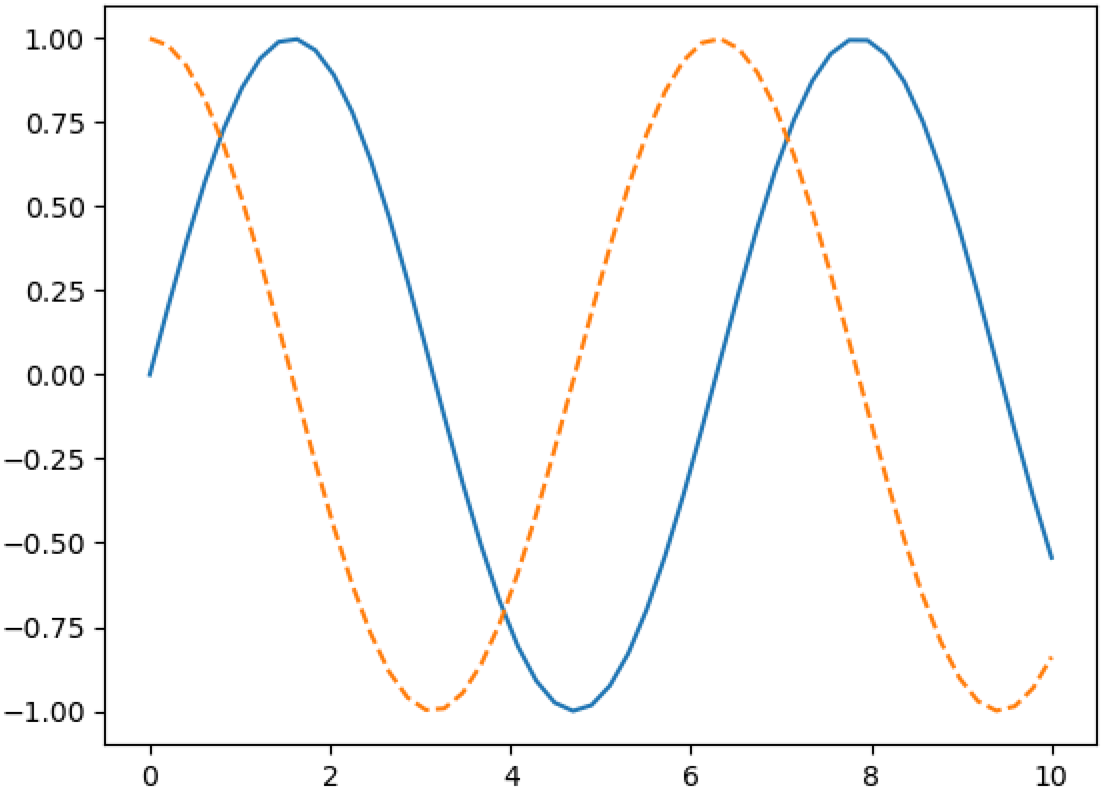
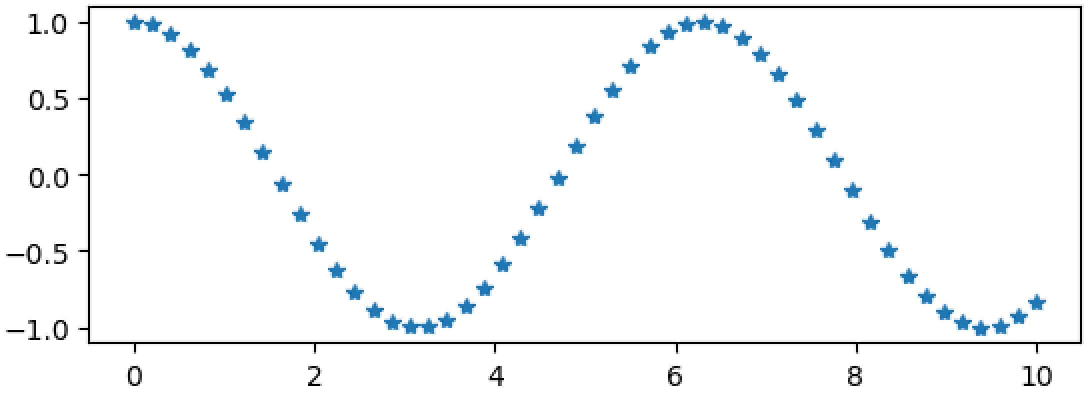
In [1]:
```
import numpy as np
import pandas as pd
```

In [2]:
```
import matplotlib.pyplot as plt
```

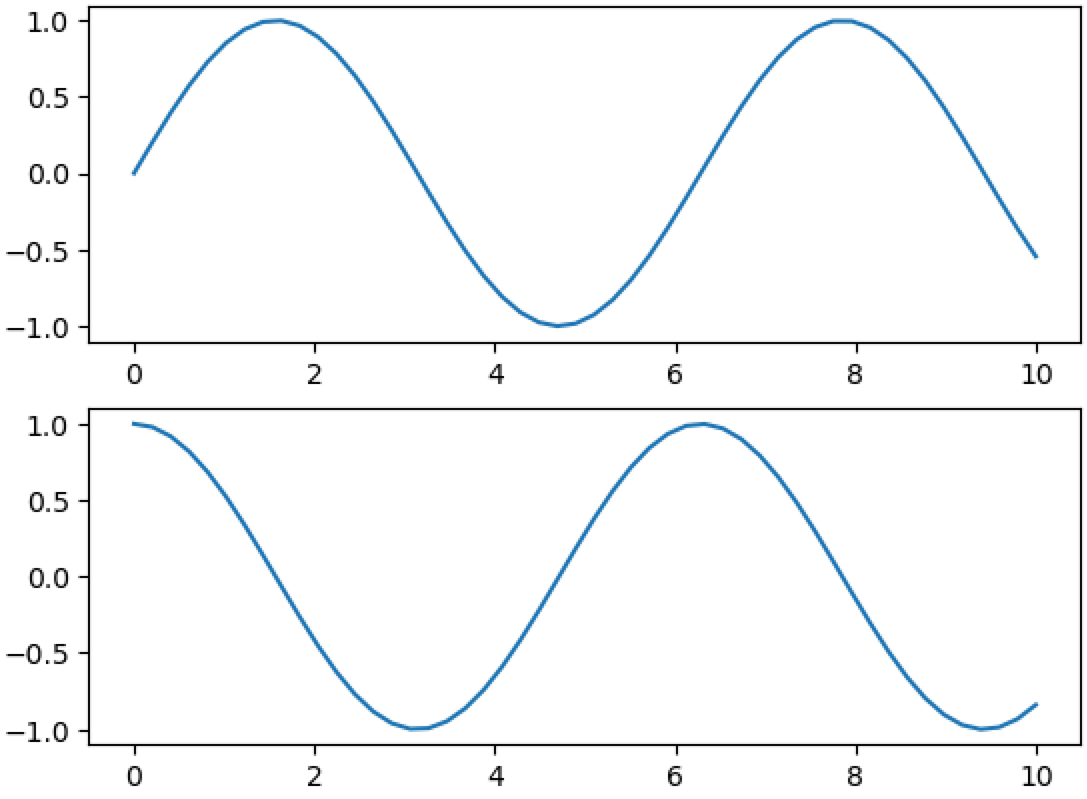
In [3]:
```
%matplotlib inline
x1=np.linspace(0,10,50)

# create a plot figure
# fig = plt.figure()

plt.plot(x1,np.sin(x1),'-')
plt.plot(x1,np.cos(x1), '--')
# plt.plot(x1,np.tan(x1),'--')
plt.show()
```



In [4]:
```
# create the first of two panels and set current axis
plt.subplot(2, 1, 1) # (rows, columns, panel number)
plt.plot(x1, np.cos(x1), '*')
plt.show()
```



In [5]:
```
# create a plot figure
plt.figure()

# create the first of two panels and set current axis
plt.subplot(2, 1, 1) # (rows, columns, panel number)
plt.plot(x1, np.sin(x1))
# create the second of two panels and set current axis
plt.subplot(2, 1, 2) # (rows, columns, panel number)
plt.plot(x1, np.cos(x1));
plt.show()
```



In [6]:
```
# get current figure information
print(plt.gcf())
```

```
Figure(640x480)
```

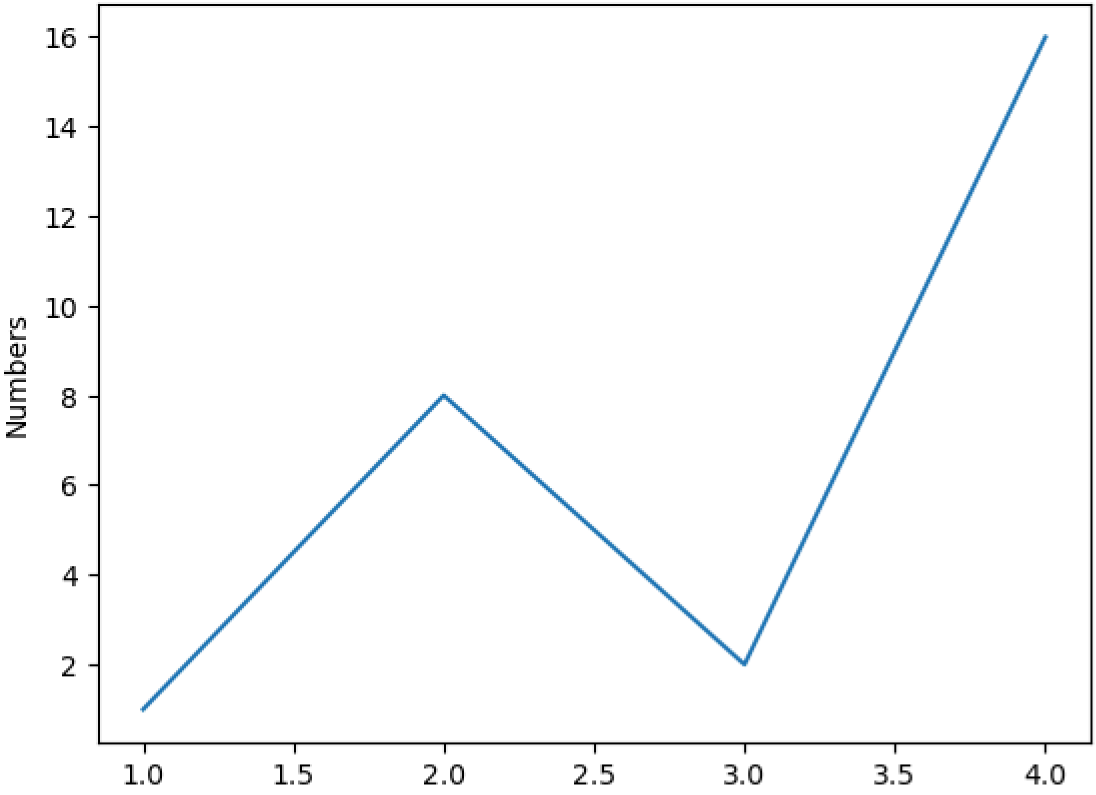
In [7]:
```
# get current axis information
```

```
print(plt.gca())
```

```
Axes(0.125,0.11;0.775x0.77)
```

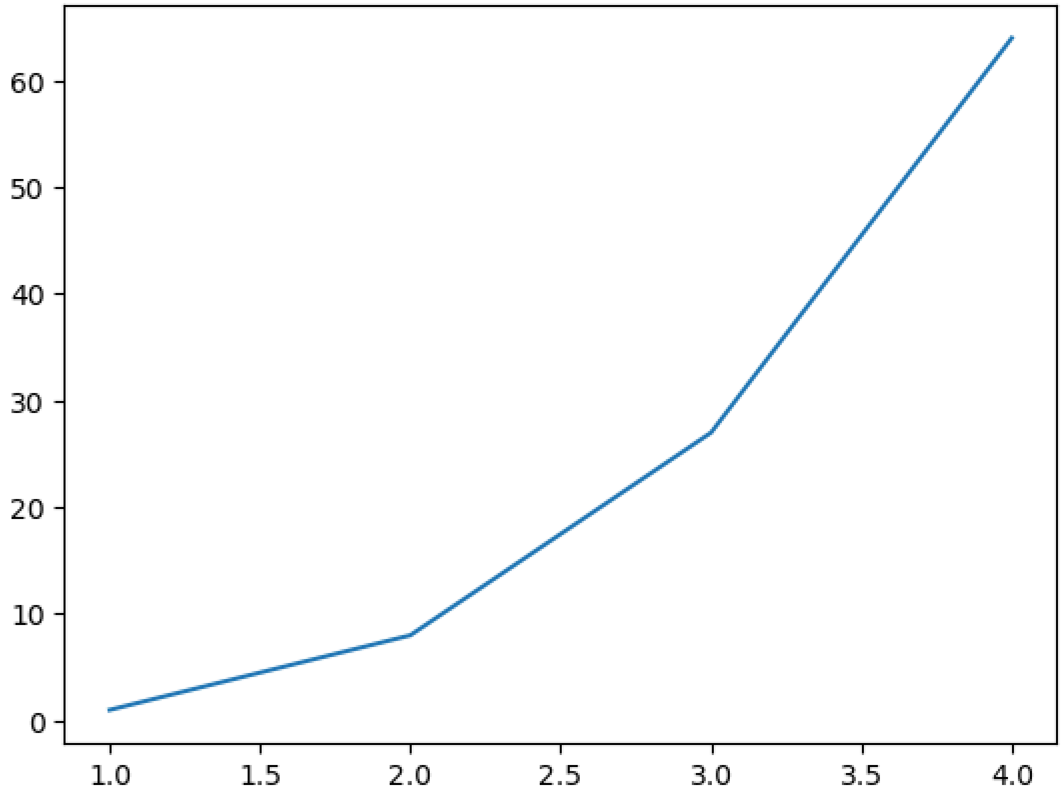
In [8]:

```
plt.plot([1,2,3,4], [1,8,2,16])
plt.ylabel('Numbers')
plt.show()
```



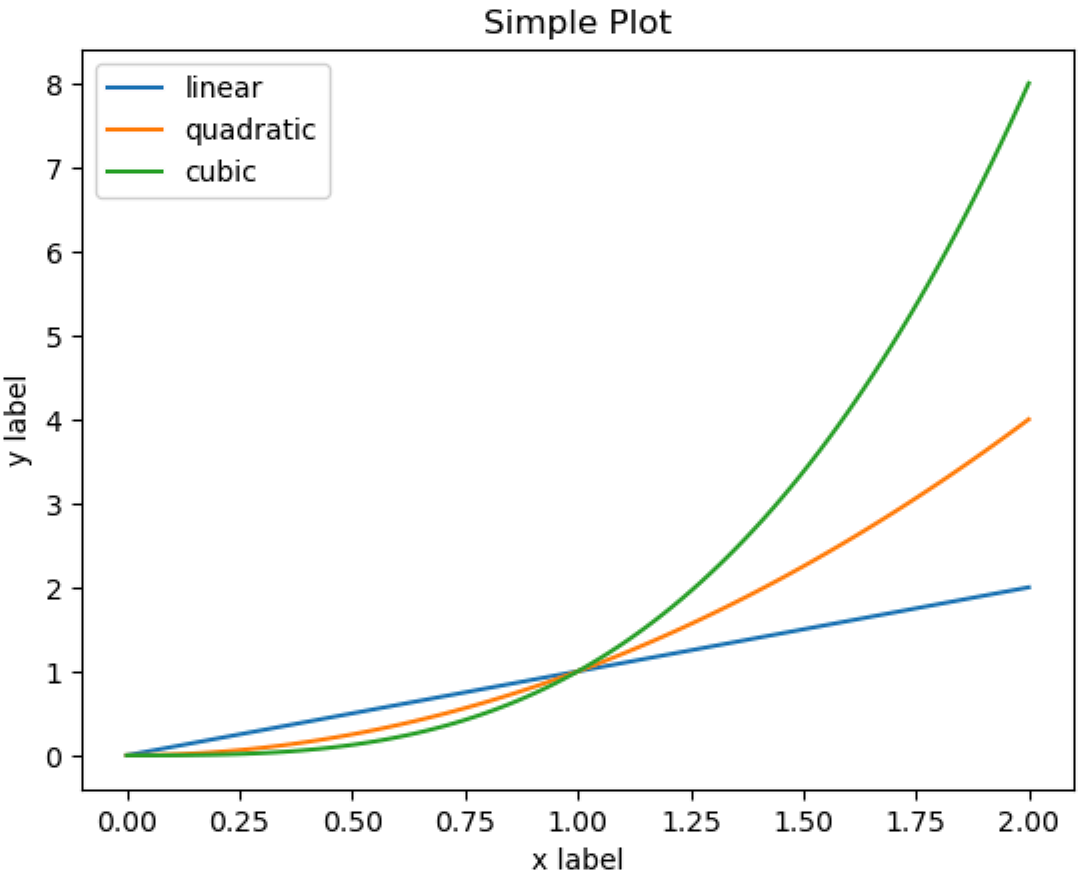
In [9]:

```
import matplotlib.pyplot as plt
plt.plot([1, 2, 3, 4], [1, 8, 27, 64])
plt.show()
```

