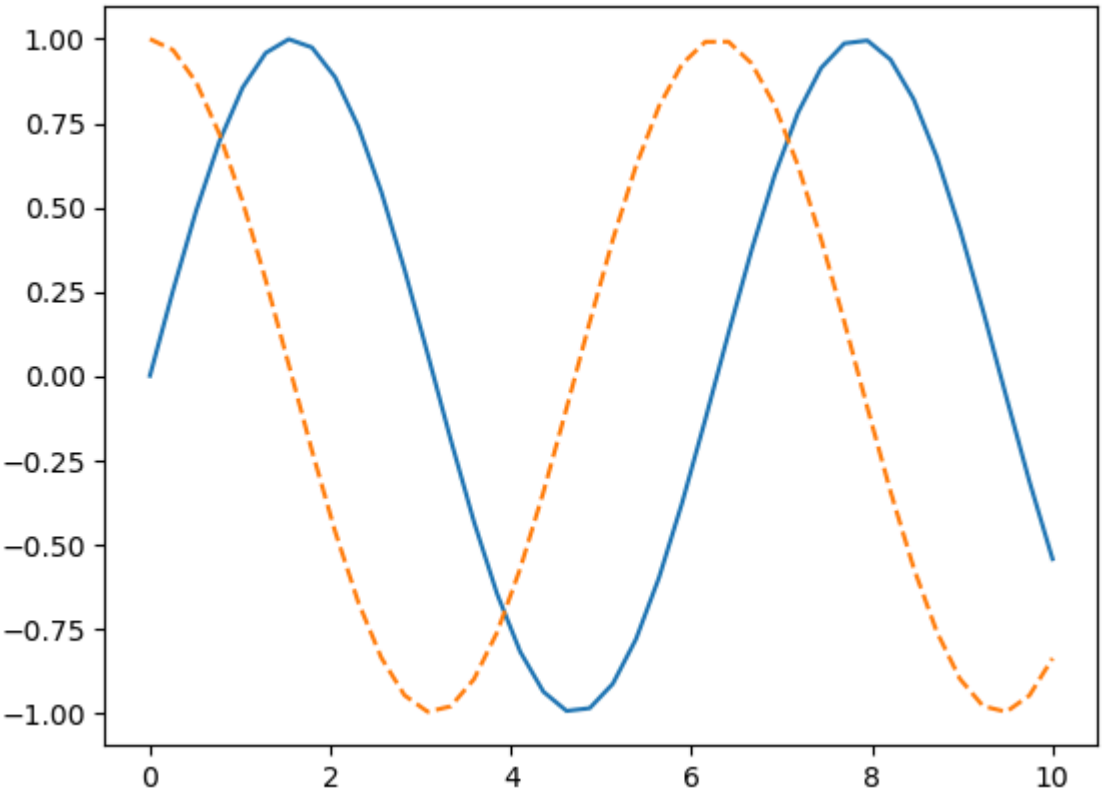
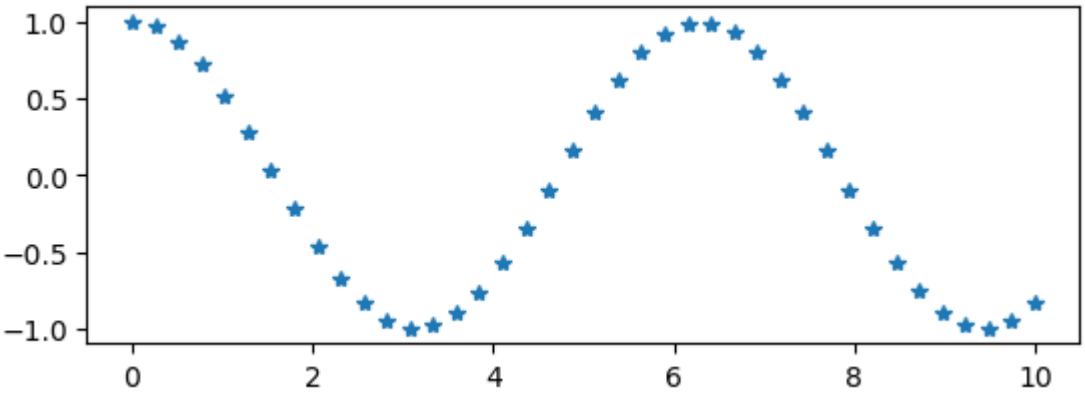
In [1]:
```
import numpy as np
```

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

In [5]:
```
%matplotlib inline
x1 = np.linspace(0, 10, 40)# create a plot figure
plt.plot(x1, np.sin(x1), '-')#fig = plt.figure()
plt.plot(x1, np.cos(x1), '--')
#plt.plot(x1, np.tan(x1), '--')
plt.show()
```

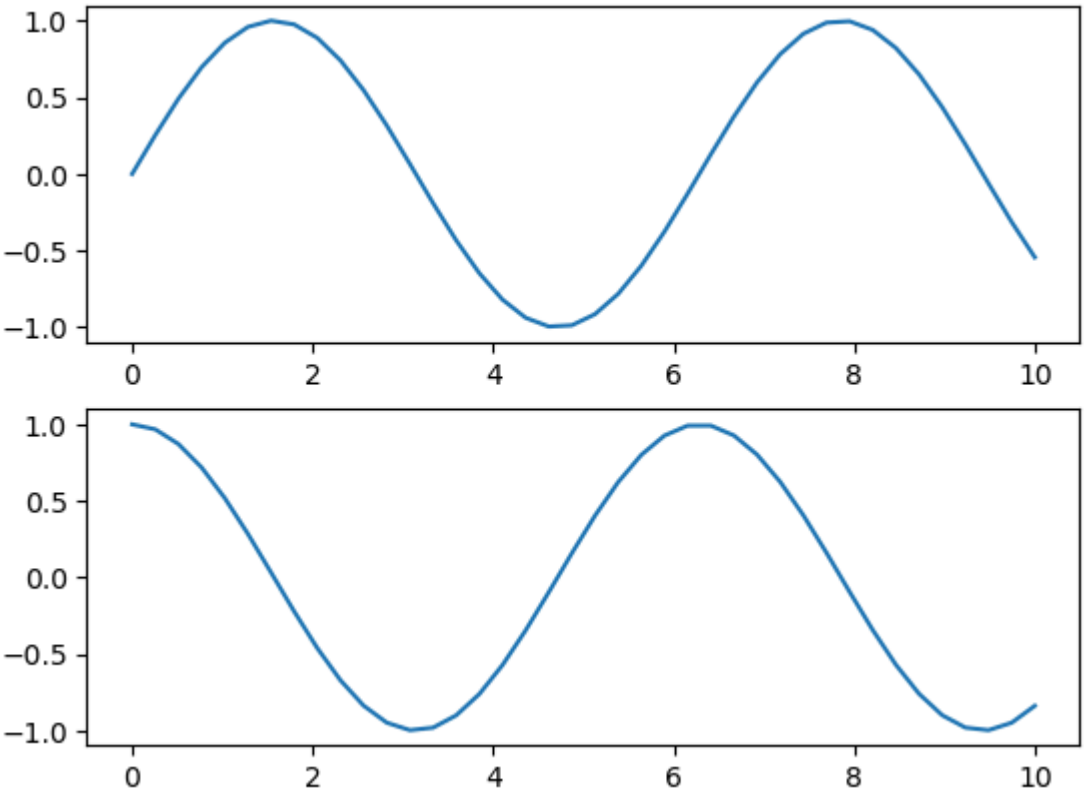


In [6]:
```
# create the first of two panels and set current axis
plt.subplot(2, 1, 1) # (rows, columns, panel number)
plt.plot(x1, np.cos(x1), '*')
plt.show()
```



