-axis showing the indices of the list (0 to 3). The resulting plot is a straight line connecting the points (0, 2), (1, 3), (2, 4), and (3, 5). If you want the x-axis to display the actual values instead of the indices, you can modify the code by providing the x-values as the second parameter in the plot() function.

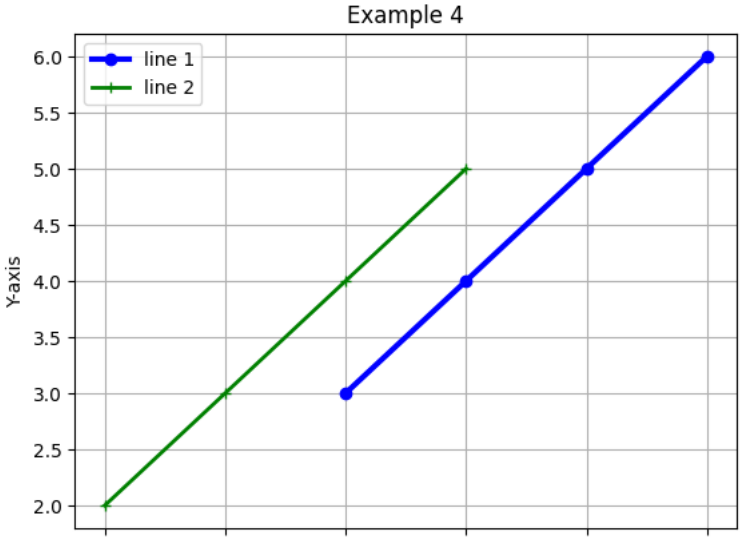
Example 3:

```
import matplotlib.pyplot as plt
x=[2, 3, 4, 5]
y=[3,4,5,6]
plt.plot(x, y, marker='o', color='red', linewidth=5)
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('The Graph')
plt.show()
```



Example 4:

```
import matplotlib.pyplot as plt
x=[2, 3, 4, 5]
y=[3, 4, 5, 6]
plt.plot(x, y, marker='o', color='blue',label='line 1', linewidth=3)
plt.plot(x, marker='+', color='green',label='line 2', linewidth=2)
#function to add title
plt.title('Example 4')
#Function to label axes
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
# Function to add a legend
plt.legend()
# function for the visibility of grid
plt.grid()
plt.show()
```



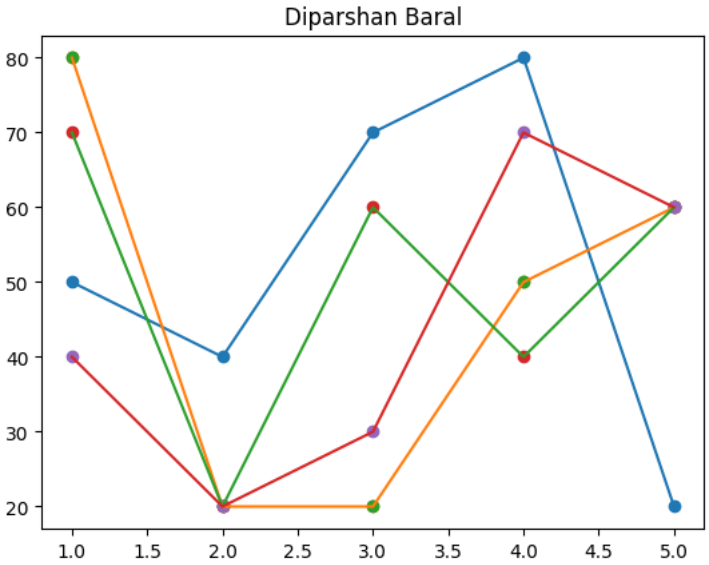
The following table shows the different vehicles and the distance covered by them in the span of 5 days. Display the following table in line plot.

a. Plot "days" in X- axis and "distance covered" in Y- axis.
b. Title of the table "bike details in Plot"

BIKES				
DAYS	DISTANCE COVERED IN KMS			
	ENFIELD	HONDA	YAHAMA	KTM
DAY 1	50	80	70	40
DAY 2	40	20	20	20
DAY 3	70	20	60	30
DAY 4	80	50	40	70
DAY 5	20	60	60	60

```
import matplotlib.pyplot as plt
x = [1,2,3,4,5]
enfield = [50,40,70,80,20]
honda = [80,20,20,50,60]
yamaha = [70,20,60,40,60]
ktm = [40,20,30,70,60]
plt.scatter(x,enfield)
plt.plot(x,enfield)
plt.scatter(x,honda)
plt.plot(x,honda)
plt.scatter(x,honda)
plt.plot(x,yamaha)
plt.scatter(x,yamaha)
plt.scatter(x,ktm)
```

```
plt.plot(x,ktm)
plt.title("Diparshan Baral")
plt.show()
```