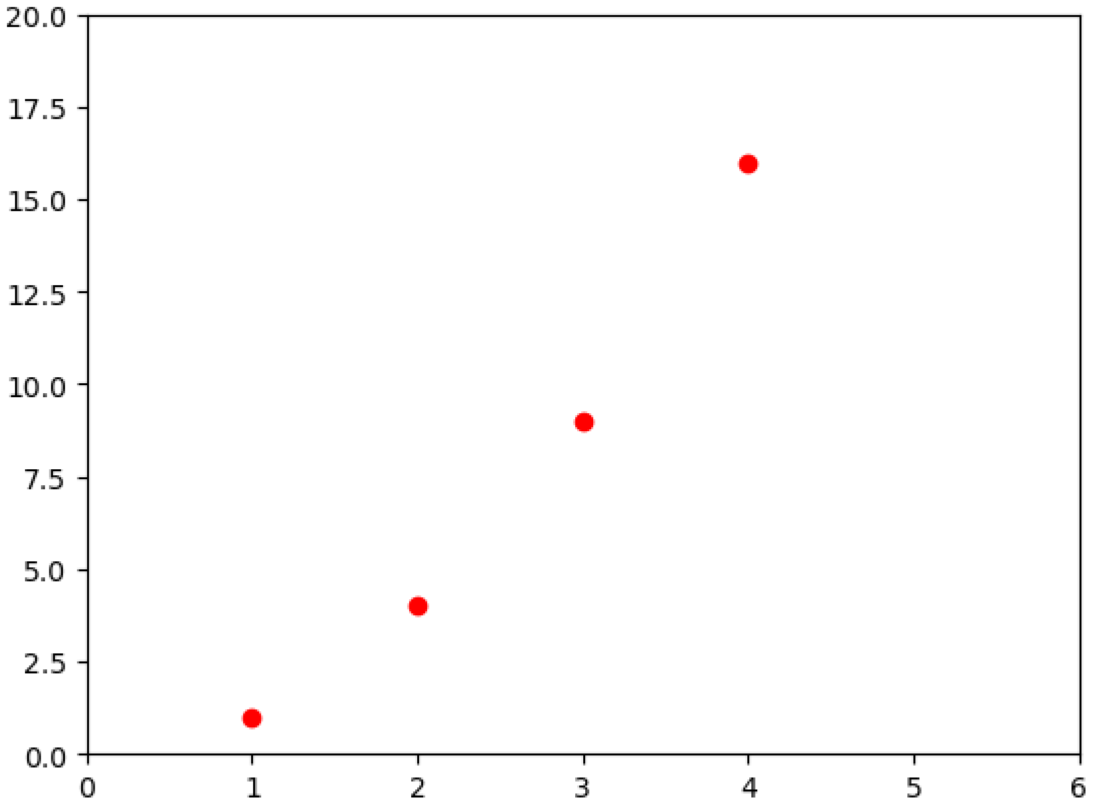


In [10]:

```
x = np.linspace(0, 2, 100)
plt.plot(x, x, label='linear')
plt.plot(x, x**2, label='quadratic')
plt.plot(x, x**3, label='cubic')
plt.xlabel('x label')
plt.ylabel('y label')
plt.title("Simple Plot")
plt.legend()
plt.show()
```

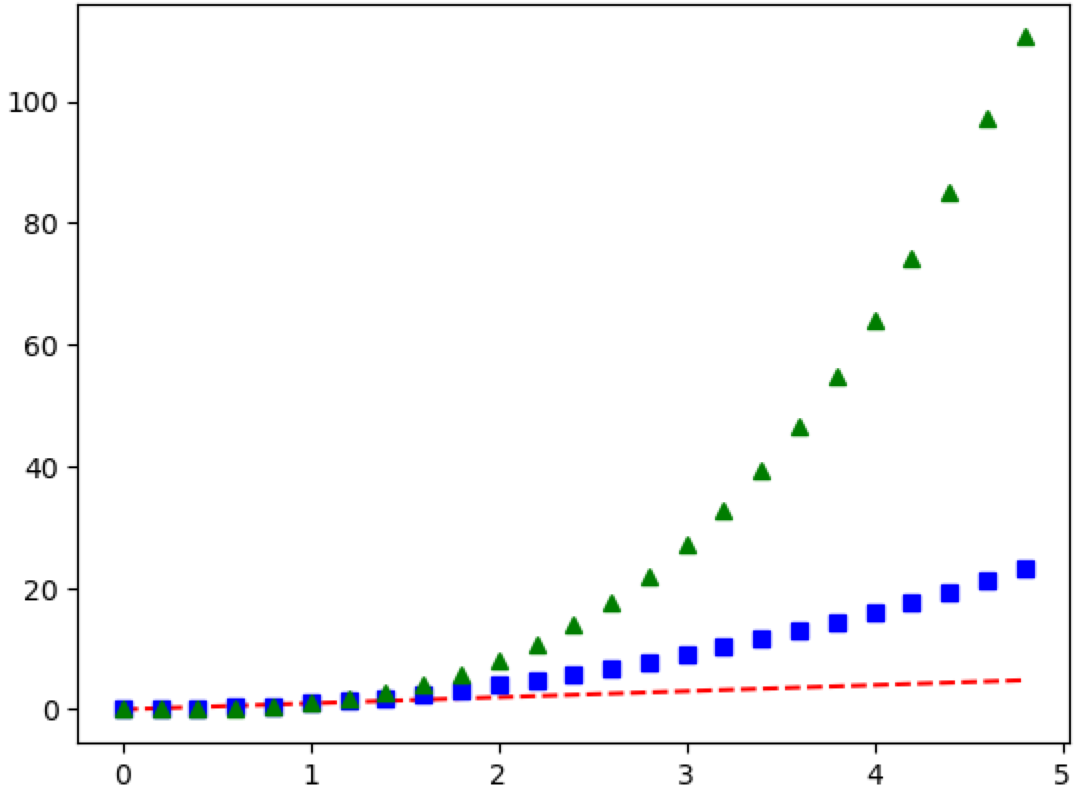


In [11]:
```
plt.plot([1, 2, 3, 4], [1, 4, 9, 16], 'ro')
plt.axis([0, 6, 0, 20])
plt.show()
```



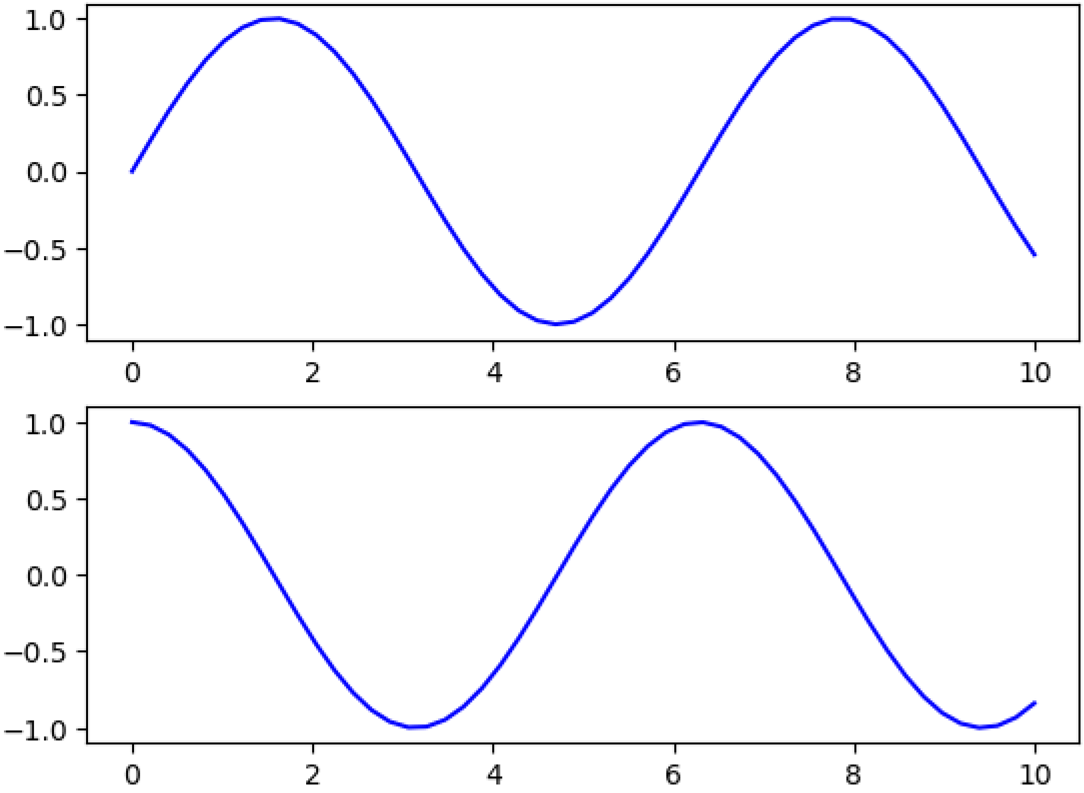
In [13]:

```
#evenly sampled time at 200ms intervals
t = np.arange(0., 5., 0.2)
# red dashes, blue squares and green triangles
plt.plot(t, t, 'r--', t, t**2, 'bs', t, t**3, 'g^')
plt.show()
```



In [14]:

```
# First create a grid of plots
# ax will be an array of two Axes objects
fig, ax = plt.subplots(2)

# Call plot() method on the appropriate object
ax[0].plot(x1, np.sin(x1), 'b-')
ax[1].plot(x1, np.cos(x1), 'b-');
plt.show()
```

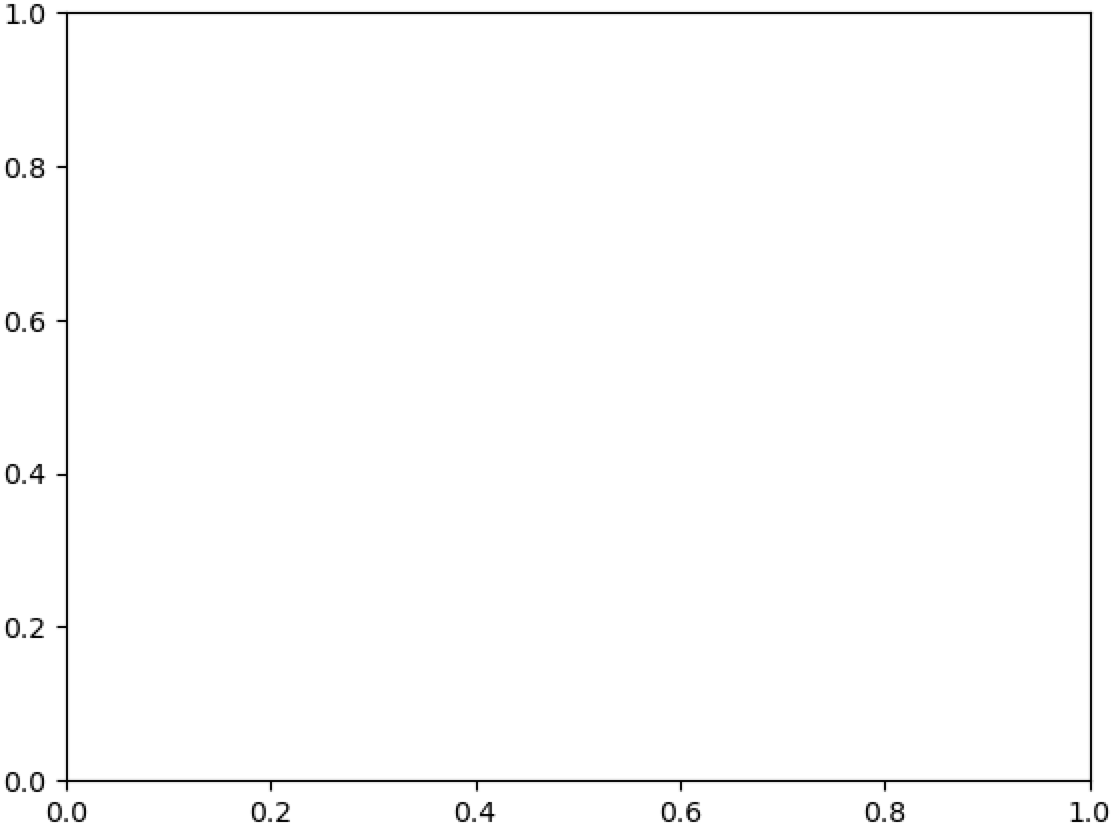


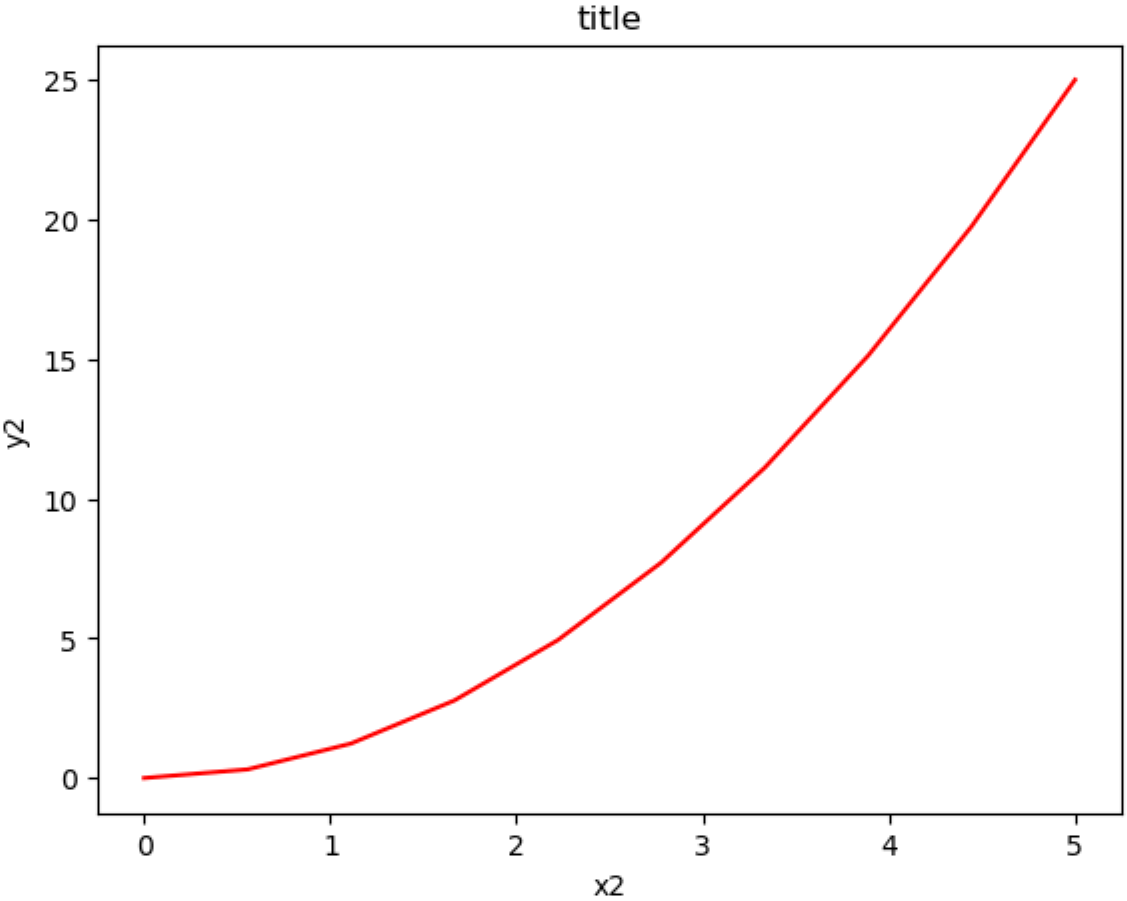
In [18]:

```
fig=plt.figure()
x2=np.linspace(0,5,10)
y2=x2**2
axes=fig.add_axes([0.1,0.1,0.8,0.8])
```

In [19]:

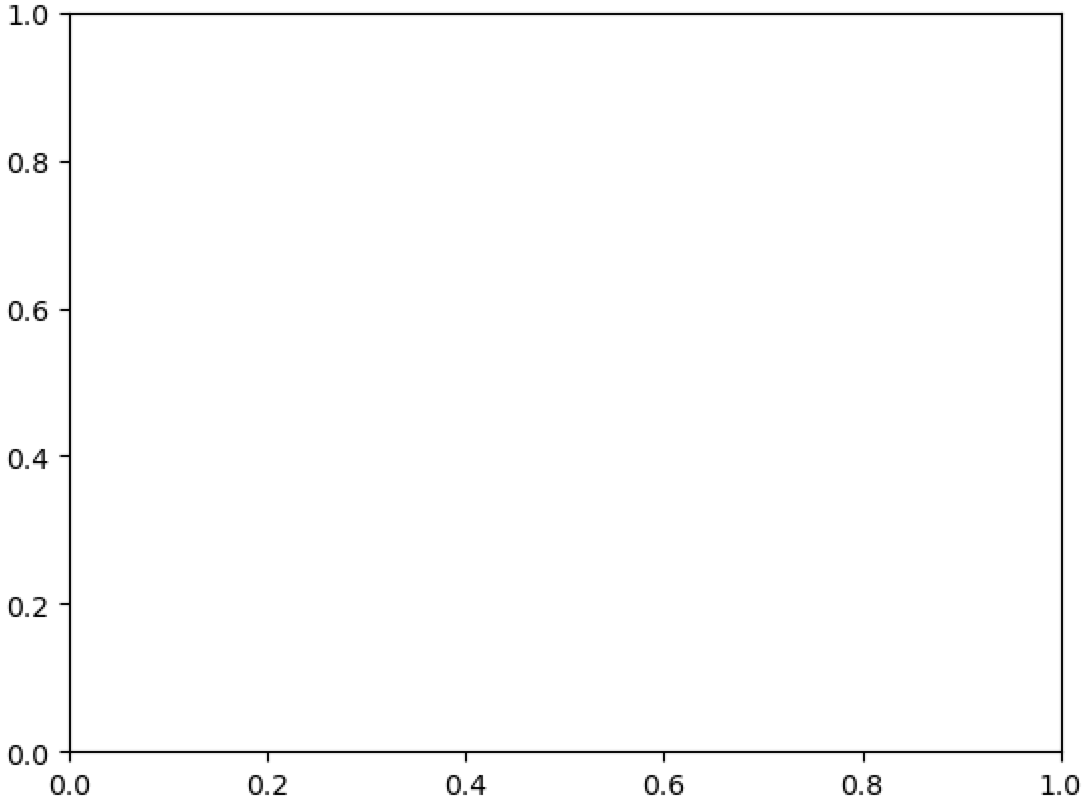
```
axes.plot(x2, y2, 'r')
axes.set_xlabel('x2')
axes.set_ylabel('y2')
axes.set_title('title');
plt.show()
```



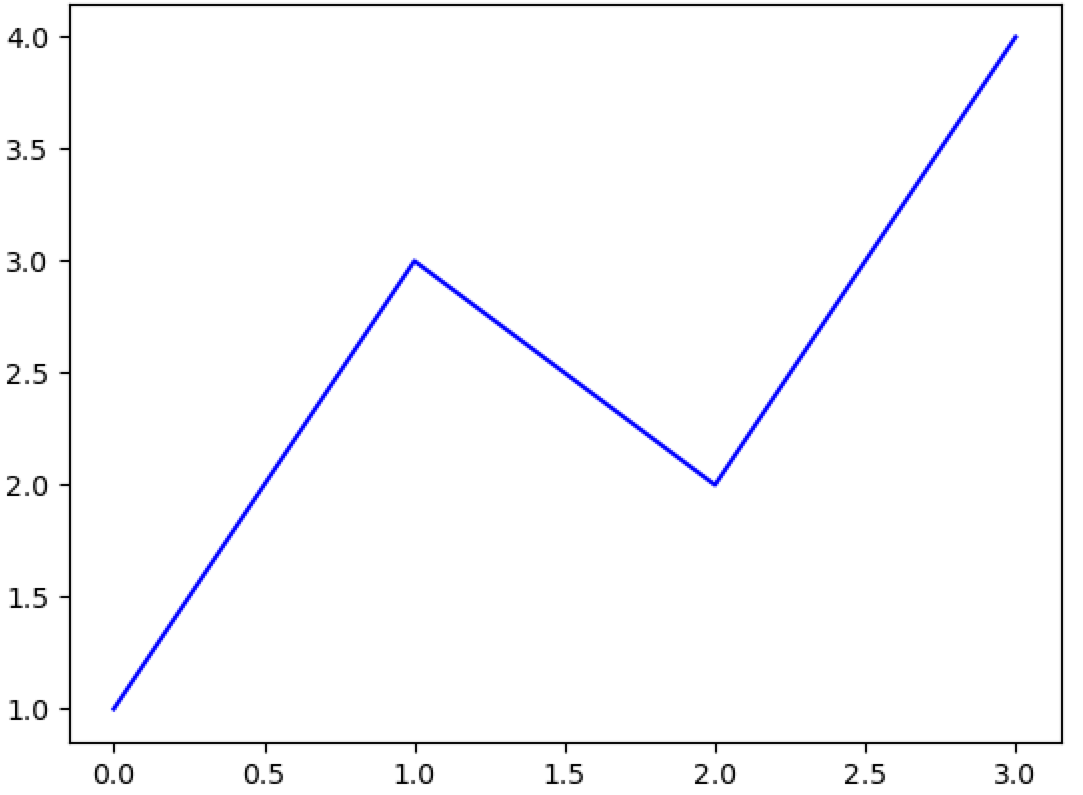


In [20]:
```
fig=plt.figure()
ax=plt.axes()
```

```
plt.show()
```

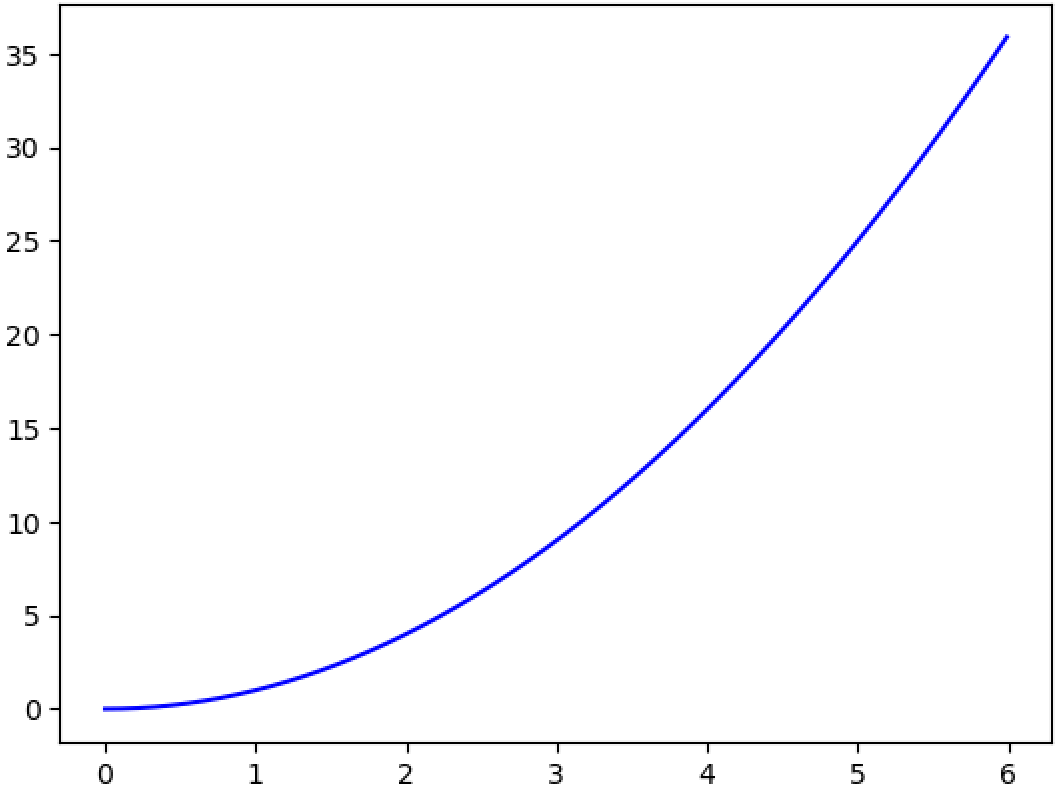


In [22]:
```
plt.plot([1,3,2,4],'b-')
plt.show()
```



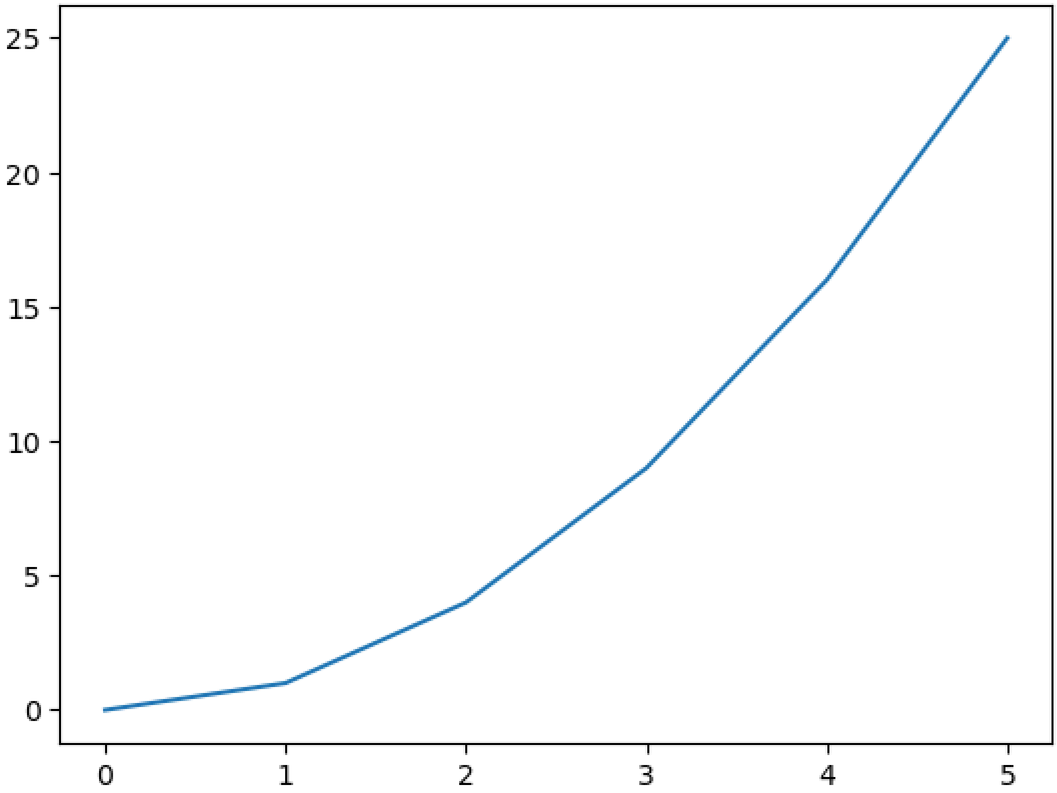
In [23]:

```
x3=np.arange(0.0,6.0,0.01)
plt.plot(x3,[xi**2 for xi in x3],'b-')
plt.show()
```

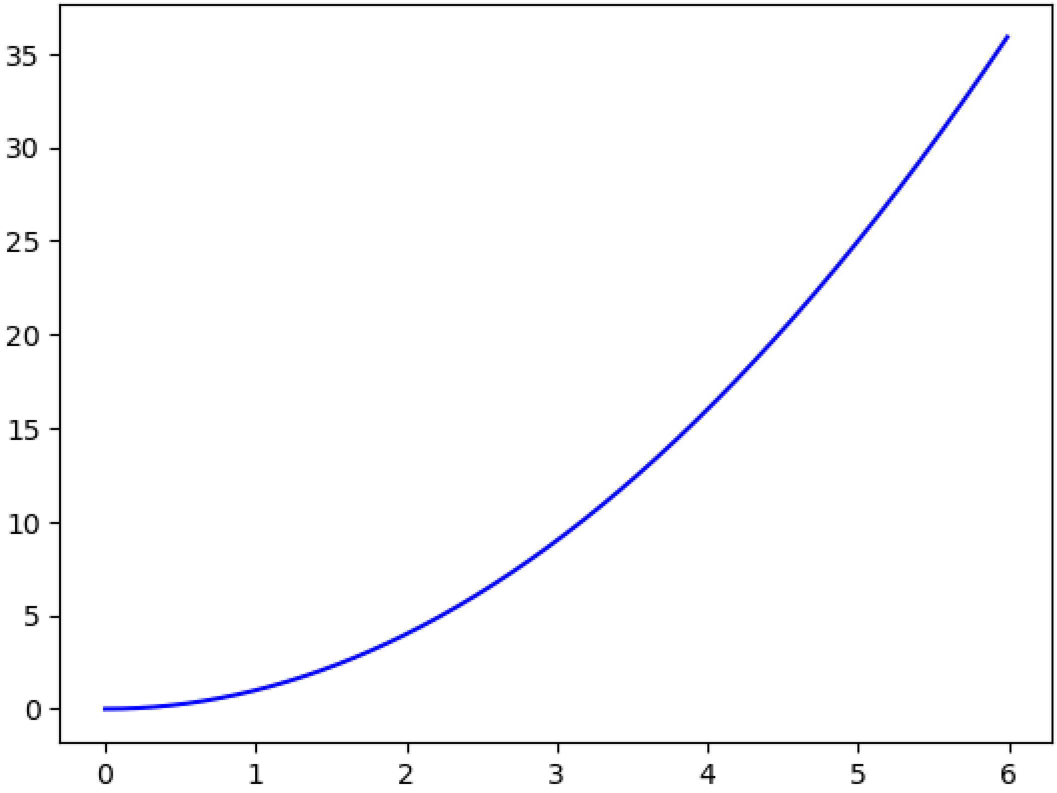


In [24]:

```
x3 = range(6)

plt.plot(x3, [xi**2 for xi in x3])

plt.show()
```

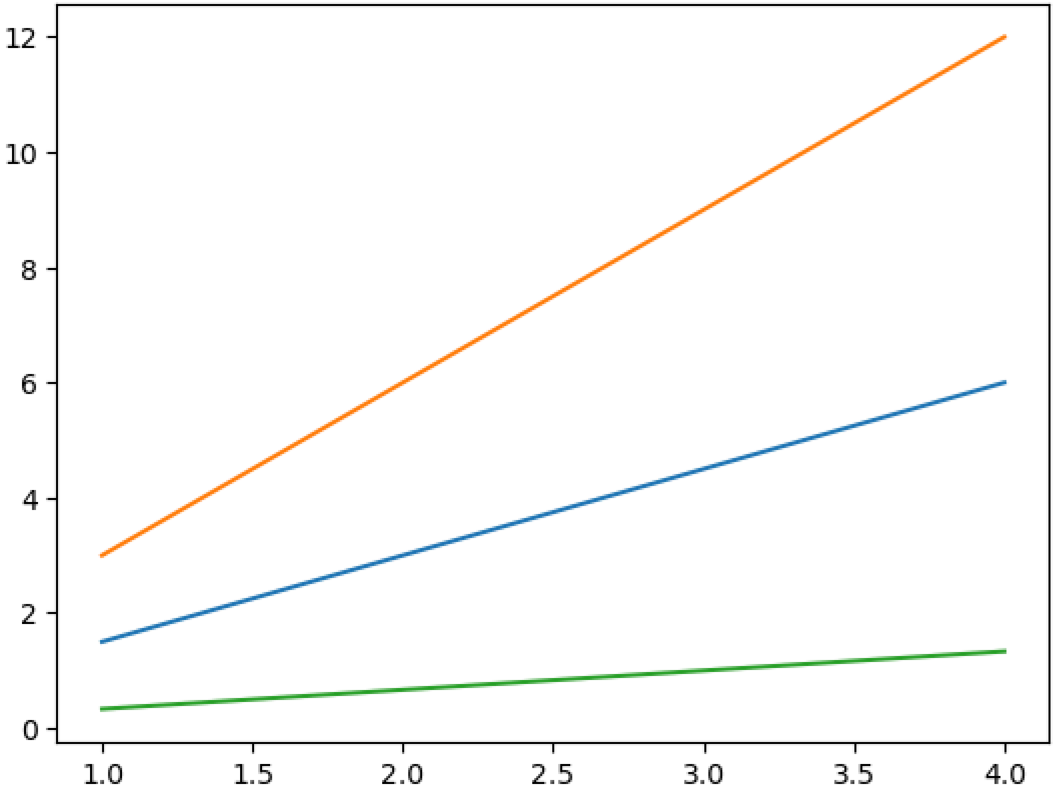


```
In [25]: x3 = np.arange(0.0, 6.0, 0.01)

         plt.plot(x3, [xi**2 for xi in x3], 'b-')

         plt.show()
```