In [7]:
```
# 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()
```

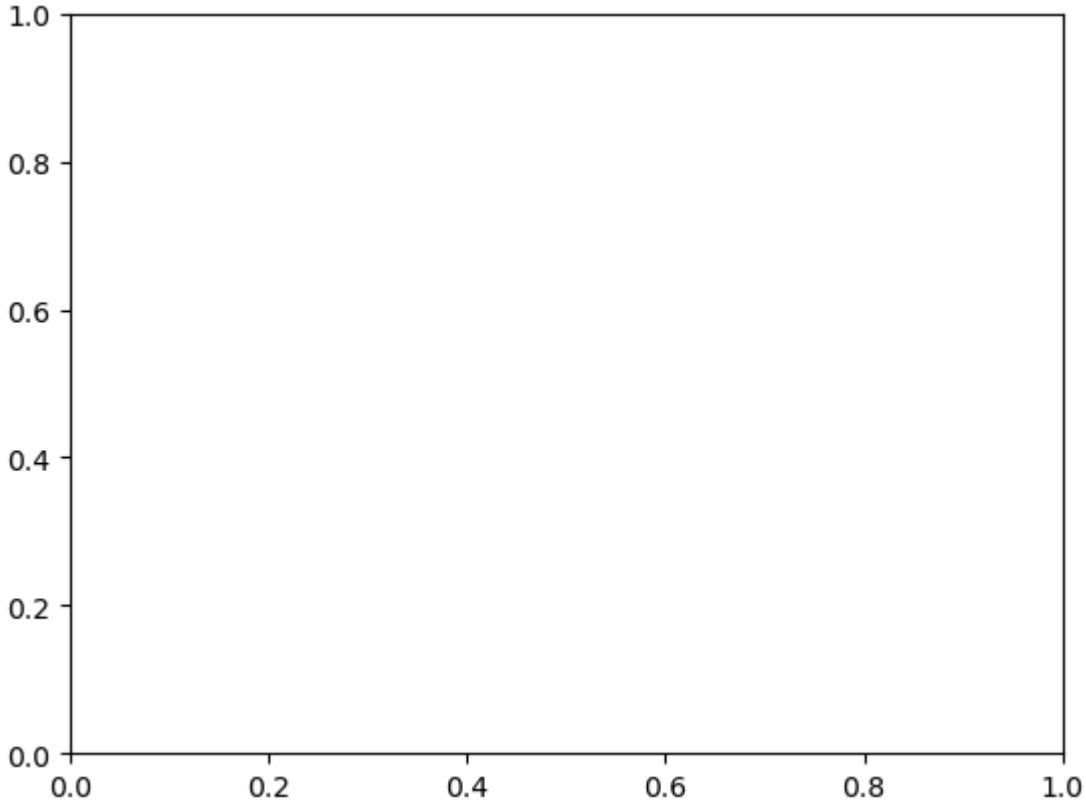


In [8]:
```
print(plt.gcf())
```

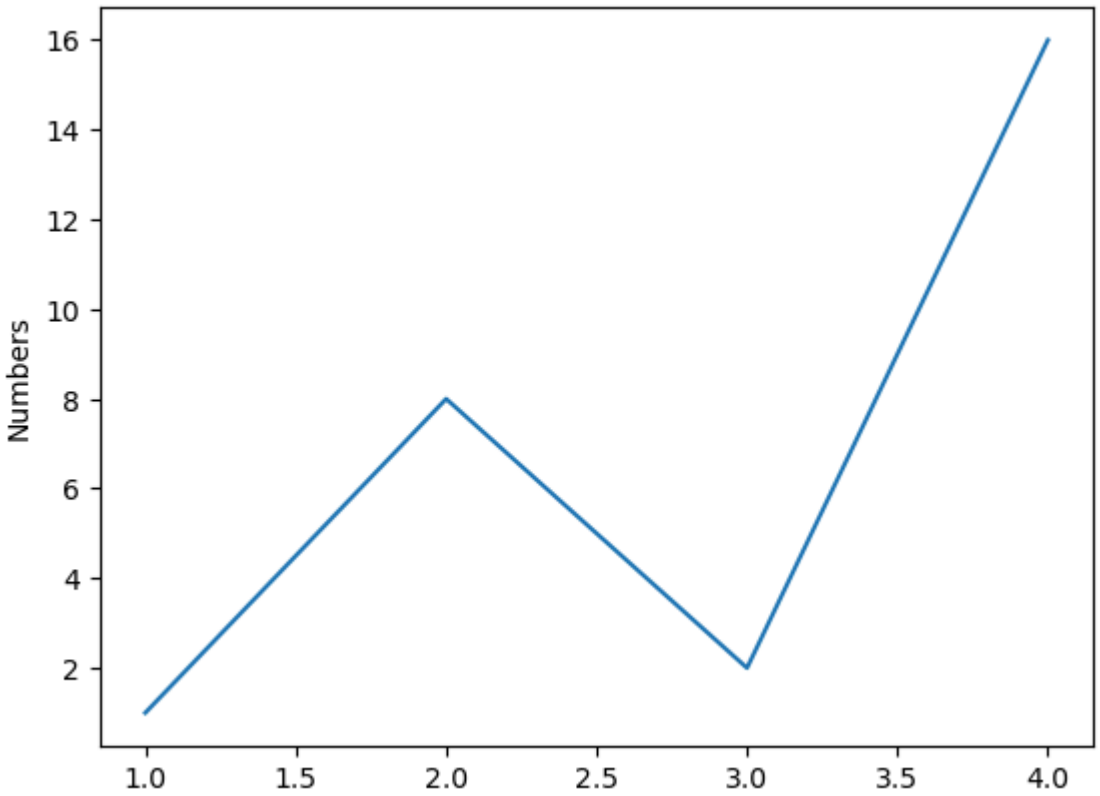
```
Figure(640x480)
```

In [9]:
```
# get current axis information
print(plt.gca())
plt.show()
```

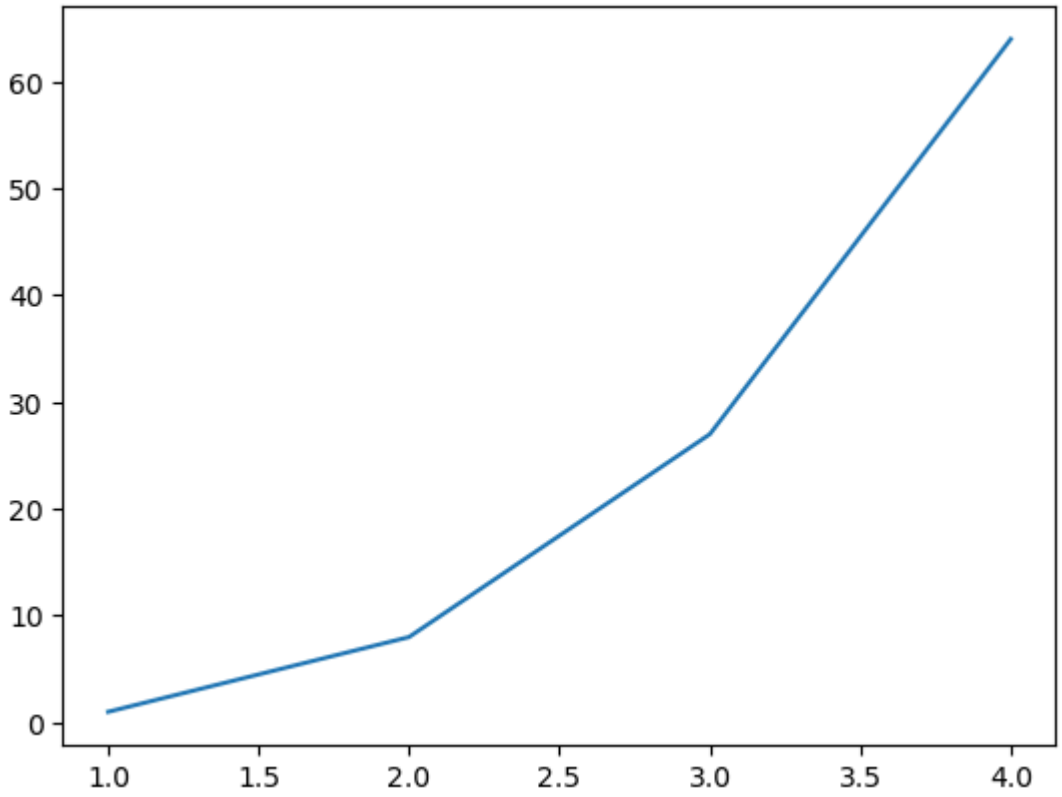
```
Axes(0.125,0.11;0.775x0.77)
```



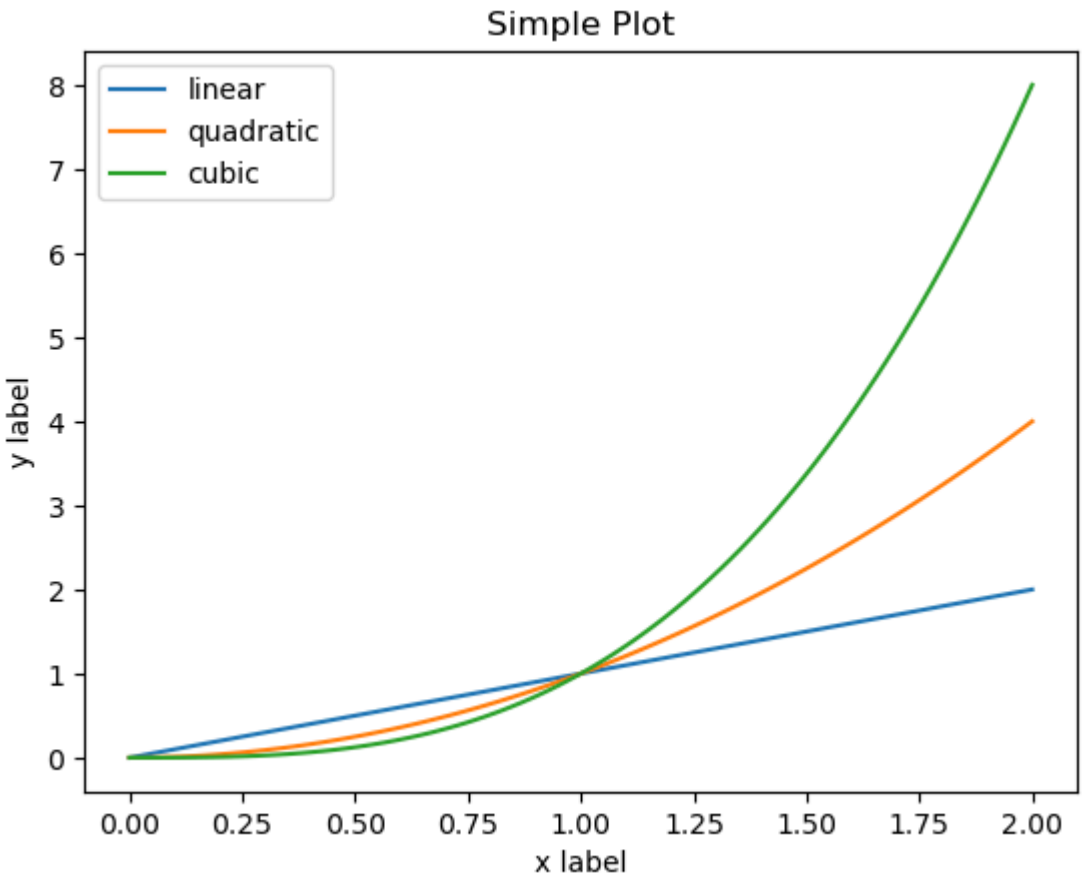
In [10]:
```