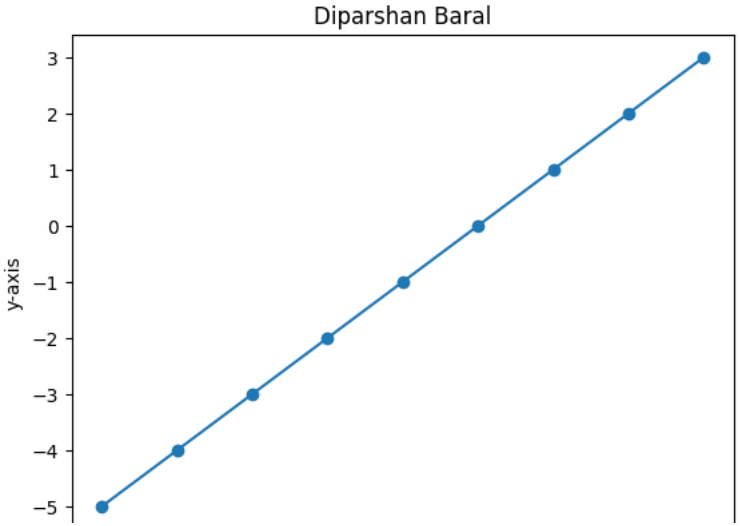


Exercise:

1. Draw the line represented by the function y=x.

```
import matplotlib.pyplot as plt
x = []
y = []
def f(x):
  return x
for i in range(-5,4):
  x.append(i)
  y.append(f(i))
print(x)
print(y)
plt.title("Diparshan Baral")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.scatter(x,y)
plt.plot(x,y)
plt.show()
```

```
[-5, -4, -3, -2, -1, 0, 1, 2, 3]
[-5, -4, -3, -2, -1, 0, 1, 2, 3]
```



2. Draw a line in a diagram that joins the position (1, 3), (2, 8), (6, 1) and (8, 10).

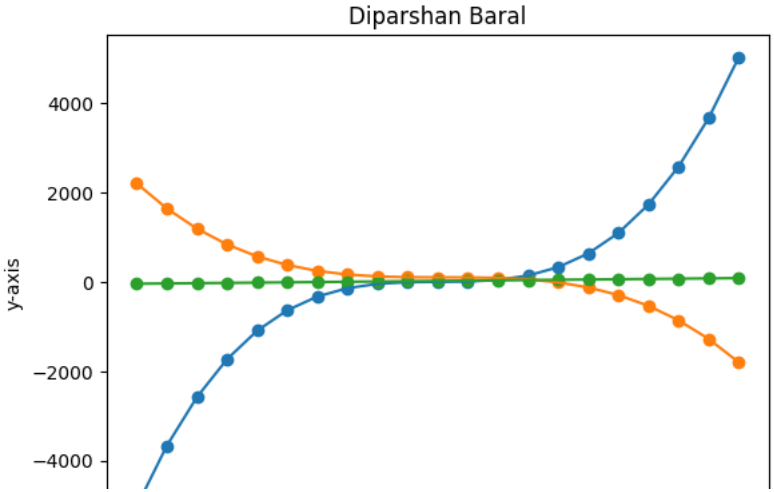
```
import matplotlib.pyplot as plt
x = [1,2,6,8]
y = [3,8,1,10]
plt.scatter(x,y)
plt.plot(x,y)
plt.title("Diparshan Baral")
plt.show()
```