In [26]:

```
x4 = range(1, 5)

plt.plot(x4, [xi*1.5 for xi in x4])

plt.plot(x4, [xi*3 for xi in x4])

plt.plot(x4, [xi/3.0 for xi in x4])

plt.show()
```



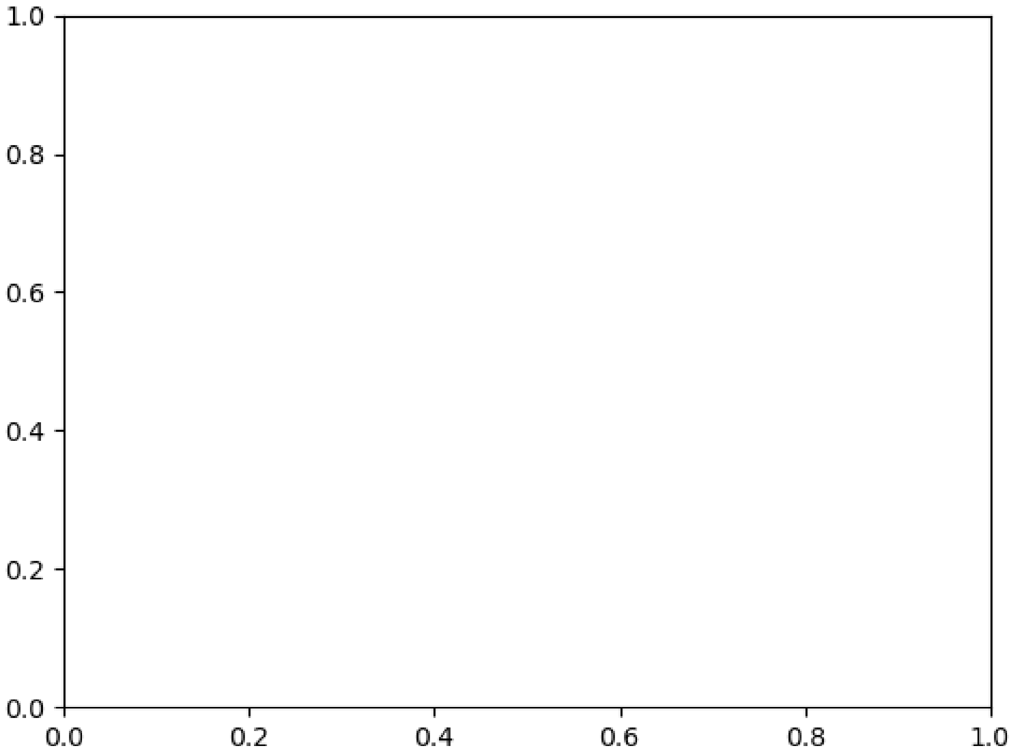
In [27]:

```
# Saving the figure

fig.savefig('plot1.png')
```

In [28]:

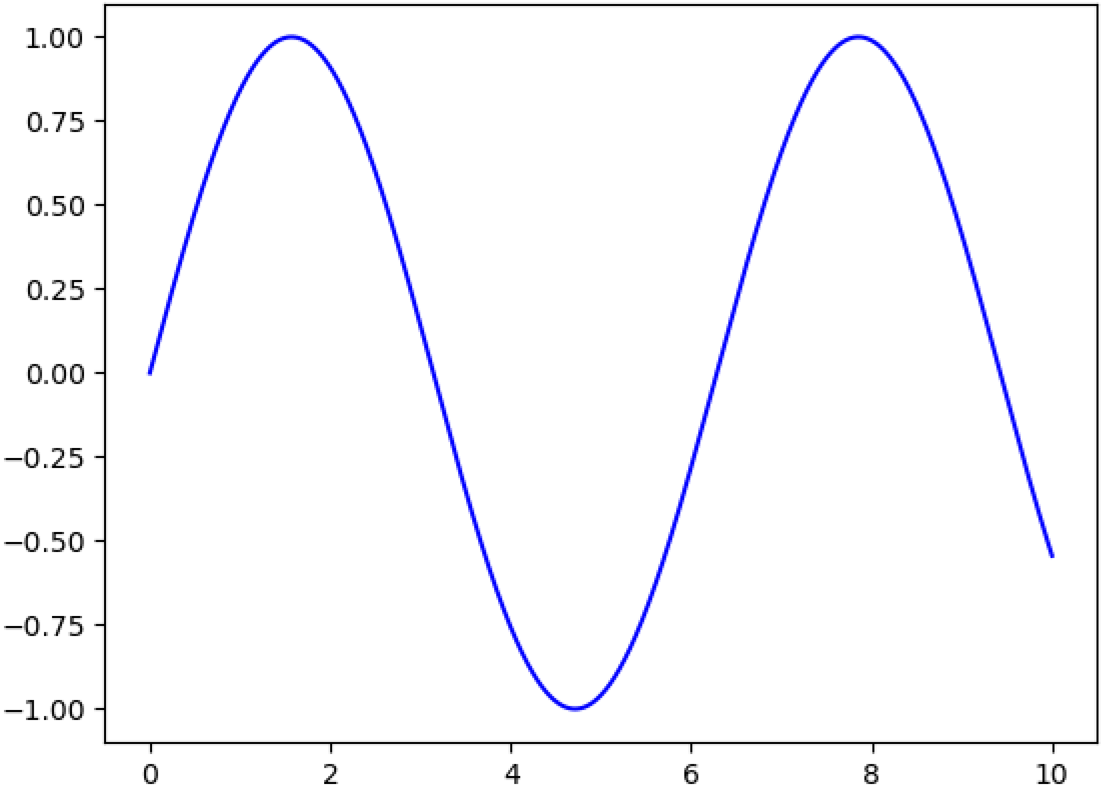
```
# Explore the contents of figure

from IPython.display import Image

Image('plot1.png')
```

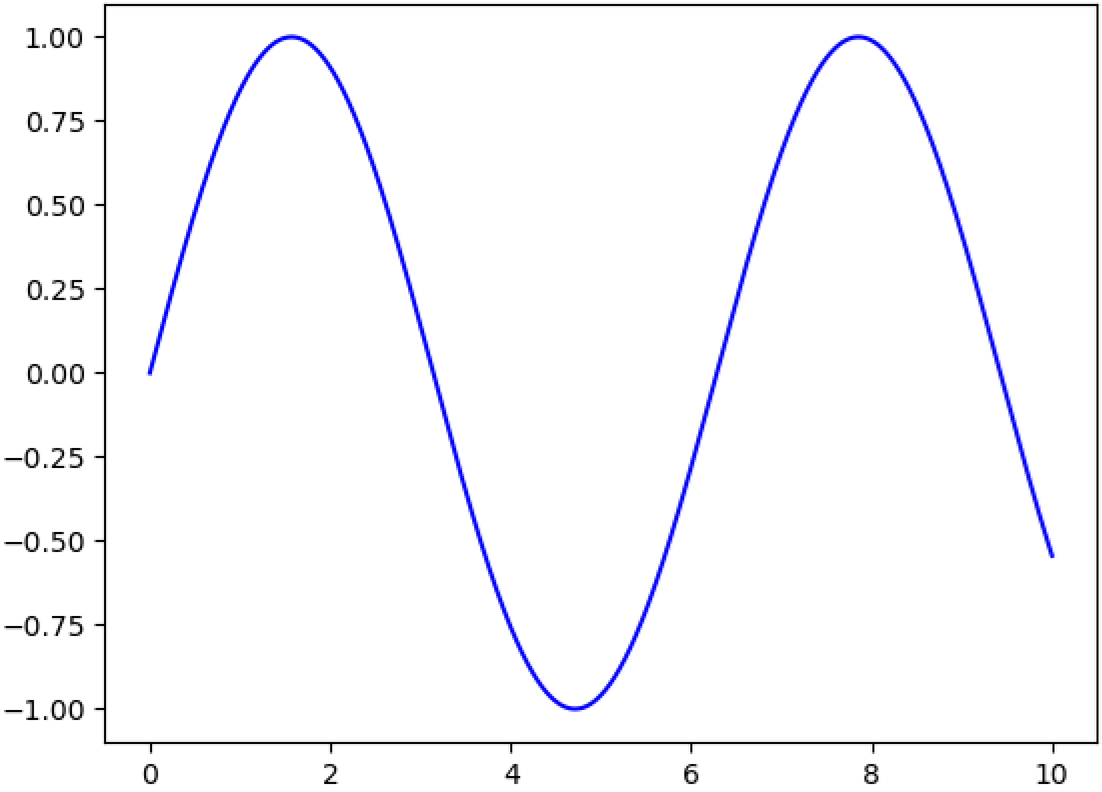
Out[28]:

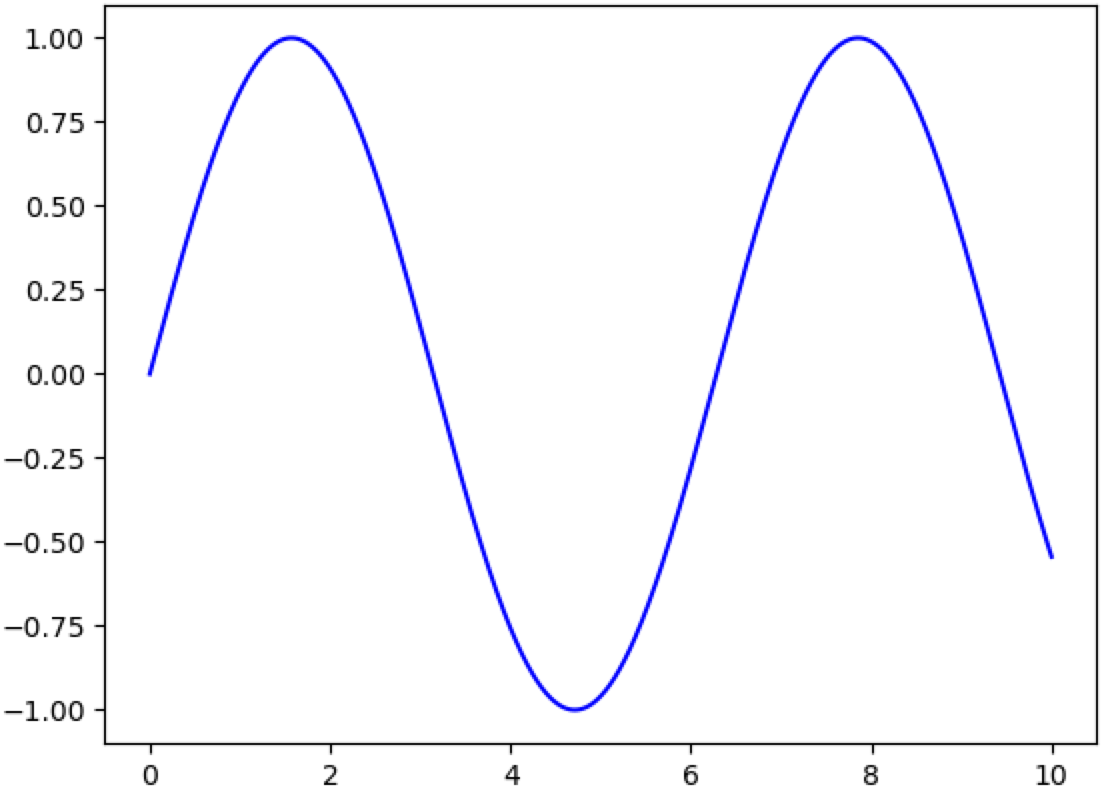


In [32]:

```
# Create figure and axes first
fig = plt.figure()

ax = plt.axes()

# Declare a variable x5
x5 = np.linspace(0, 10, 1000)


# Plot the sinusoid function
ax.plot(x5, np.sin(x5), 'b-');
plt.show()
```

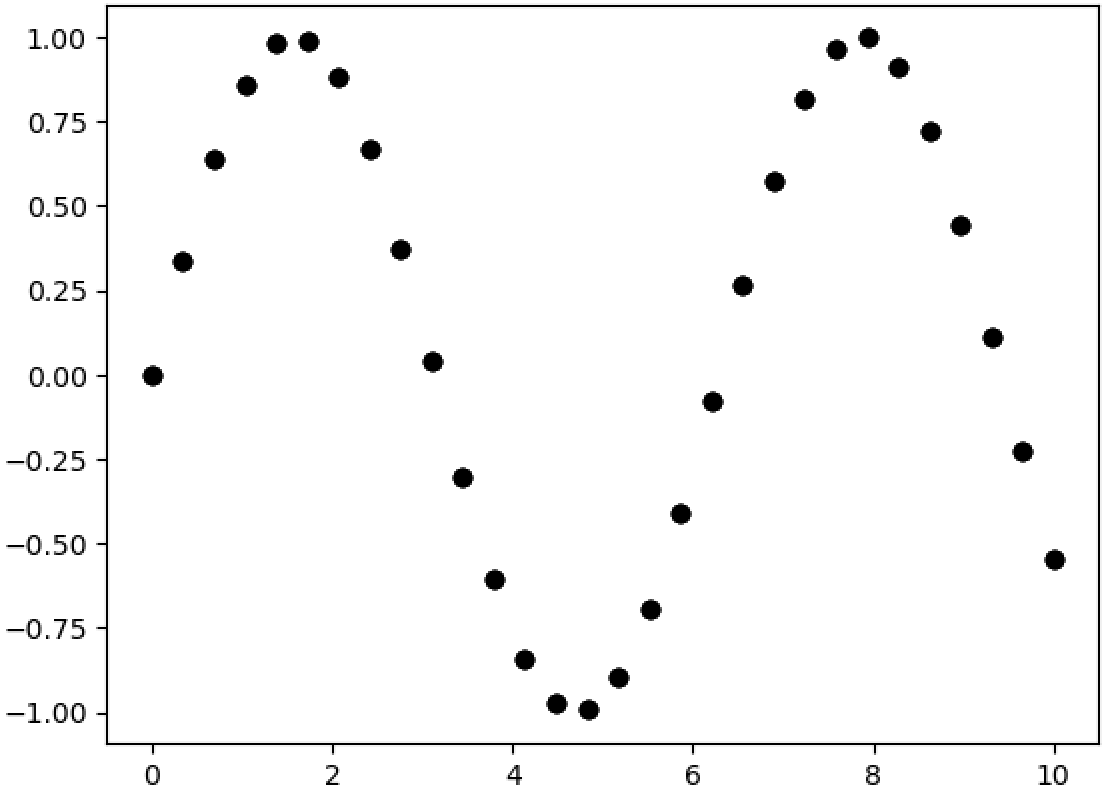

1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
0
2
4
6
8
10


1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
0
2
4
6
8
10



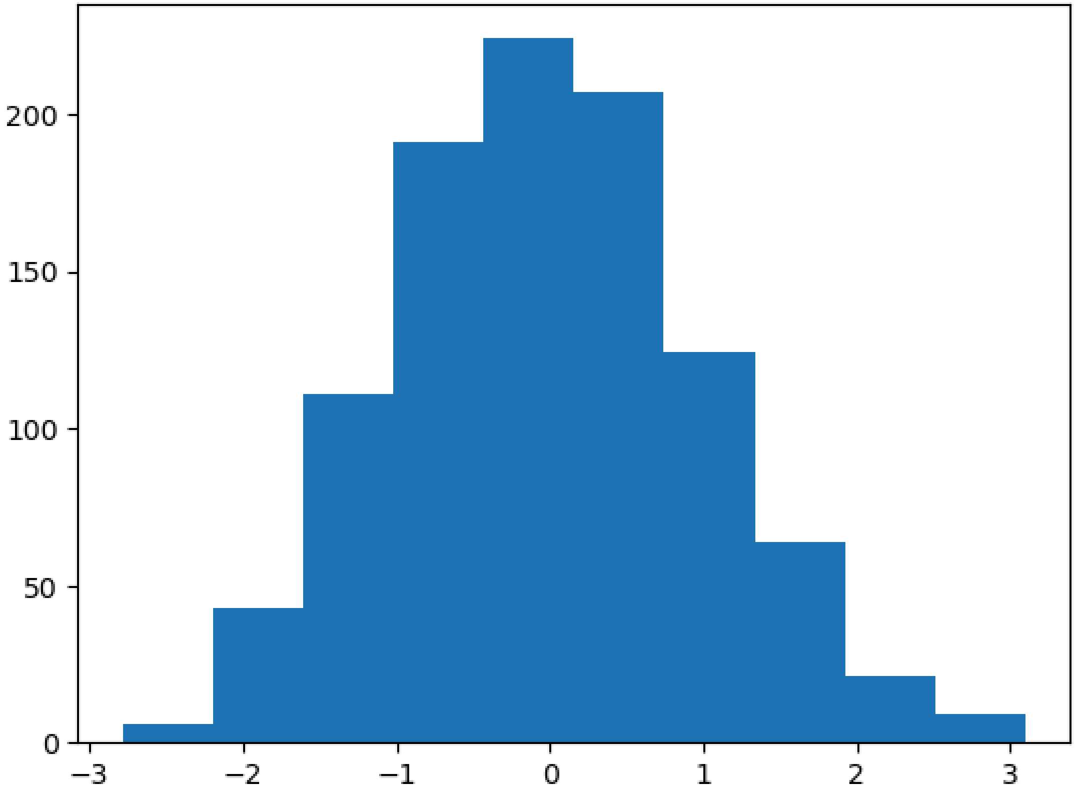
In [35]:

```
x7 = np.linspace(0, 10, 30)

y7 = np.sin(x7)

plt.plot(x7, y7, 'o', color = 'black');
plt.show()
```