plt.plot([1,2,3,4], [1,8,2,16])
plt.ylabel('Numbers')
plt.show()
```



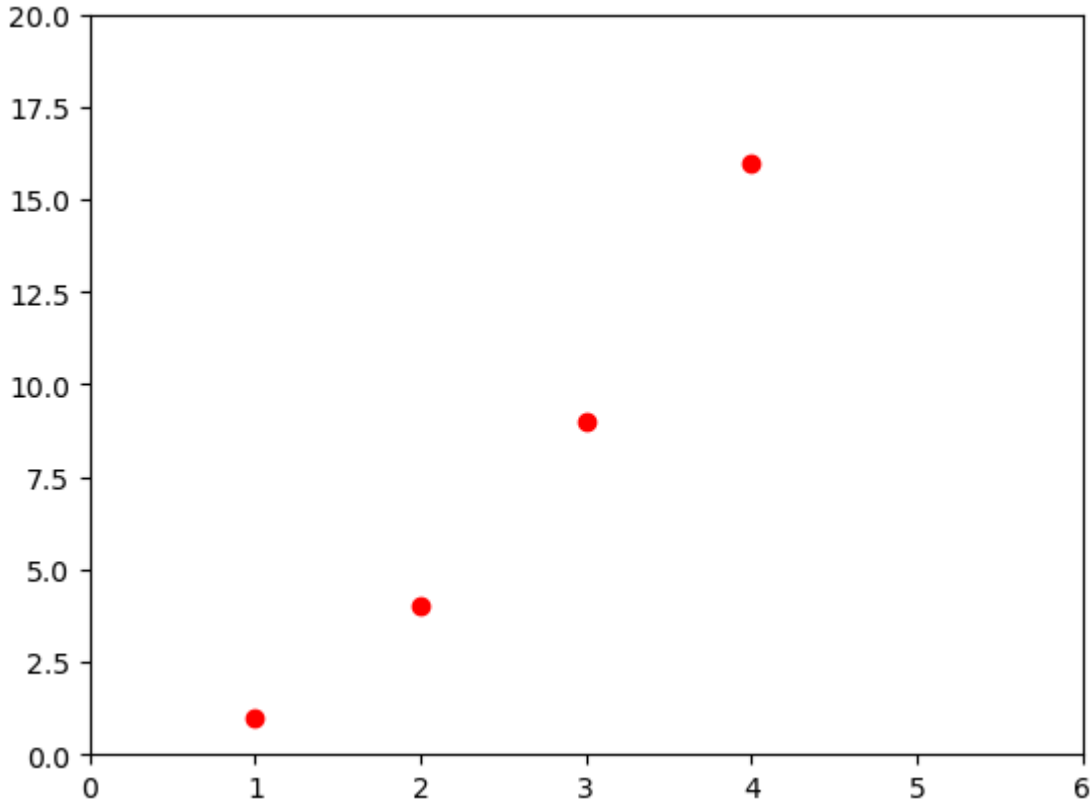
In [11]:
```
import matplotlib.pyplot as plt
plt.plot([1, 2, 3, 4], [1, 8, 27, 64])
plt.show()
```



In [12]:
```
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()
```

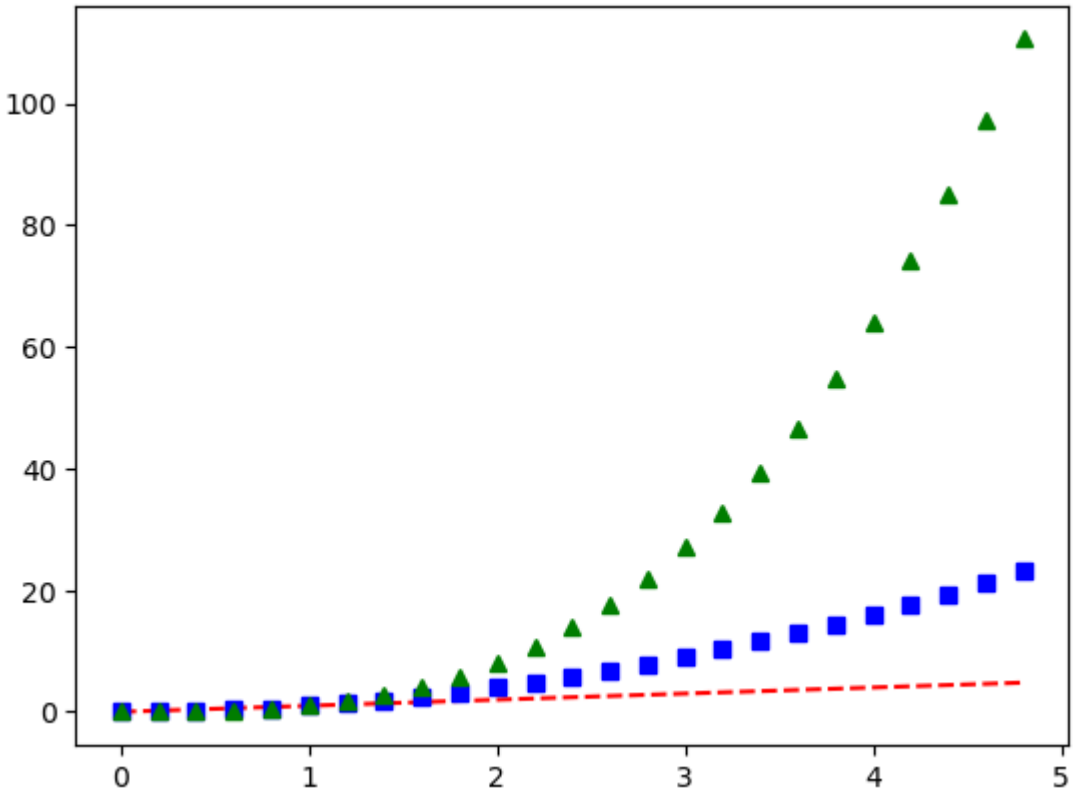


In [14]:
```
plt.plot([1, 2, 3, 4], [1, 4, 9, 16], 'ro')
plt.axis([0, 6, 0, 20])
plt.show()
```