$$f(x) = 5x^3 + 2x - 1$$
$$f(x) = -2x^3 + x^2 + 100$$
$$f(x) = 2\pi x + 20$$

3. Plot 20 values of x and y from the following functions.

```
import matplotlib.pyplot as plt
x = []
y = []
a = []
b = []
c = []
d = []
def f1(x):
  return 5*x*x*x + 2*x - 1
def f2(x):
  return -2*(x*x*x) + (x*x) + 100
def f3(x):
  return 2*3.15*x + 20
for i in range(-10,11):
  x.append(i)
  y.append(f1(i))
for j in range(-10,11):
  a.append(j)
  b.append(f2(j))
for k in range(-10,11):
  c.append(k)
  d.append(f3(k))
print("f1(x)=",x)
print("f1(y)=",y)
print("f2(x)=",a)
print("f2(y)=",b)
print("f3(x)=",c)
print("f3(y)=",d)
plt.title("Title")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.scatter(x,y)
plt.plot(x,y)
plt.scatter(a,b)
plt.plot(a,b)
plt.scatter(c,d)
plt.plot(c,d)
plt.title("Diparshan Baral")
plt.show()
```

```
f1(x)= [-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
f1(y)= [-5021, -3664, -2577, -1730, -1093, -636, -329, -142, -45, -8, -1, 6, 43, 140,
f2(x)= [-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
f2(y)= [2200, 1639, 1188, 835, 568, 375, 244, 163, 120, 103, 100, 99, 88, 55, -12, -12
f3(x)= [-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
f3(y)= [-43.0, -36.699999999999996, -30.4, -24.1, -17.799999999999997, -11.5, -5.19999
```

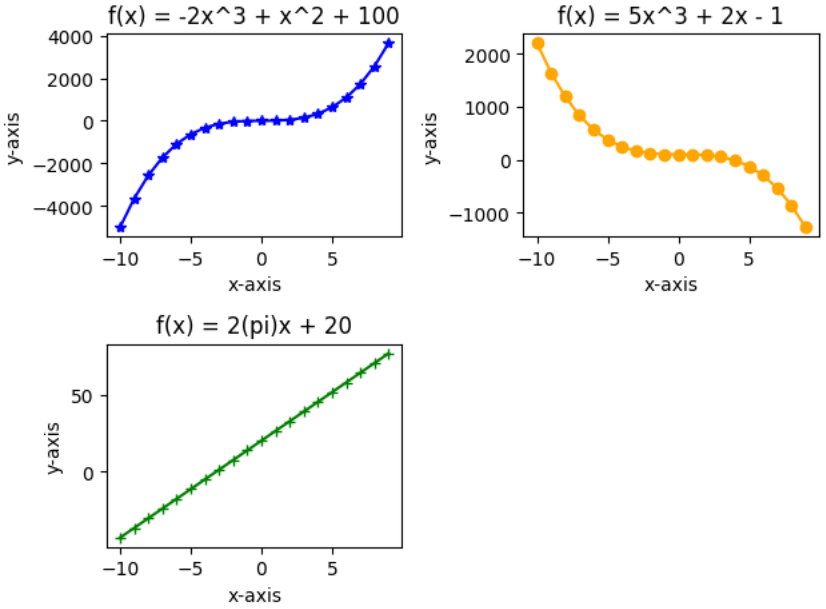


4. Plot all the graph from Q no 3 on the same plane using subplot.

x-axis

```
import matplotlib.pyplot as plt
x = []
y1 = []
y2 = []
y3 = []
def f1(x):
  return 5*x*x*x + 2*x - 1
def f2(x):
  return -2*(x*x*x) + (x*x) + 100
def f3(x):
  return 2*3.15*x + 20
for i in range(-10,10):
  x.append(i)
  y1.append(f1(i))
  y2.append(f2(i))
  y3.append(f3(i))
plt.subplot(2,2,1)
plt.plot(x,y1, marker='*' , c = 'blue')
plt.title("f(x) = -2x^3 + x^2 + 100")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.subplot(2,2,2)
plt.plot(x,y2, marker='o' , c = 'orange')
plt.title("f(x) = 5x^3 + 2x - 1")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.subplot(2,2,3)
```

```
plt.plot(x,y3, marker='+' , c = 'green')
plt.title("f(x) = 2(pi)x + 20")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.tight_layout()
```



5. Plot all the graph from Task 2 using subplot.

```
import matplotlib.pyplot as plt
x = [1,2,3,4,5]
enfield = [50,40,70,80,20]
honda = [80,20,20,50,60]
yamaha = [70,20,60,40,60]
ktm = [40,20,30,70,60]
plt.subplot(2,2,1)
plt.scatter(x,enfield)
plt.plot(x,enfield)
plt.title("ENFIELD")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.subplot(2,2,2)
plt.scatter(x,honda)
plt.plot(x,honda)
plt.title("HONDA")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.subplot(2,2,3)
```

```
plt.scatter(x,yamaha)
plt.plot(x,yamaha)
plt.title("YAMAHA")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.subplot(2,2,4)
plt.scatter(x,ktm)
plt.plot(x,ktm)
plt.title("KTM")
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.tight_layout()
```