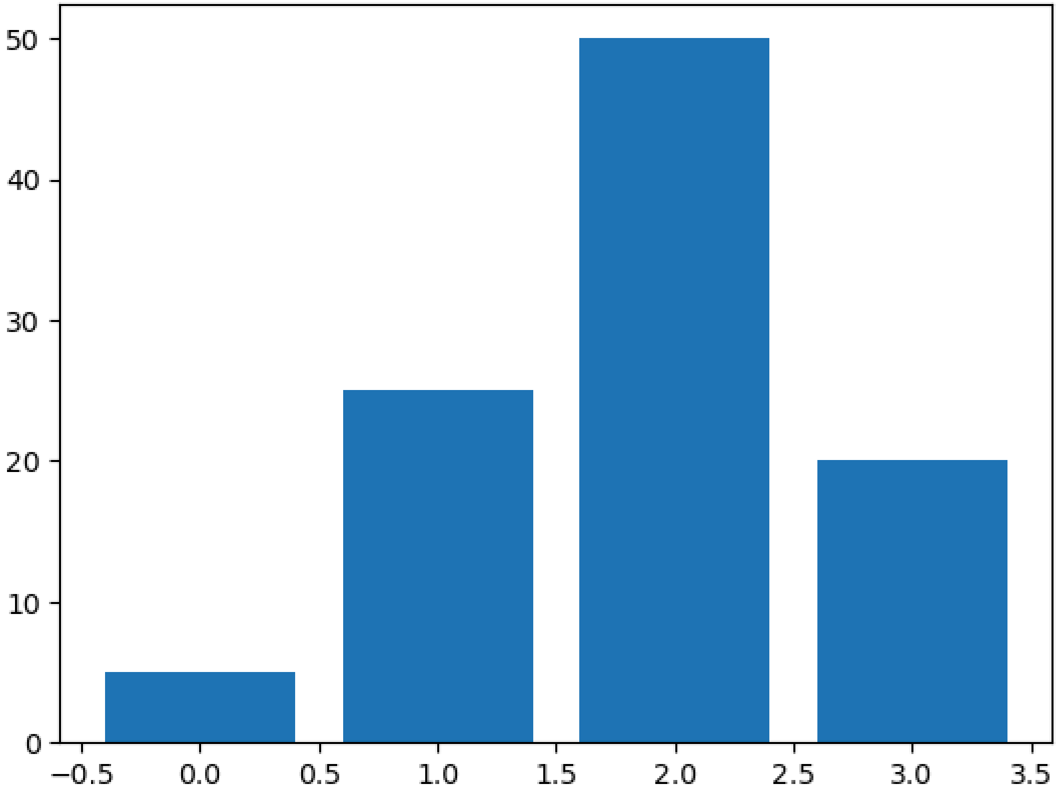
In [36]:

```
data1 = np.random.randn(1000)

plt.hist(data1);
plt.show()
```



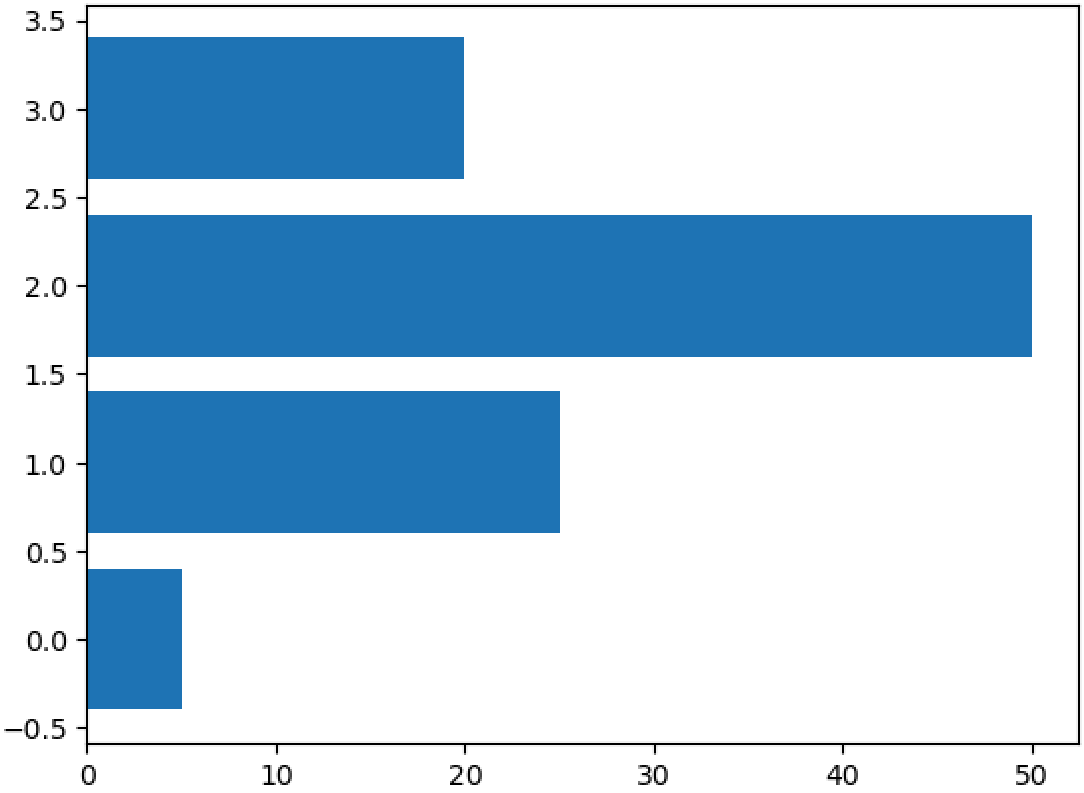
In [37]:

```
data2 = [5. , 25. , 50. , 20.]

plt.bar(range(len(data2)), data2)

plt.show()
```



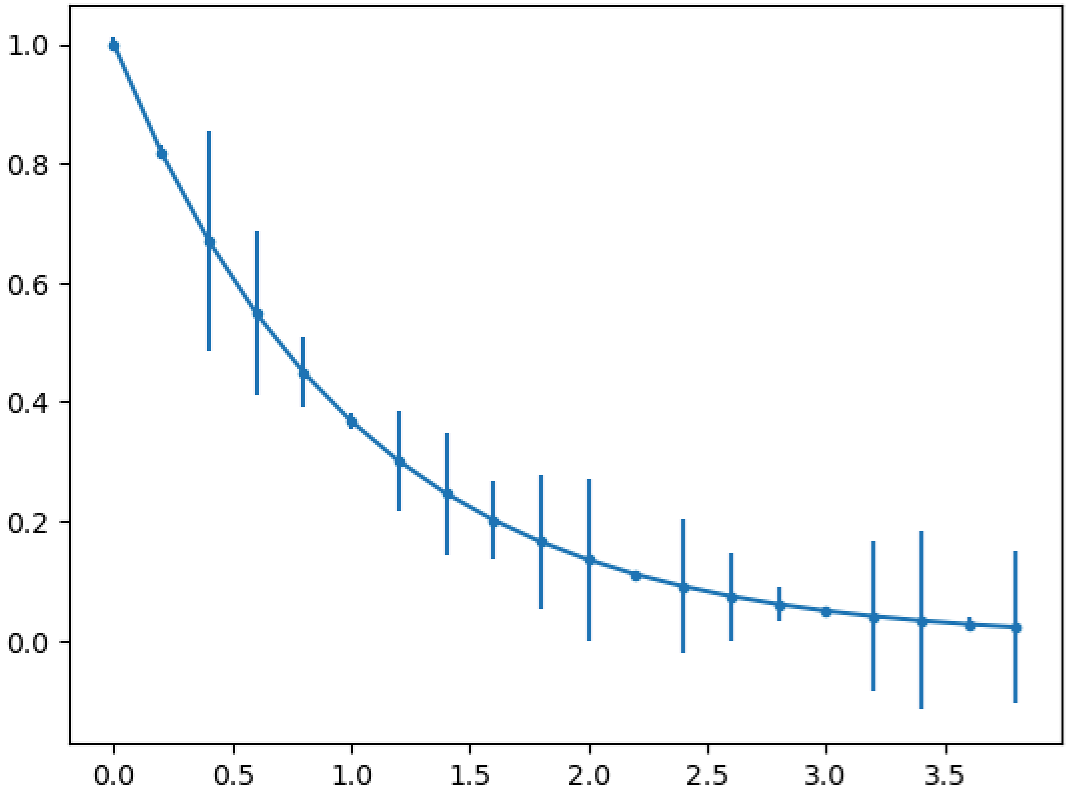
In [38]:

```
data2 = [5. , 25. , 50. , 20.]

plt.barh(range(len(data2)), data2)

plt.show()
```



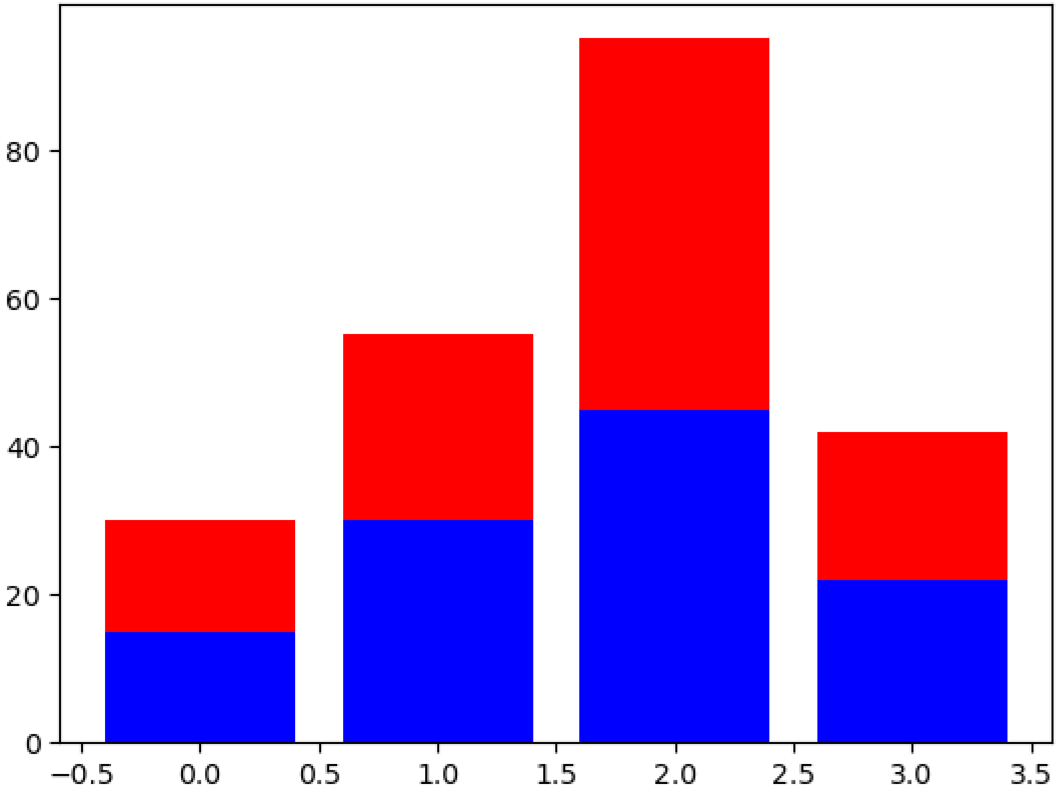
In [39]:

```
x9 = np.arange(0, 4, 0.2)

y9 = np.exp(-x9)

e1 = 0.1 * np.abs(np.random.randn(len(y9)))

plt.errorbar(x9, y9, yerr = e1, fmt = '.-')

plt.show();
```



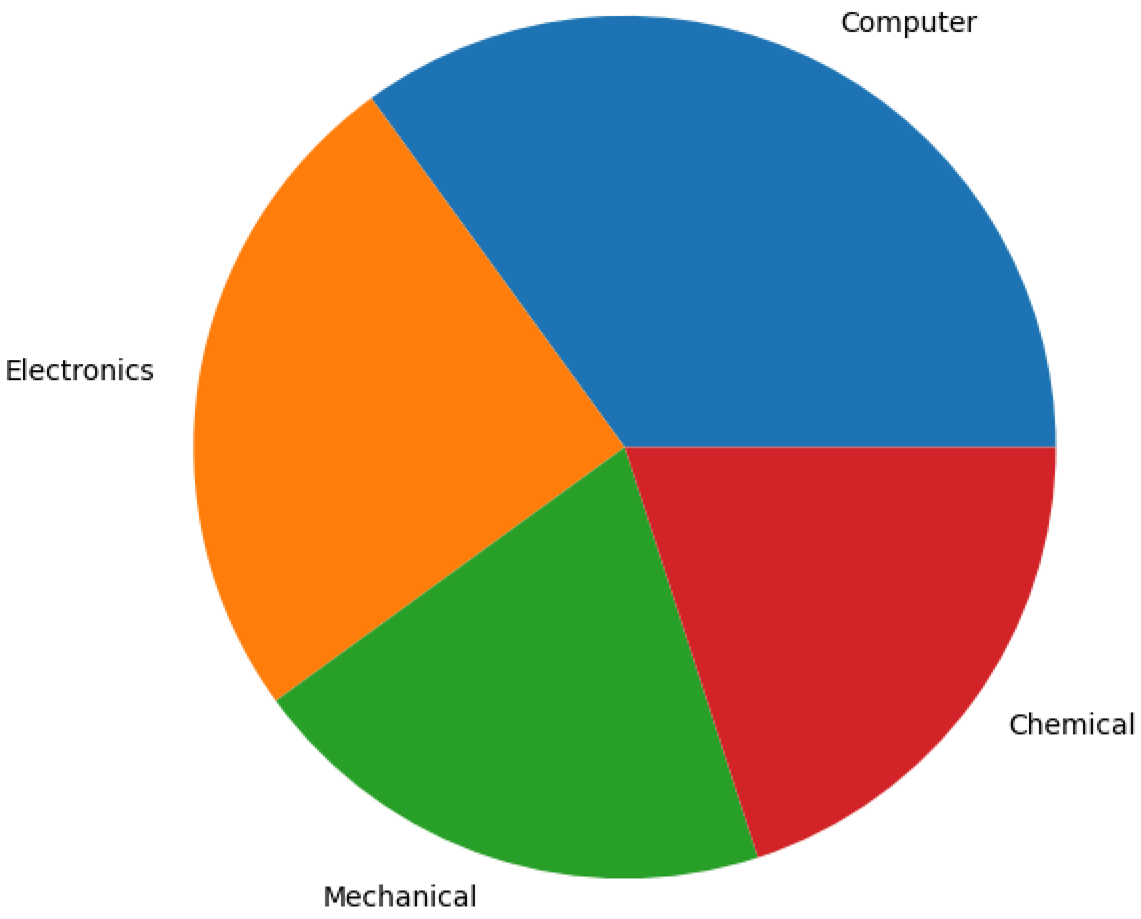
In [40]:

```
A = [15., 30., 45., 22.]

B = [15., 25., 50., 20.]

z2 = range(4)

plt.bar(z2, A, color = 'b')
plt.bar(z2, B, color = 'r', bottom = A)

plt.show()
```