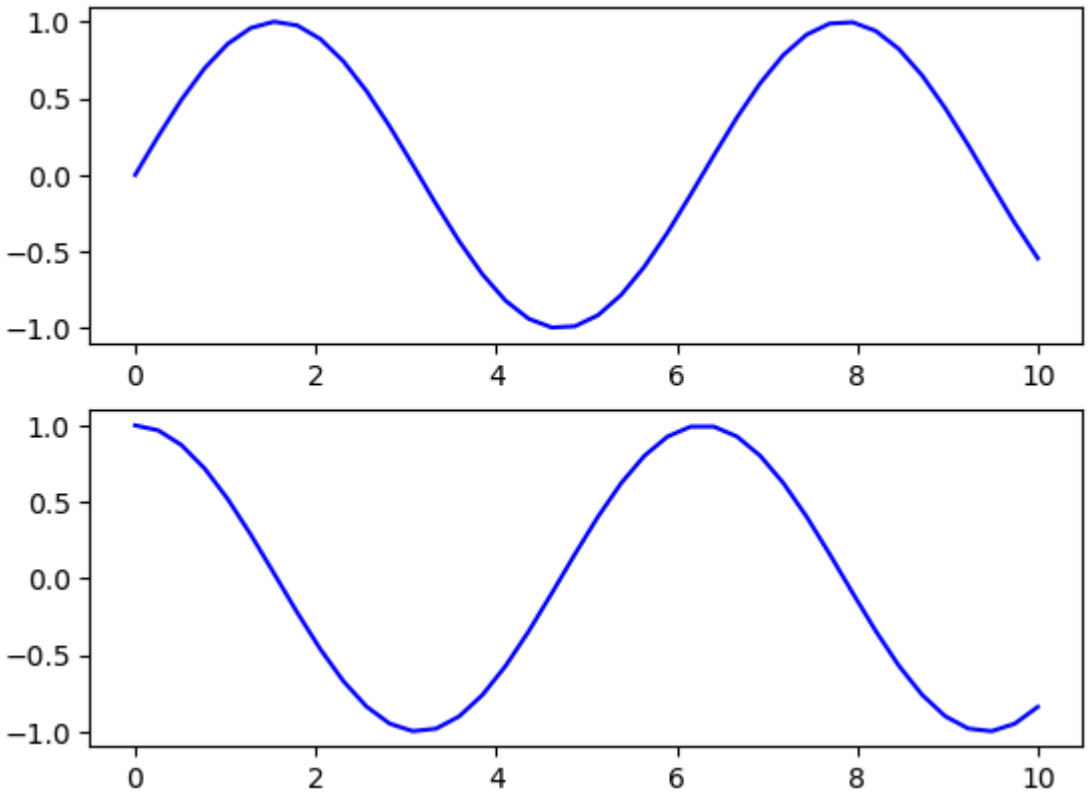


In [15]:
```
t=np.arange(0.,5.,0.2) #evenly samples r=time at 200ms intervals
```

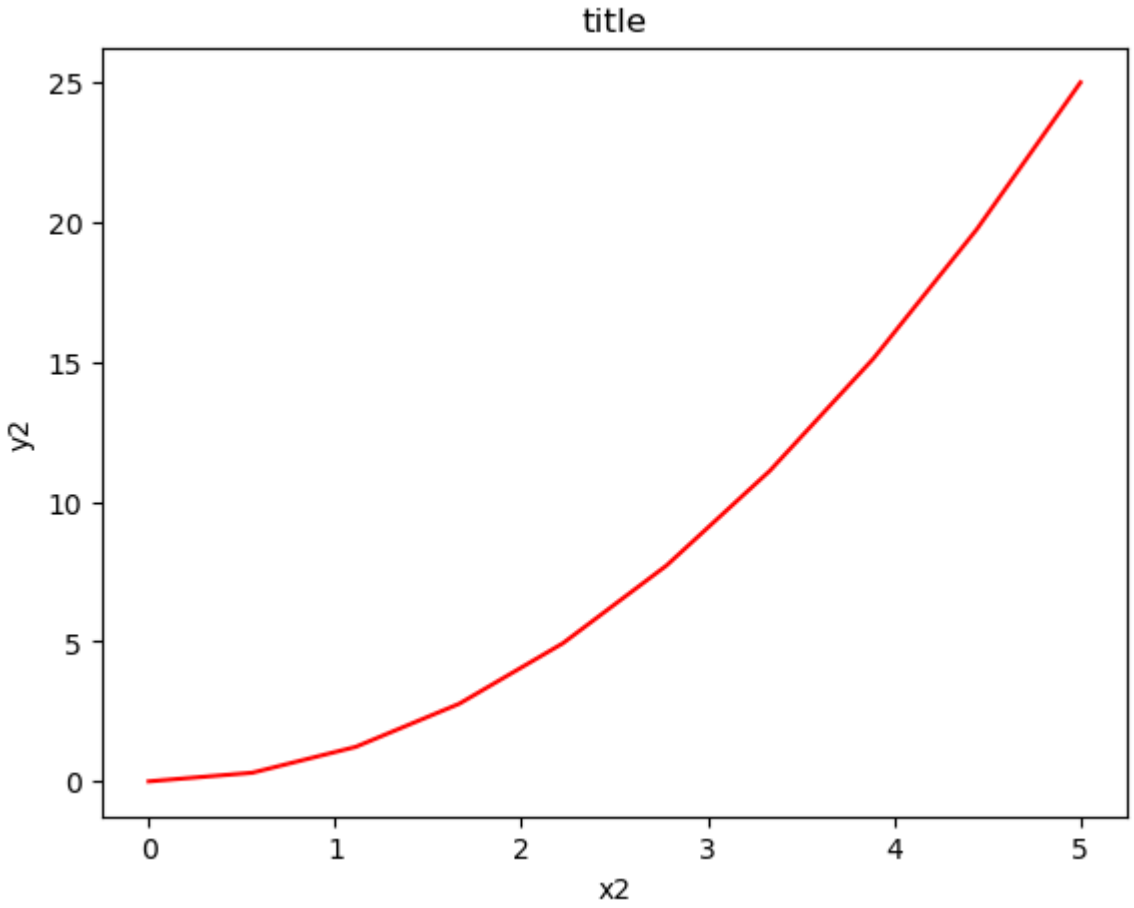
In [16]:
```
plt.plot(t,t,'r--',t,t**2,'bs',t,t**3,'g^')
plt.show()#red dashes,blue squares and green triangles
```



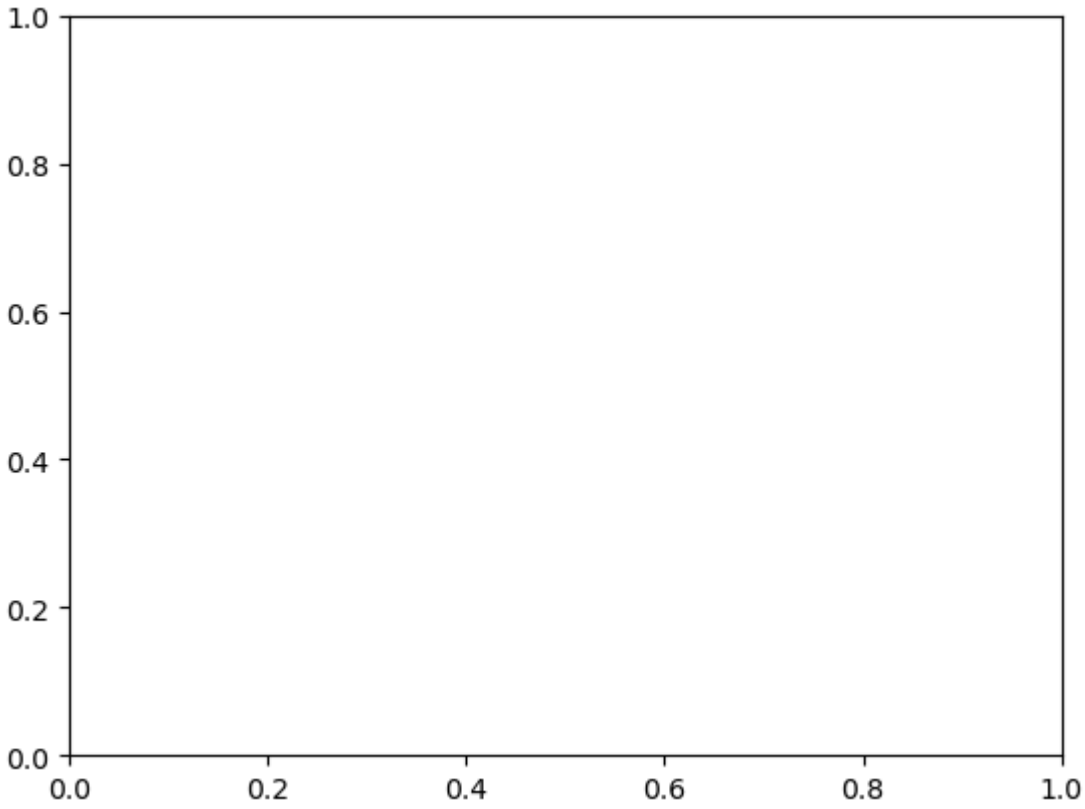
In [17]:
```
fig, ax = plt.subplots(2)#first creates a grid of plots
#ax will be an array of two Axes objects
# Call plot() method on the appropriate object
ax[0].plot(x1, np.sin(x1), 'b-')
ax[1].plot(x1, np.cos(x1), 'b-');
plt.show()
```



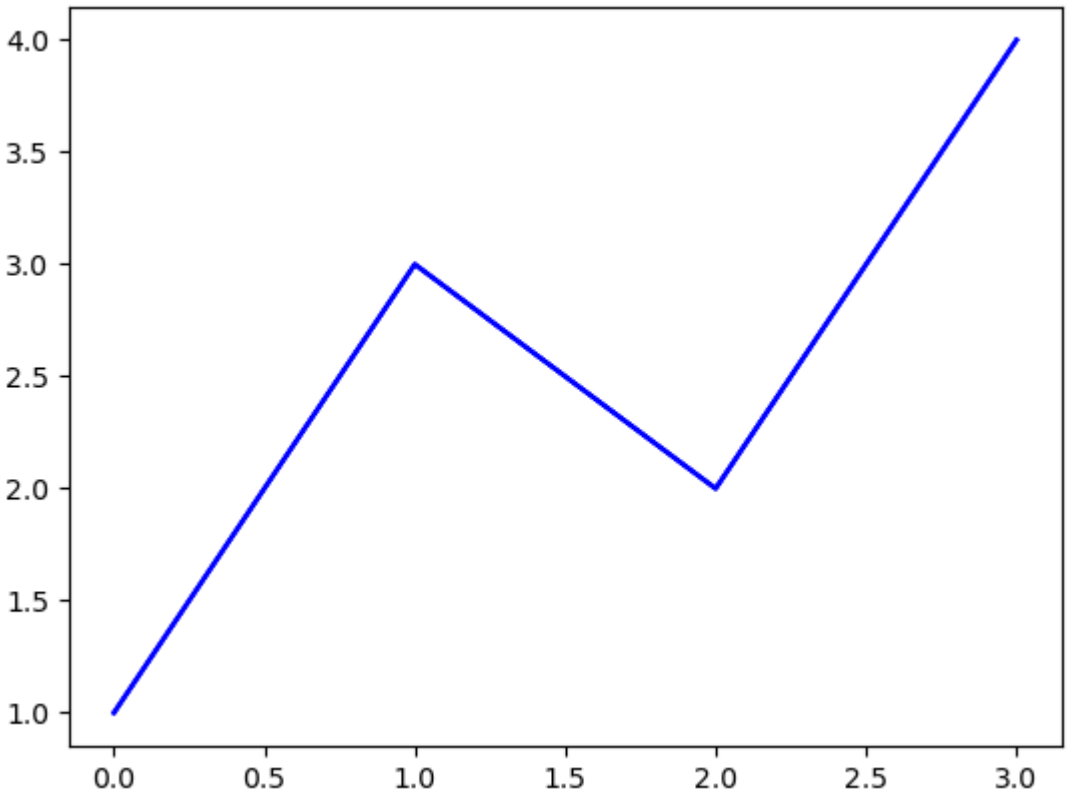
In [19]:
```
fig = plt.figure()
x2 = np.linspace(0, 5, 10)
y2 = x2 ** 2
axes = fig.add_axes([0.1, 0.1, 0.8, 0.8])
axes.plot(x2, y2, 'r')
axes.set_xlabel('x2')
axes.set_ylabel('y2')
axes.set_title('title');
plt.show()
```



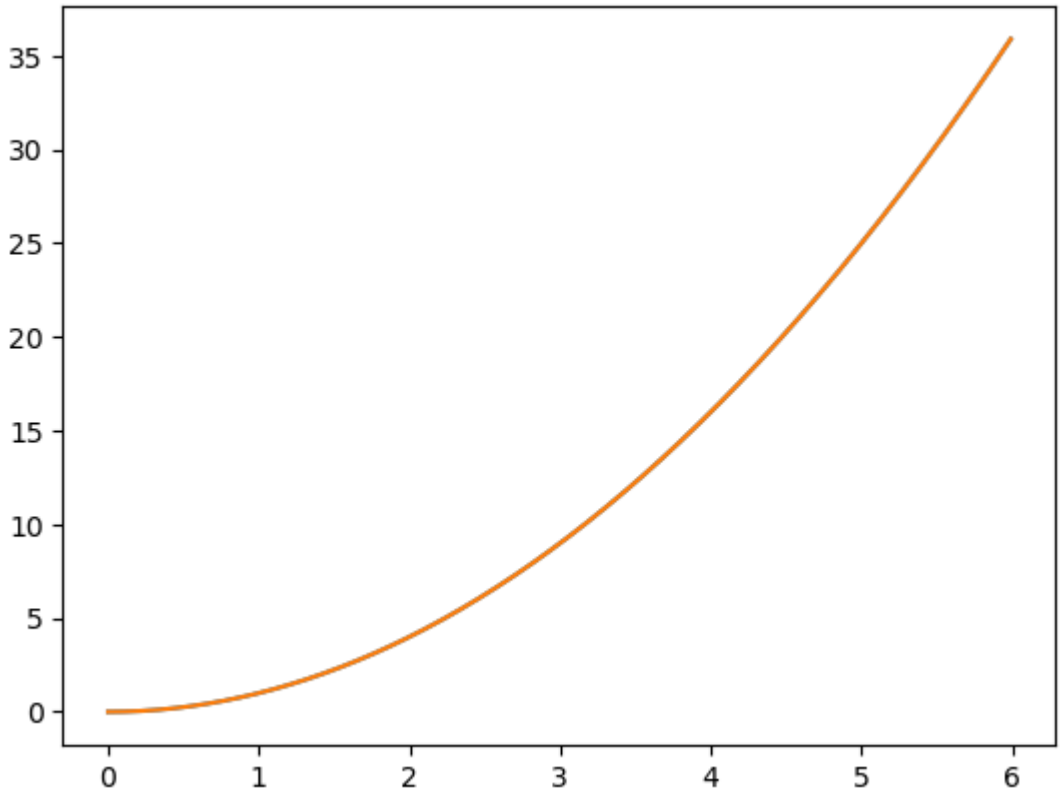
In [20]:
```
fig = plt.figure()
ax = plt.axes()
plt.show()
```



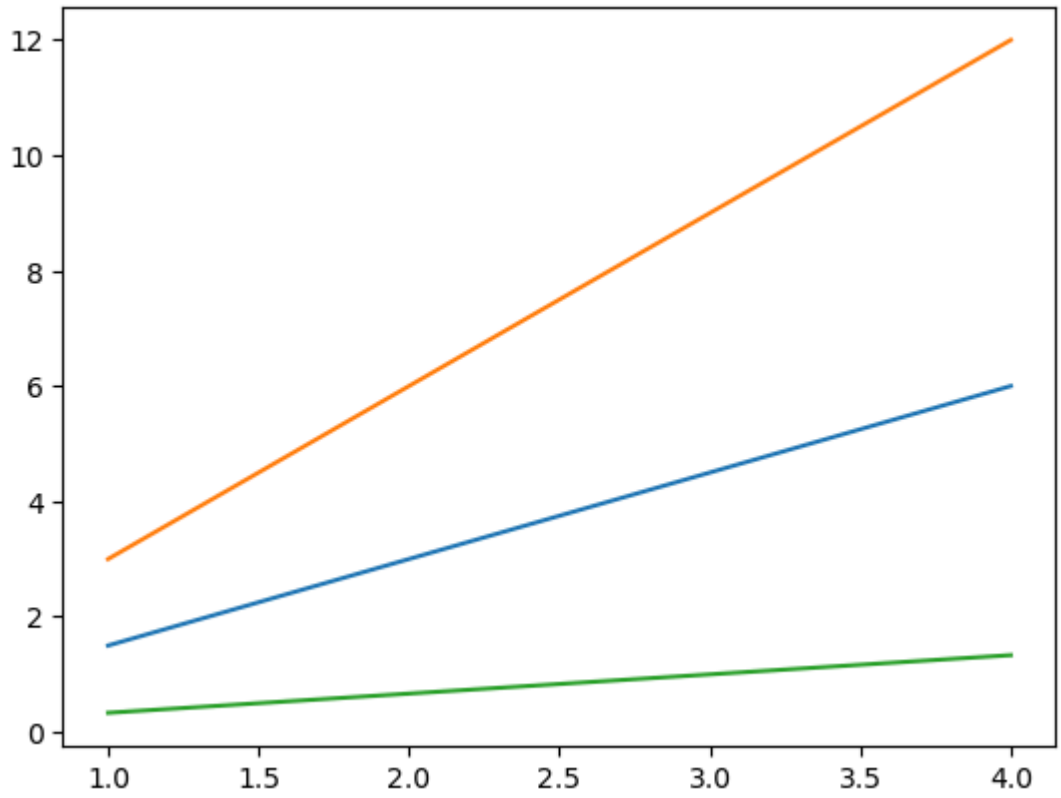
In [24]:
```
plt.plot([1,3,2,4],'b-')
plt.show()
```



In [26]:
```
x3=np.arange(0.0,6.0,0.01)
plt.plot(x3,[xi**2 for xi in x3])
plt.show()
```