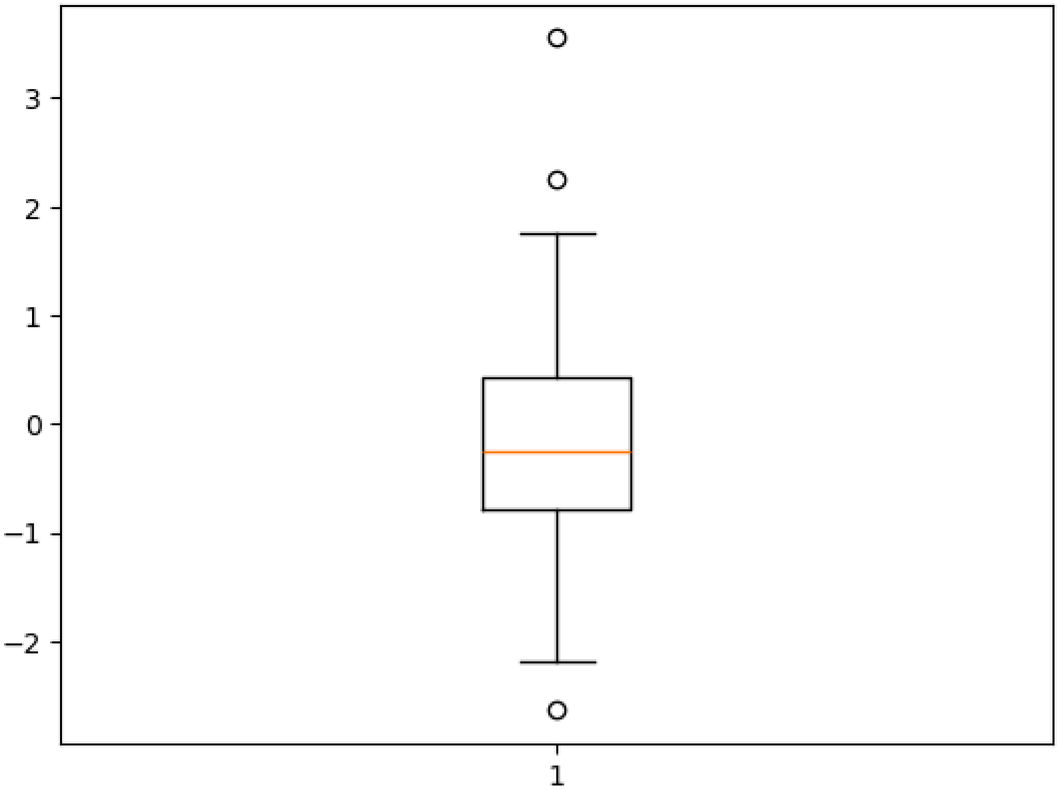


In [41]:

```
plt.figure(figsize=(7,7))

x10 = [35, 25, 20, 20]

labels = ['Computer', 'Electronics', 'Mechanical', 'Chemical']

plt.pie(x10, labels=labels);

plt.show()
```

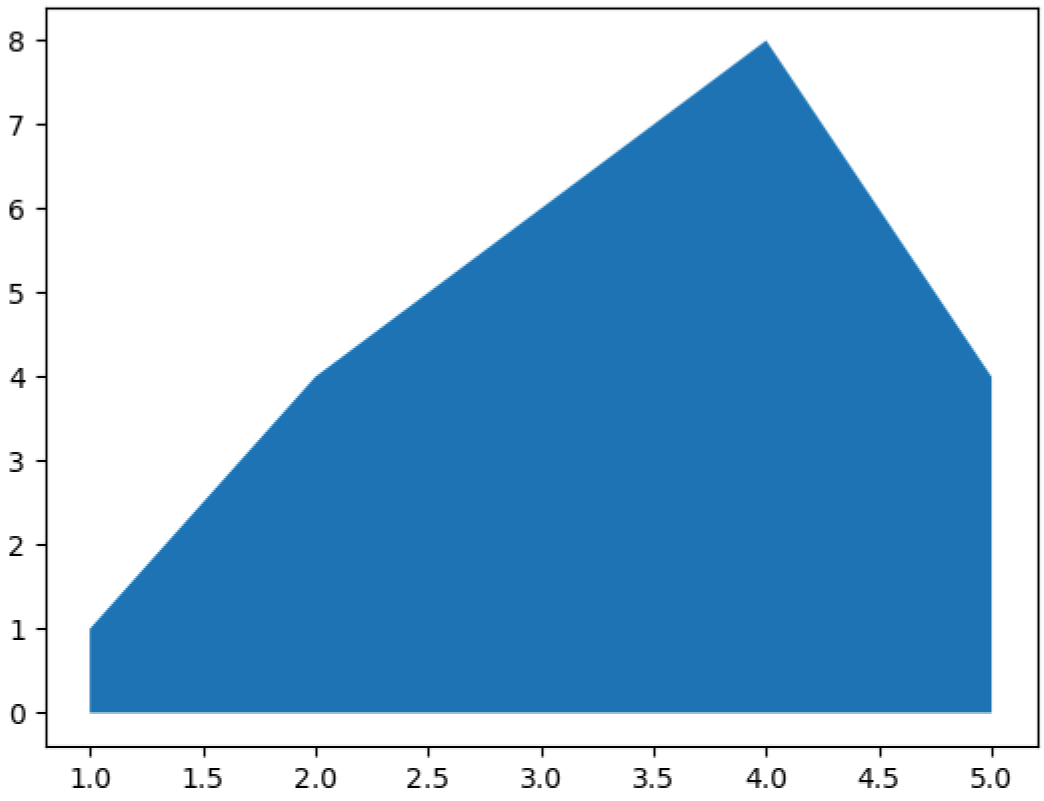


```
In [42]: data3 = np.random.randn(100)

         plt.boxplot(data3)

         plt.show();
```



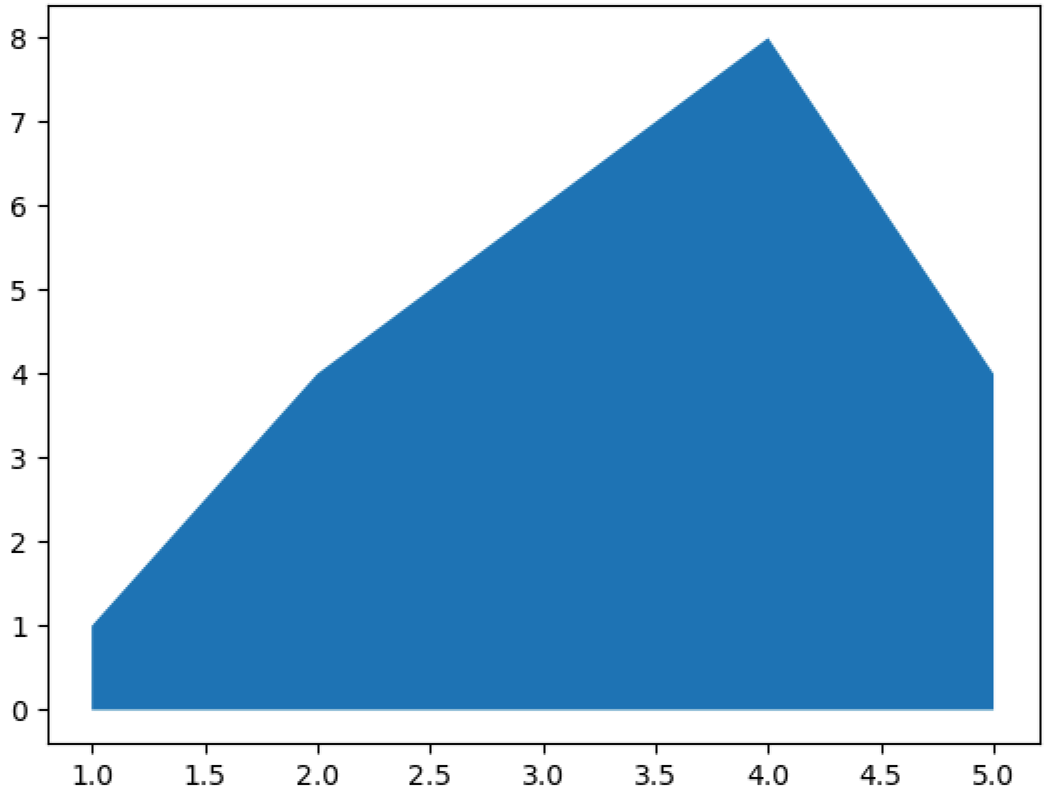
In [43]:

```
# Create some data
x12 = range(1, 6)
y12 = [1, 4, 6, 8, 4]

# Area plot
plt.fill_between(x12, y12)
plt.show()
```



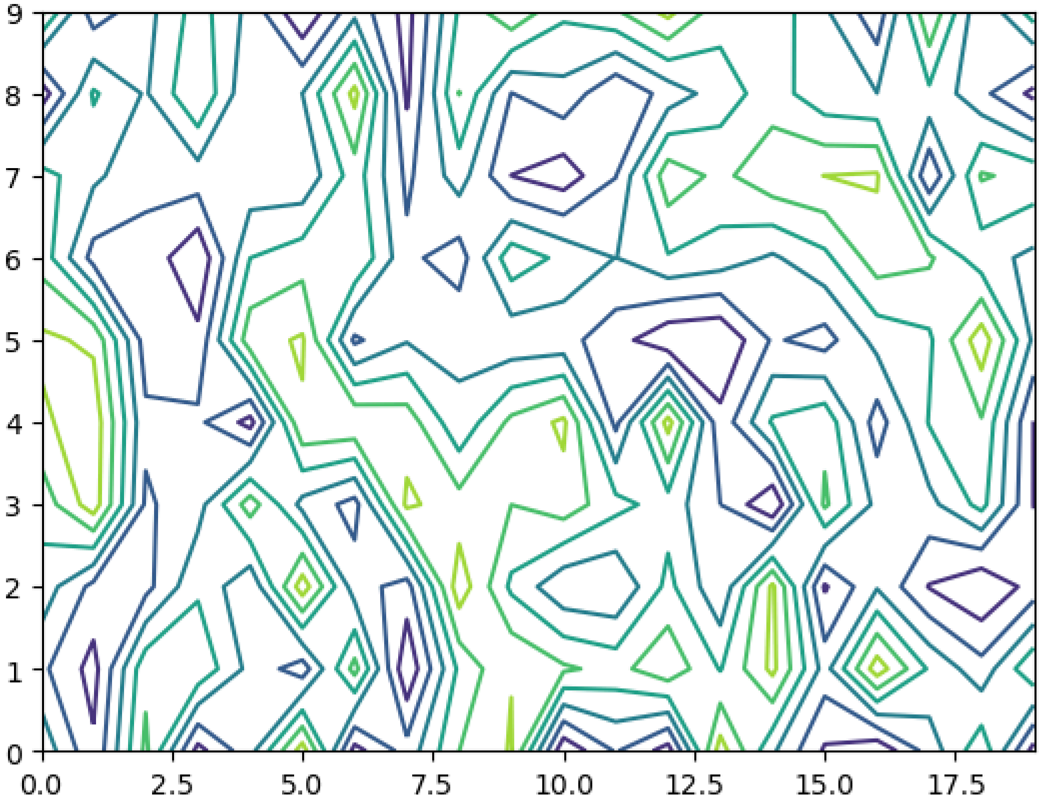
In [44]:

```
# Create some data
x12 = range(1, 6)
y12 = [1, 4, 6, 8, 4]

# Area plot
plt.fill_between(x12, y12)
plt.show()
```



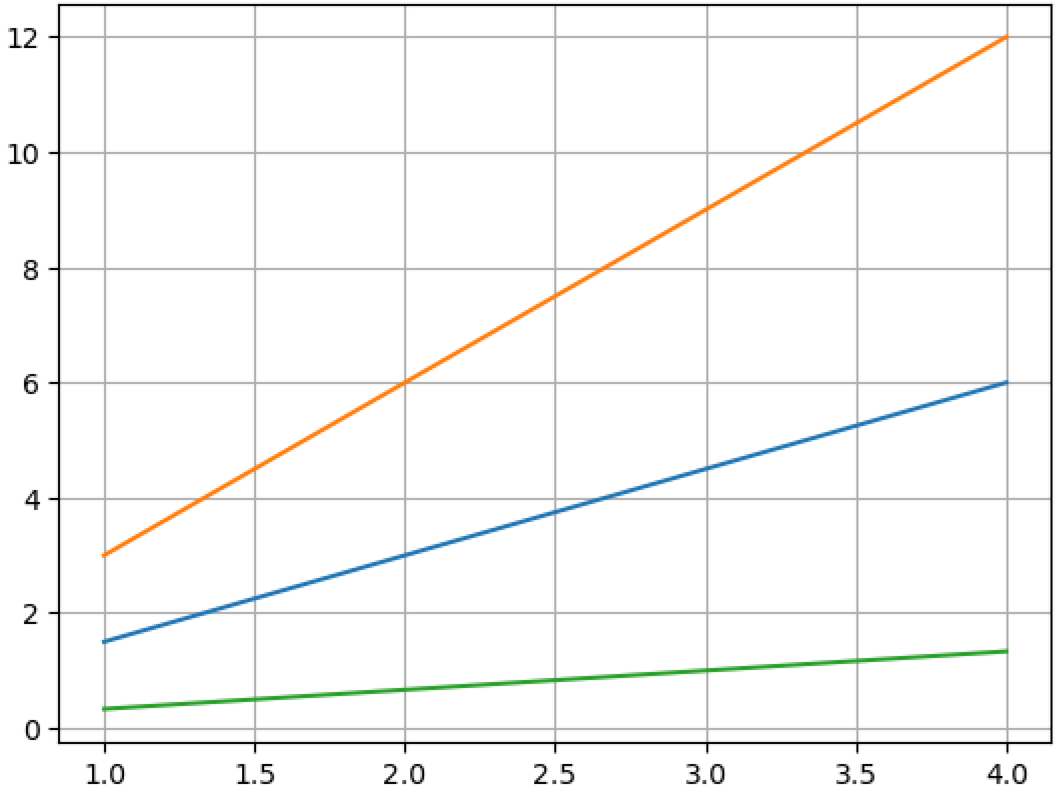
In [45]:

```
# Create a matrix
matrix1 = np.random.rand(10, 20)

cp = plt.contour(matrix1)

plt.show()
```



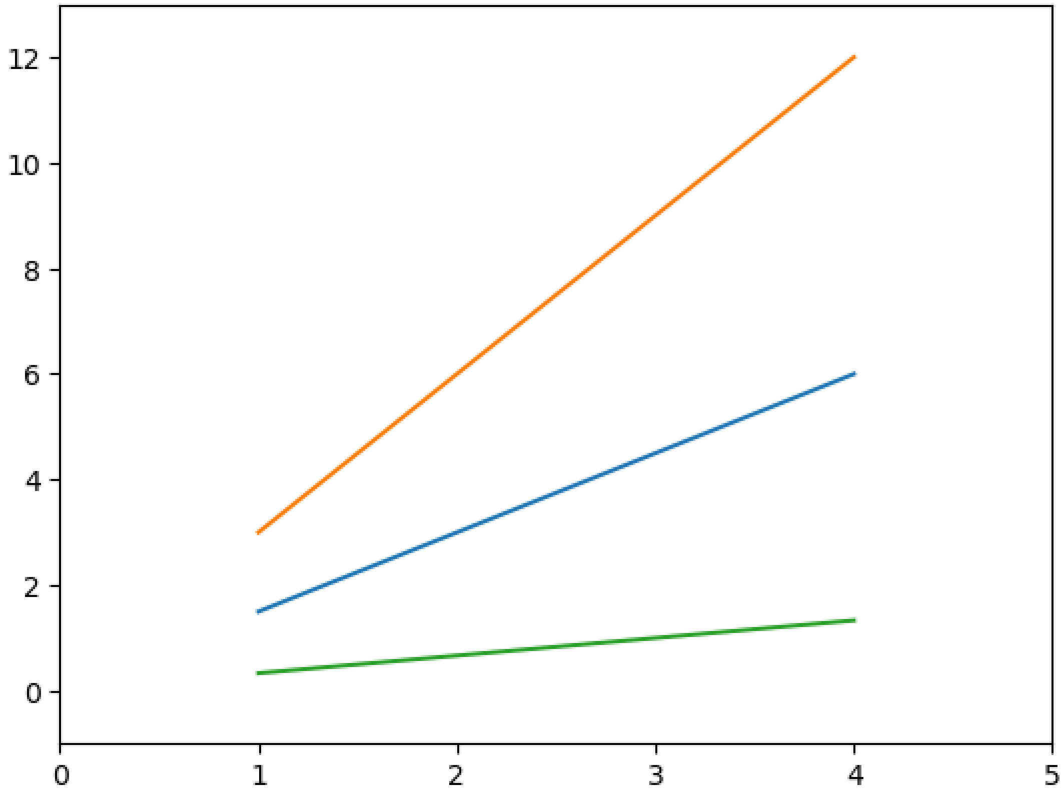
In [46]:

```
x15 = np.arange(1, 5)

plt.plot(x15, x15*1.5, x15, x15*3.0, x15, x15/3.0)

plt.grid(True)

plt.show()
```