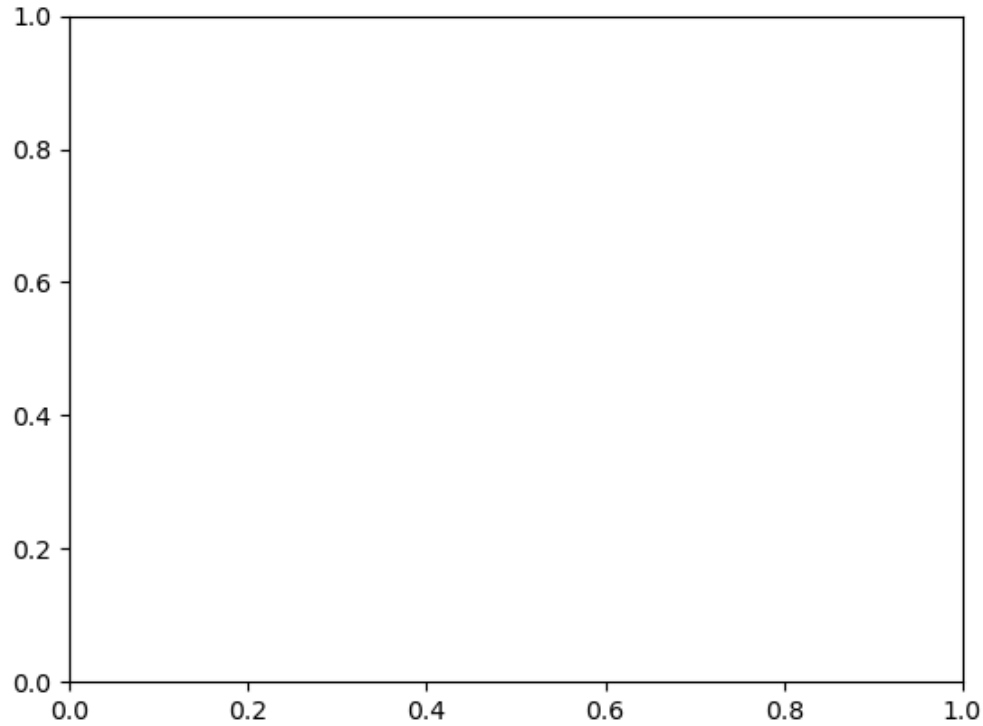
In [27]:
```
x4 = range(1, 5)
plt.plot(x4, [xi*1.5 for xi in x4])
plt.plot(x4, [xi*3 for xi in x4])
plt.plot(x4, [xi/3.0 for xi in x4])
plt.show()
```



In [39]:
```
fig.savefig('fig1.png') #saving the figure
```

In [43]:
```
from IPython.display import Image
Image('fig1.png') #Explore the contents of figure
```

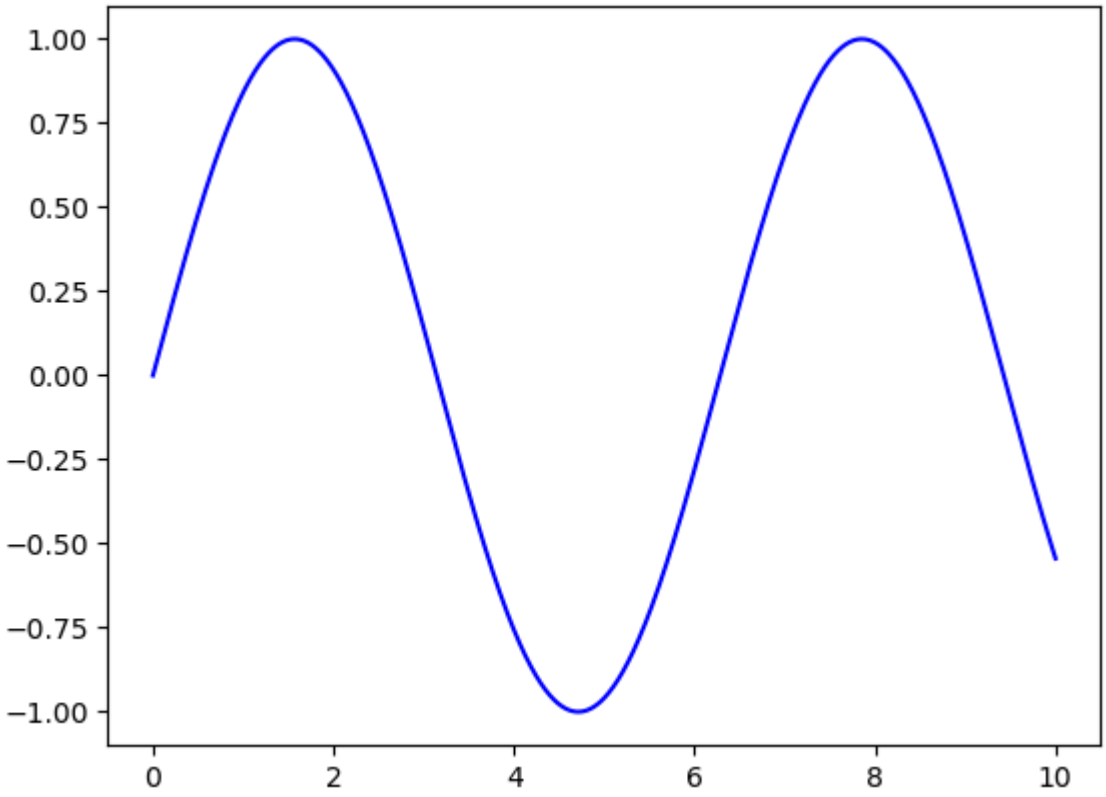
Out[43]:



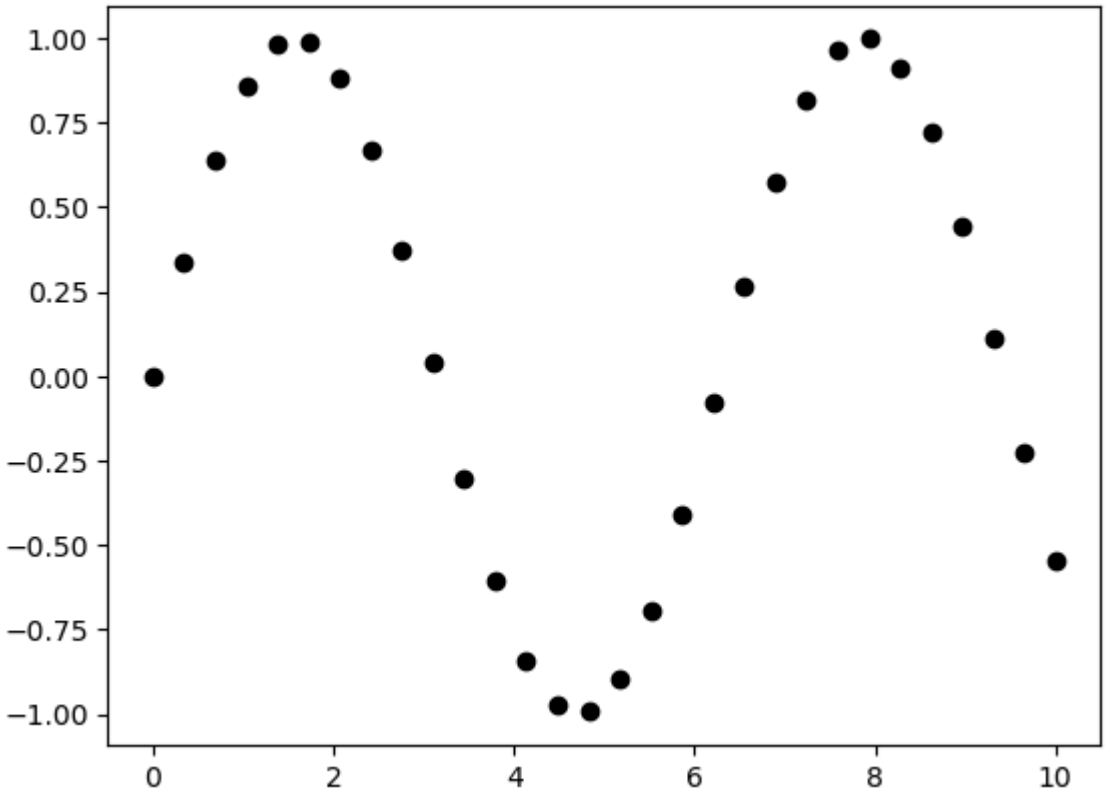
In [45]:
```
fig.canvas.get_supported_filetypes() #Explore supported file formats
```

Out[45]:
```
{'eps': 'Encapsulated Postscript',
 'jpg': 'Joint Photographic Experts Group',
 'jpeg': 'Joint Photographic Experts Group',
 'pdf': 'Portable Document Format',
 'pgf': 'PGF code for LaTeX',
 'png': 'Portable Network Graphics',
 'ps': 'Postscript',
 'raw': 'Raw RGBA bitmap',
 'rgba': 'Raw RGBA bitmap',
 'svg': 'Scalable Vector Graphics',
 'svgz': 'Scalable Vector Graphics',
 'tif': 'Tagged Image File Format',
 'tiff': 'Tagged Image File Format',
 'webp': 'WebP Image Format'}
```

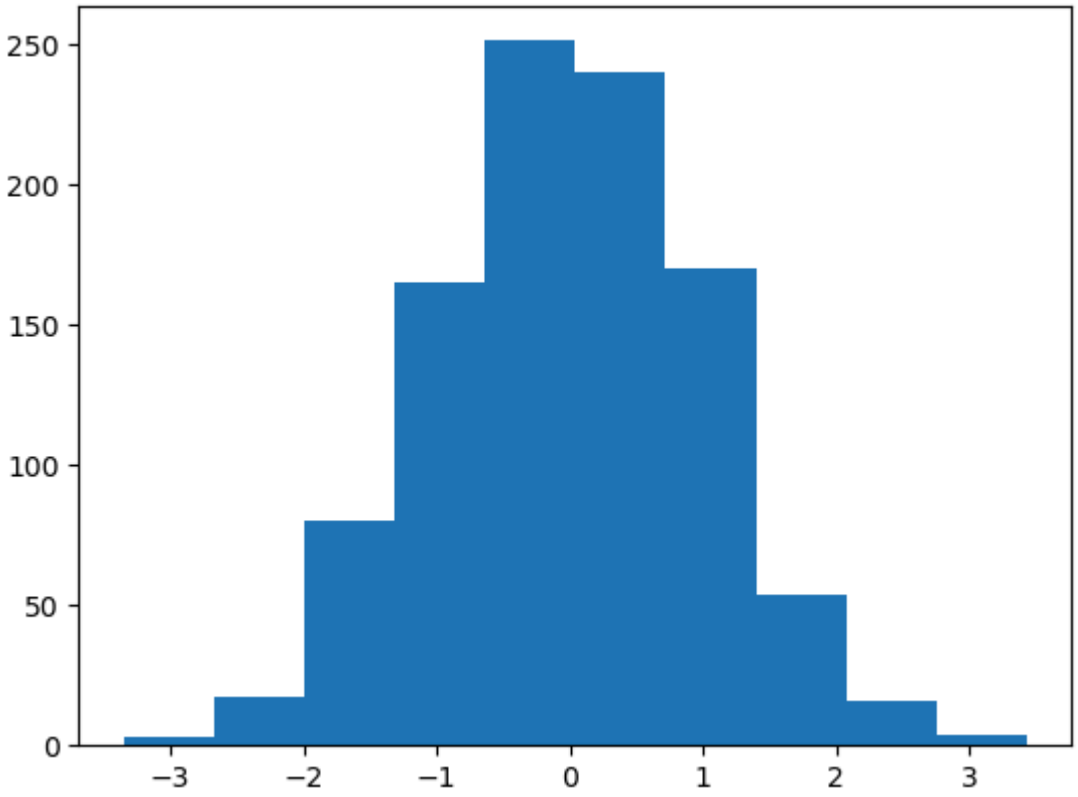
In [46]:
```
fig = plt.figure() #create figure and axes first
ax = plt.axes()
# Declare a variable x5
x5 = np.linspace(0, 10, 1000)

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



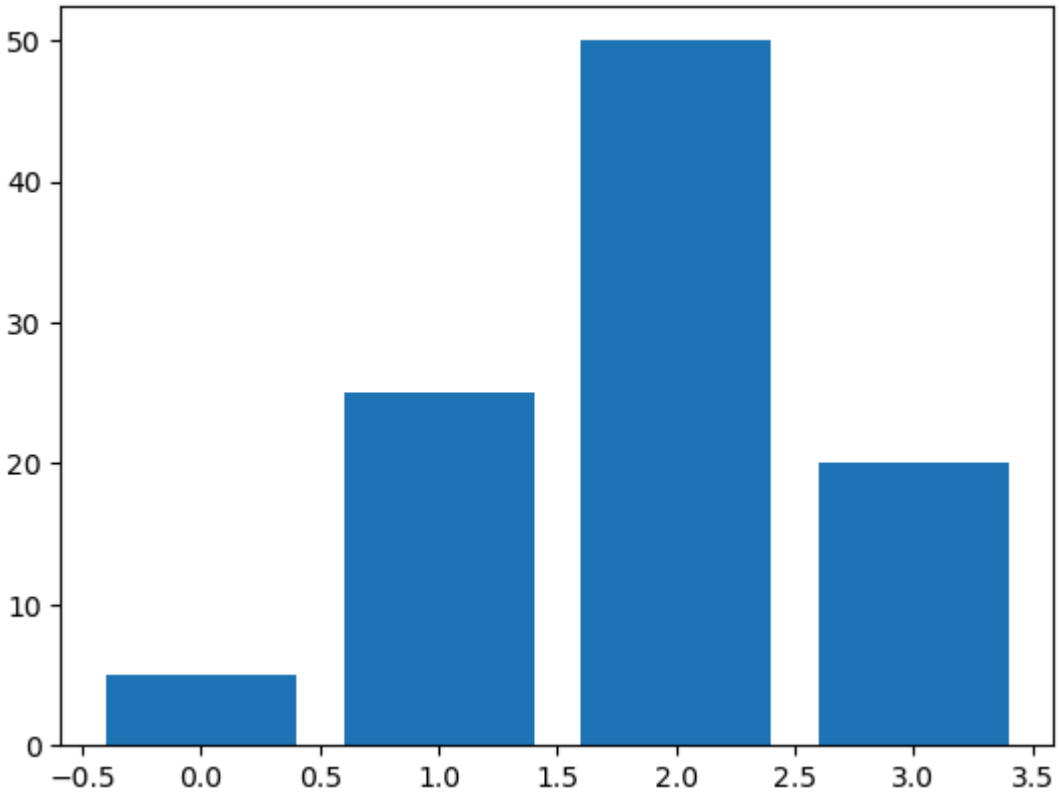
In [47]:
```
x7 = np.linspace(0, 10, 30)
y7 = np.sin(x7)
plt.plot(x7, y7, 'o', color = 'black');
plt.show()
```



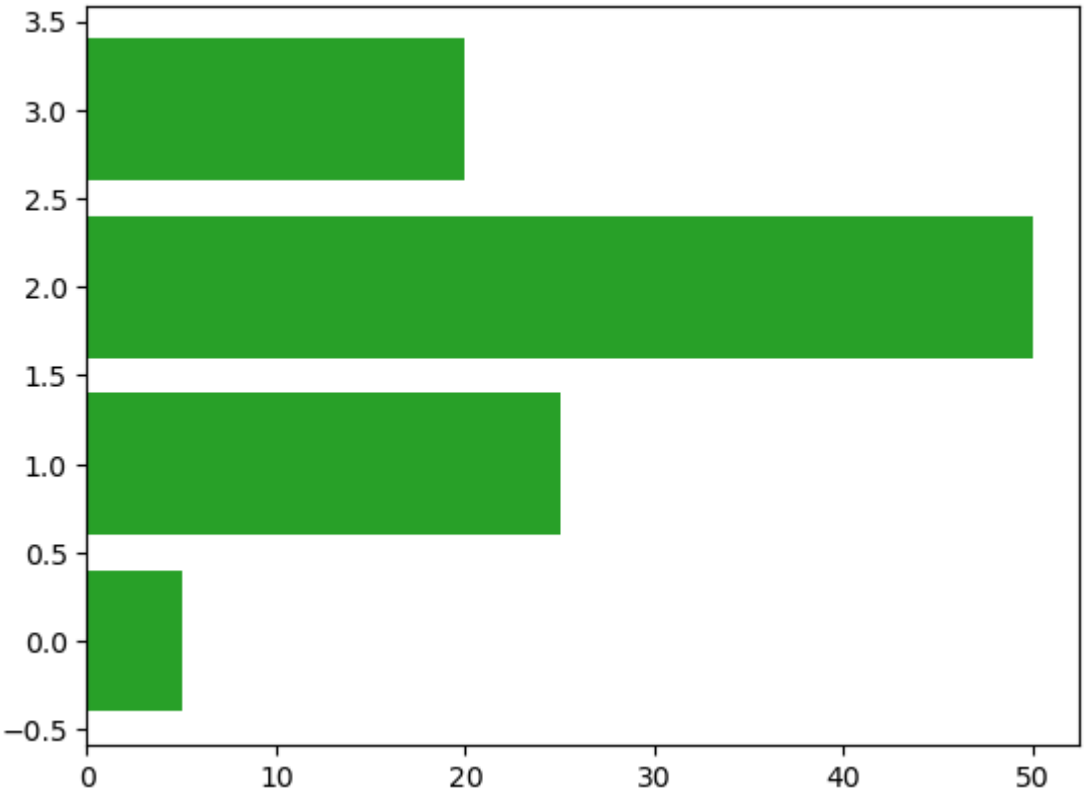
In [48]:
```
data1 = np.random.randn(1000)
plt.hist(data1);
plt.show()
```



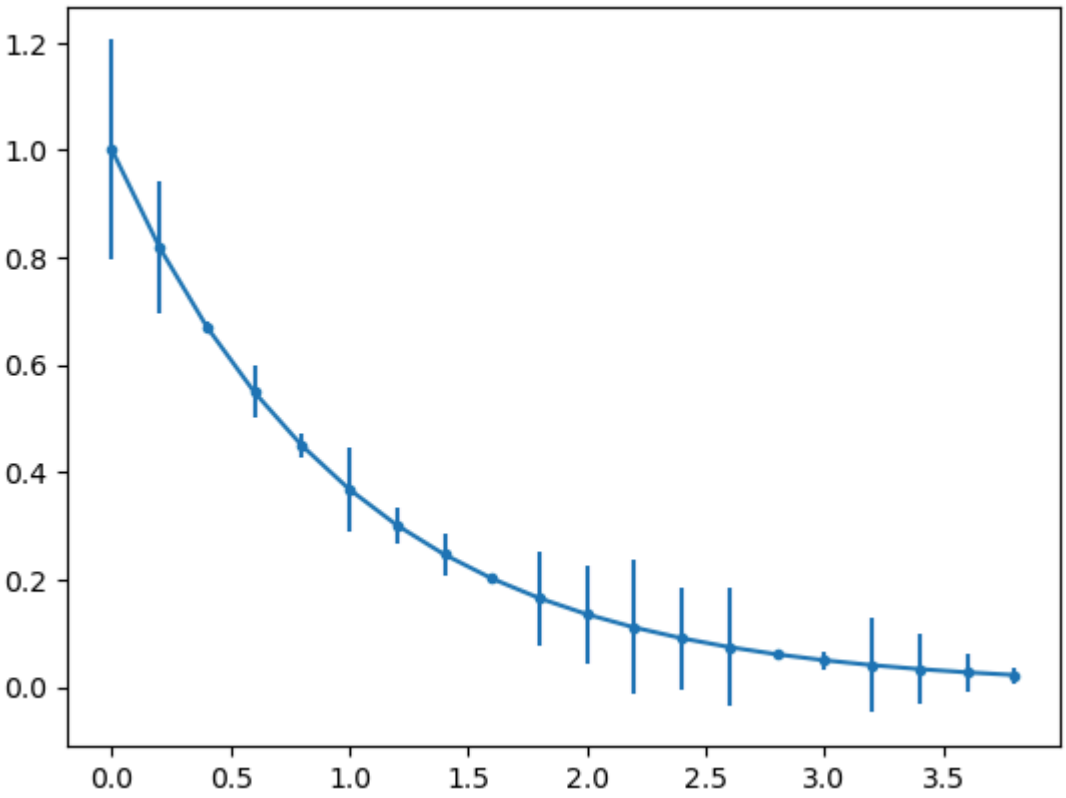