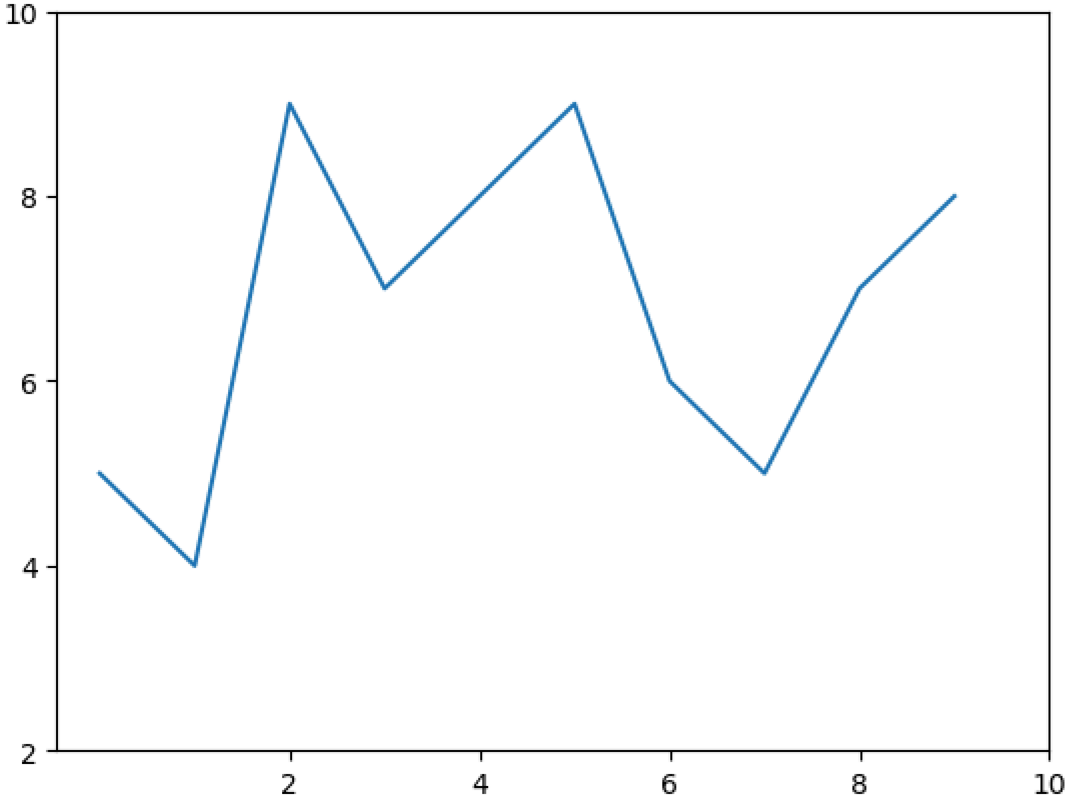


In [48]:

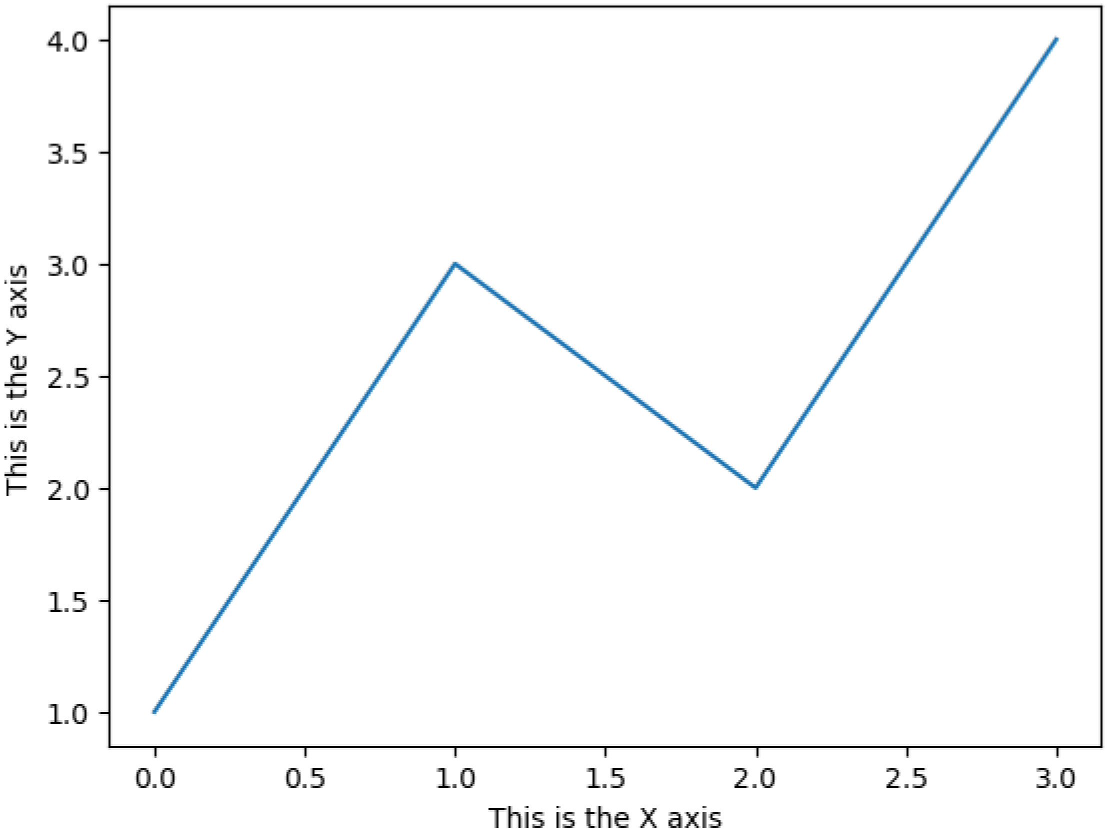
```
x15 = np.arange(1, 5)

plt.plot(x15, x15*1.5, x15, x15*3.0, x15, x15/3.0)

plt.axis()   # shows the current axis limits values

plt.axis([0, 5, -1, 13])

plt.show()
```



In [49]:
```
u = [5, 4, 9, 7, 8, 9, 6, 5, 7, 8]

plt.plot(u)

plt.xticks([2, 4, 6, 8, 10])
plt.yticks([2, 4, 6, 8, 10])

plt.show()
```

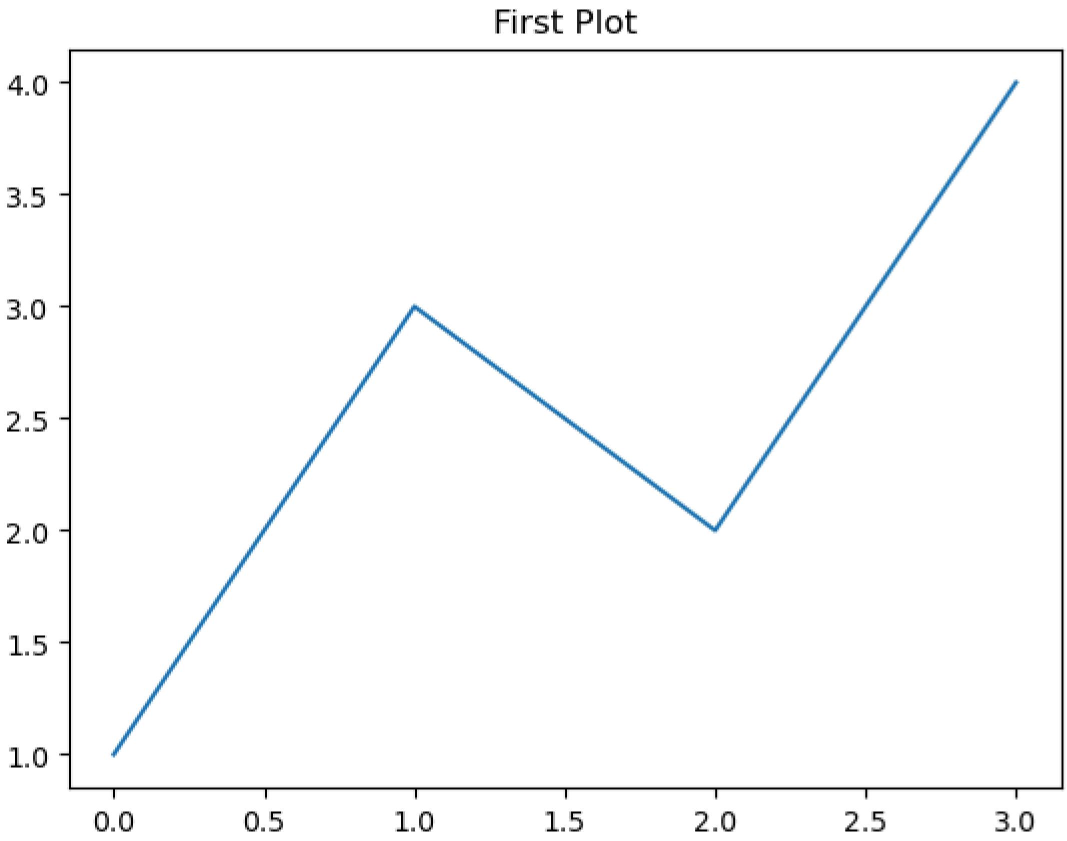


```
In [50]: plt.plot([1, 3, 2, 4])

plt.xlabel('This is the X axis')

plt.ylabel('This is the Y axis')

plt.show()
```



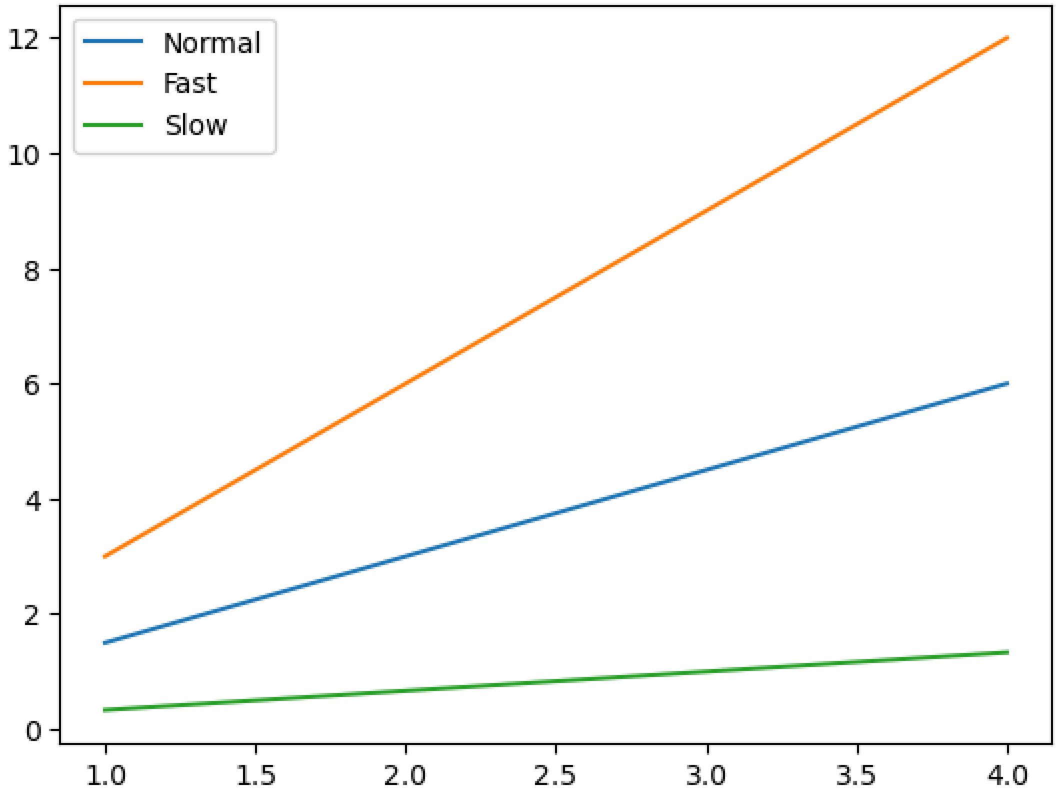
In [51]:

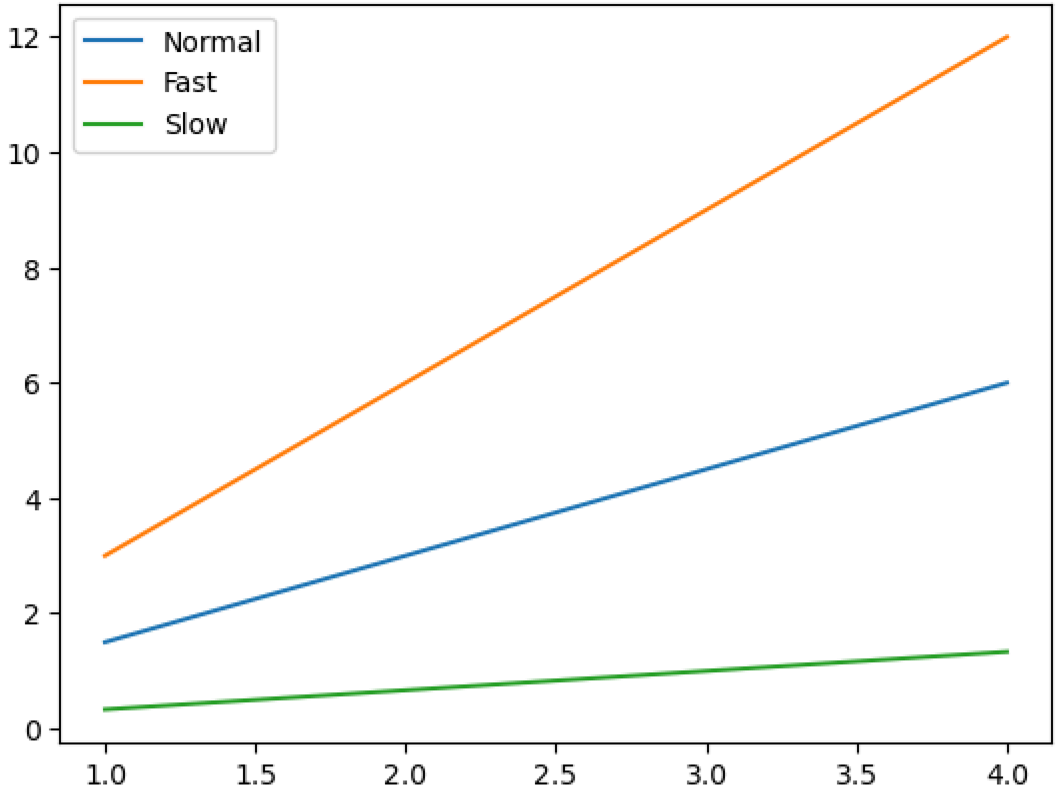
```
plt.plot([1, 3, 2, 4])

plt.title('First Plot')

plt.show()
```

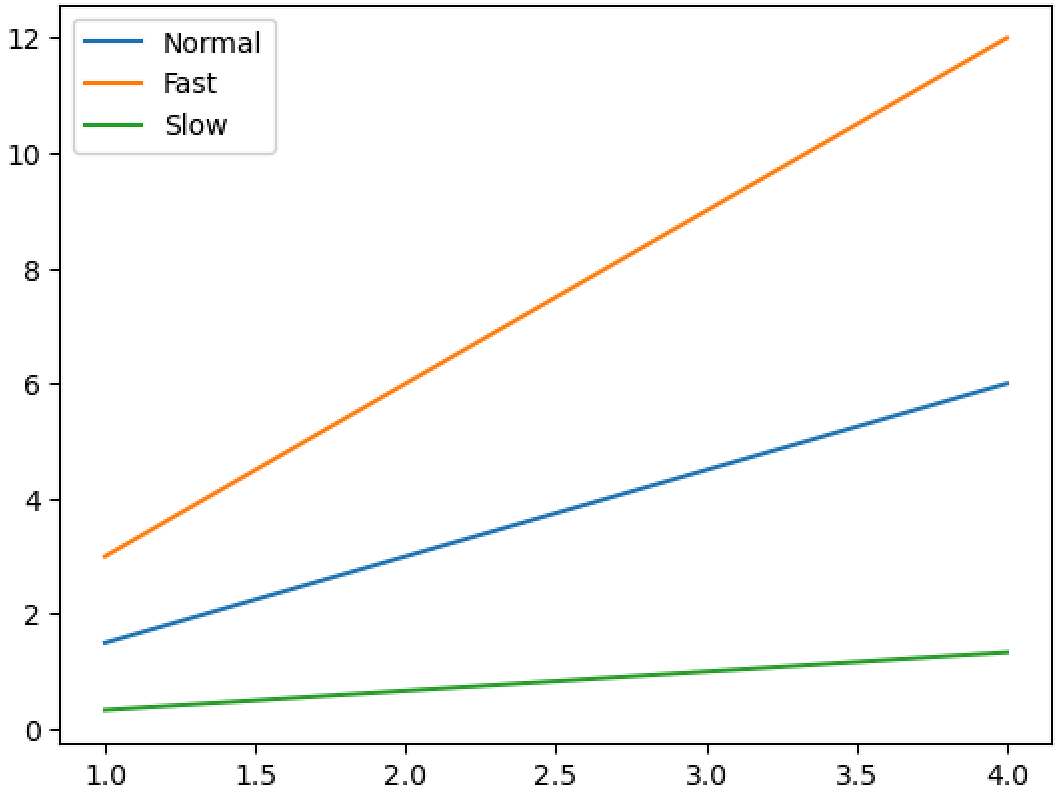


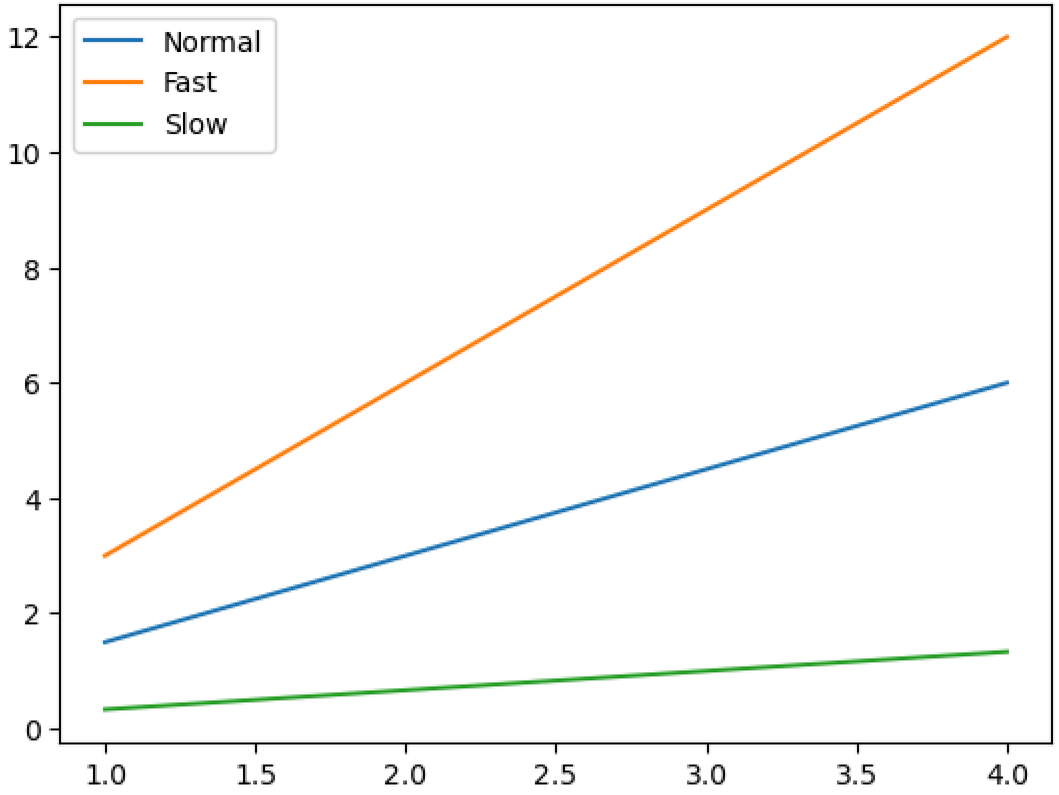
In [56]:

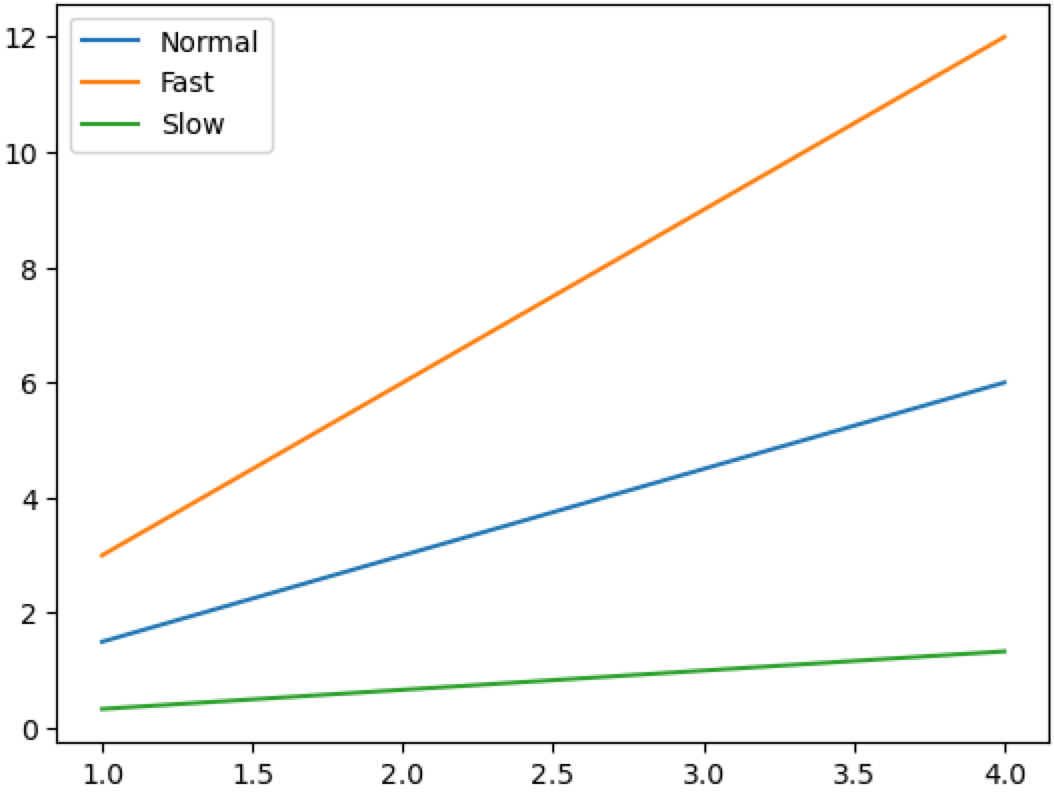
```
x15 = np.arange(1, 5)

fig, ax = plt.subplots()

ax.plot(x15, x15*1.5)
ax.plot(x15, x15*3.0)
ax.plot(x15, x15/3.0)

ax.legend(['Normal','Fast','Slow']);
plt.show()
```


Normal
Fast
Slow
0
2
4
6
8
10
12
1.0
1.5
2.0
2.5
3.0
3.5
4.0


Normal
Fast
Slow
0
2
4
6
8
10
12
1.0
1.5
2.0
2.5
3.0
3.5
4.0

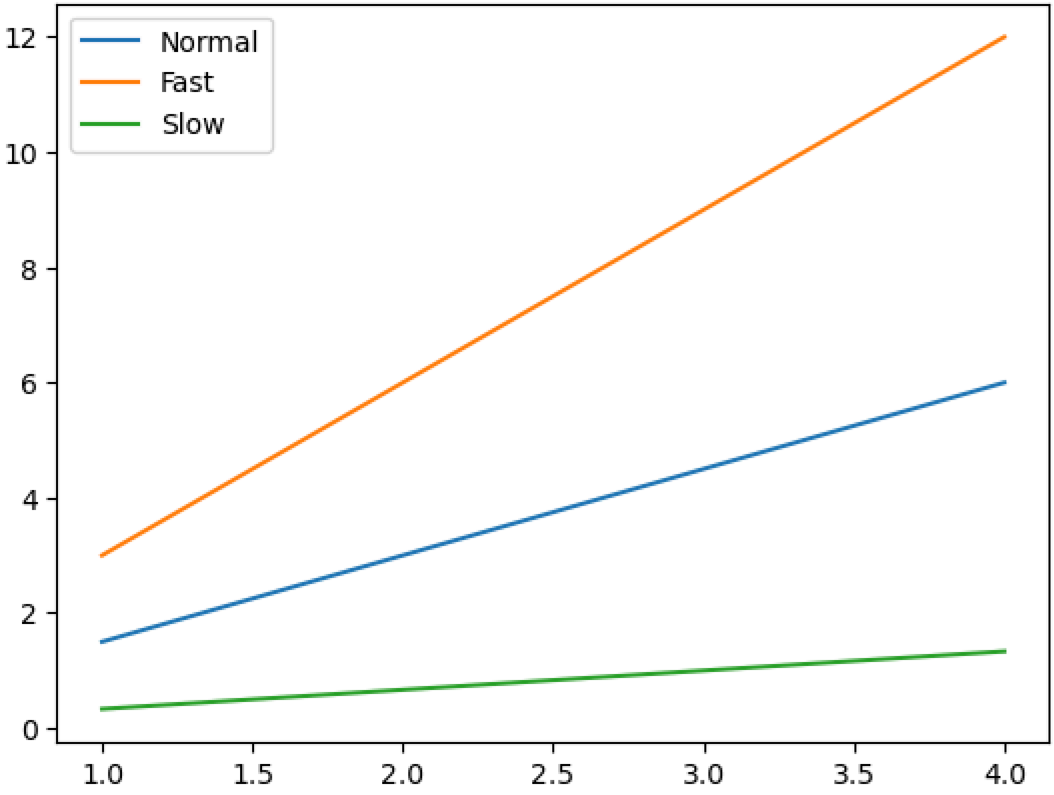

Normal
Fast
Slow
0
2
4
6
8
10
12
1.0
1.5
2.0
2.5
3.0
3.5
4.0


Normal
Fast
Slow
0
2
4
6
8
10
12
1.0
1.5
2.0
2.5
3.0
3.5
4.0

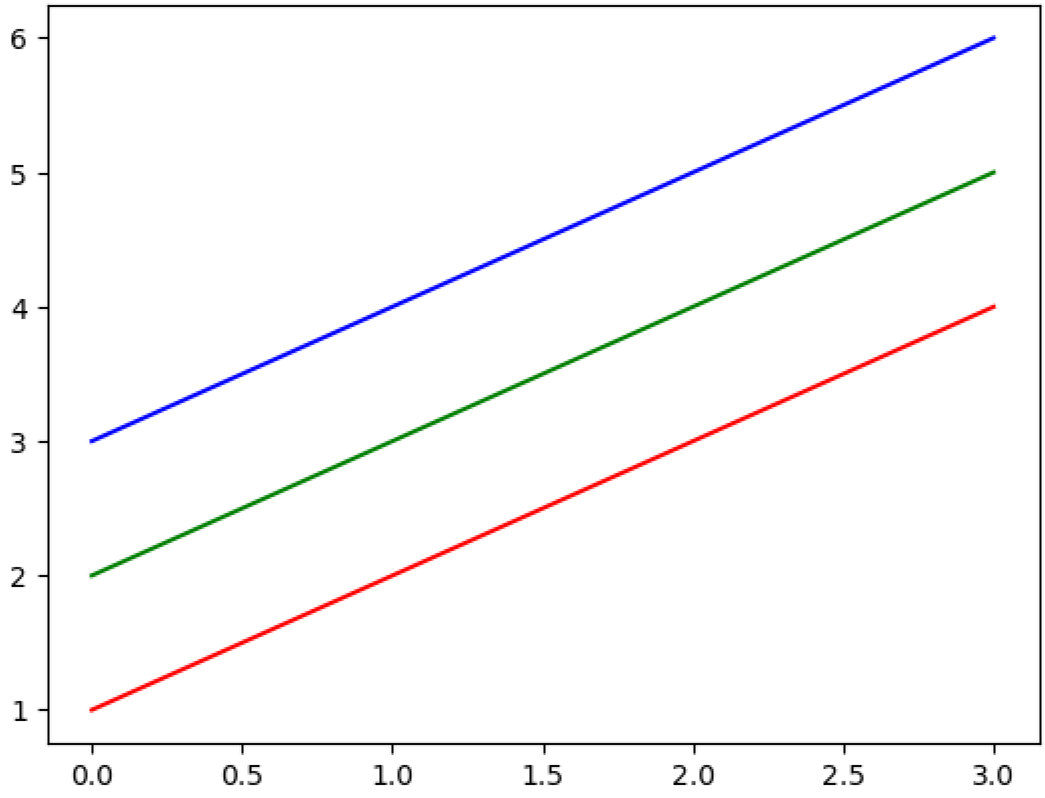


In [57]:

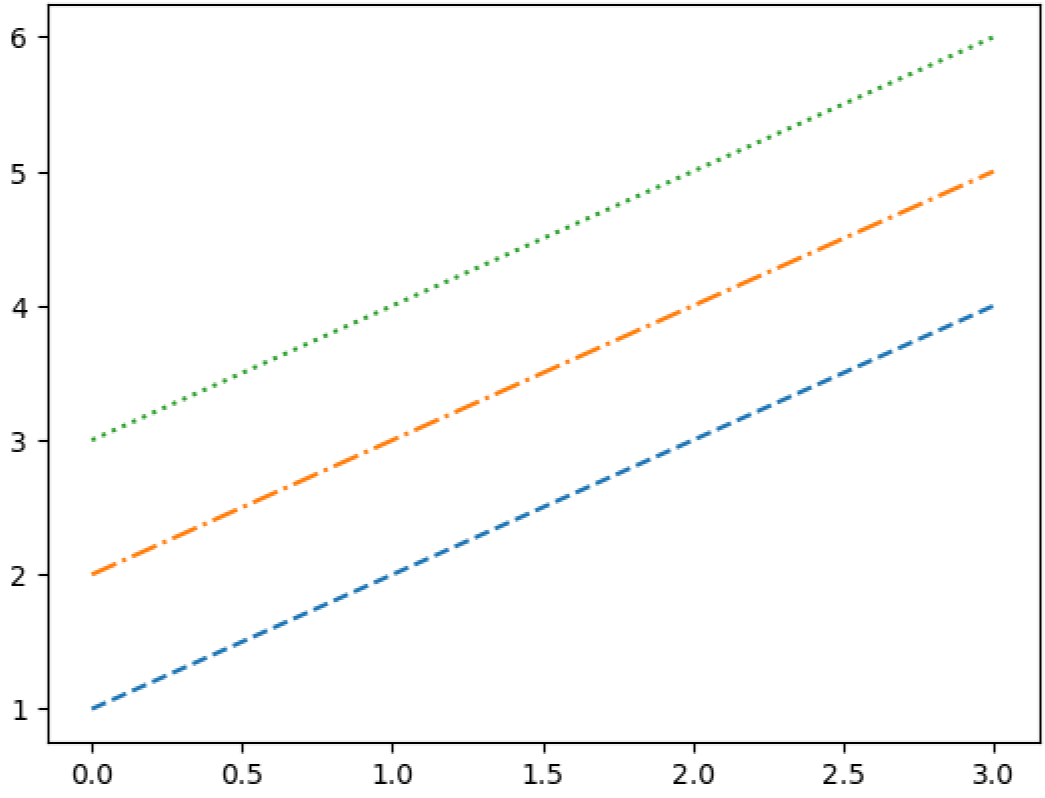
```
x15 = np.arange(1, 5)

fig, ax = plt.subplots()

ax.plot(x15, x15*1.5, label='Normal')
ax.plot(x15, x15*3.0, label='Fast')
ax.plot(x15, x15/3.0, label='Slow')

ax.legend();
plt.show()
```



In [58]:
```
x16 = np.arange(1, 5)

plt.plot(x16, 'r')
plt.plot(x16+1, 'g')
plt.plot(x16+2, 'b')

plt.show()
```



In [59]:
```
x16 = np.arange(1, 5)

plt.plot(x16, '--', x16+1, '-.', x16+2, ':')

plt.show()
```


6
5
4
3
2
1
0.0
0.5
1.0
1.5
2.0
2.5
3.0