In [49]:
```
data2 = [5. , 25. , 50. , 20.]
plt.bar(range(len(data2)), data2)
plt.show()
```



In [52]:
```
data2 = [5. , 25. , 50. , 20.]
plt.barh(range(len(data2)), data2)
plt.show()
```

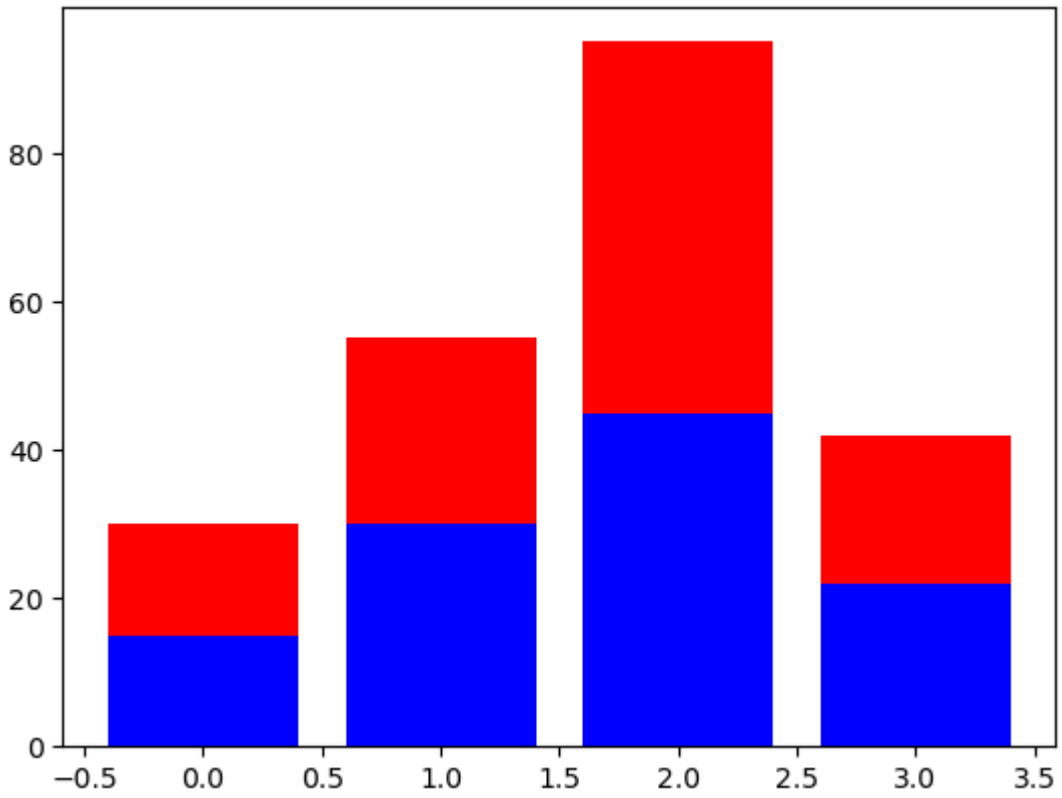


In [53]:
```
x9 = np.arange(0, 4, 0.2)
y9 = np.exp(-x9)
e1 = 0.1 * np.abs(np.random.randn(len(y9)))
plt.errorbar(x9, y9, yerr = e1, fmt = '.-')
plt.show();
```

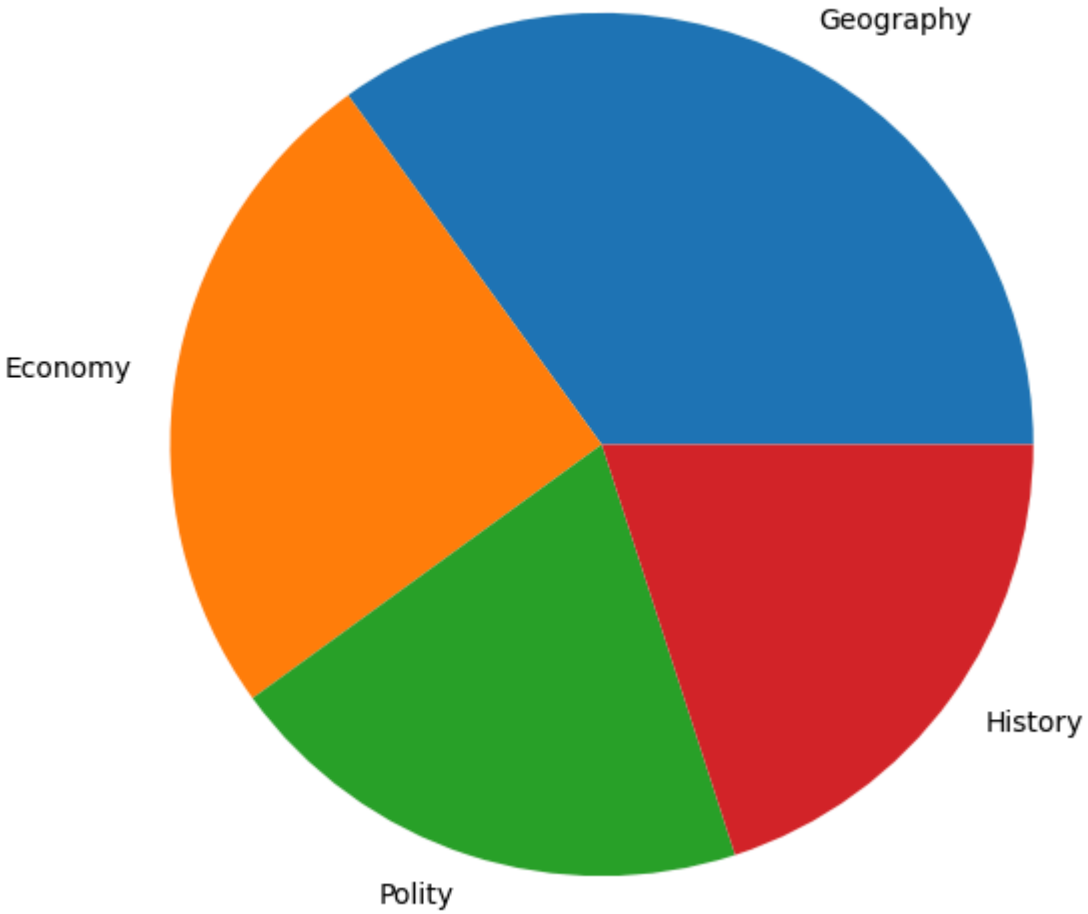


In [54]:
```
A = [15., 30., 45., 22.]
B = [15., 25., 50., 20.]
z2 = range(4)
```

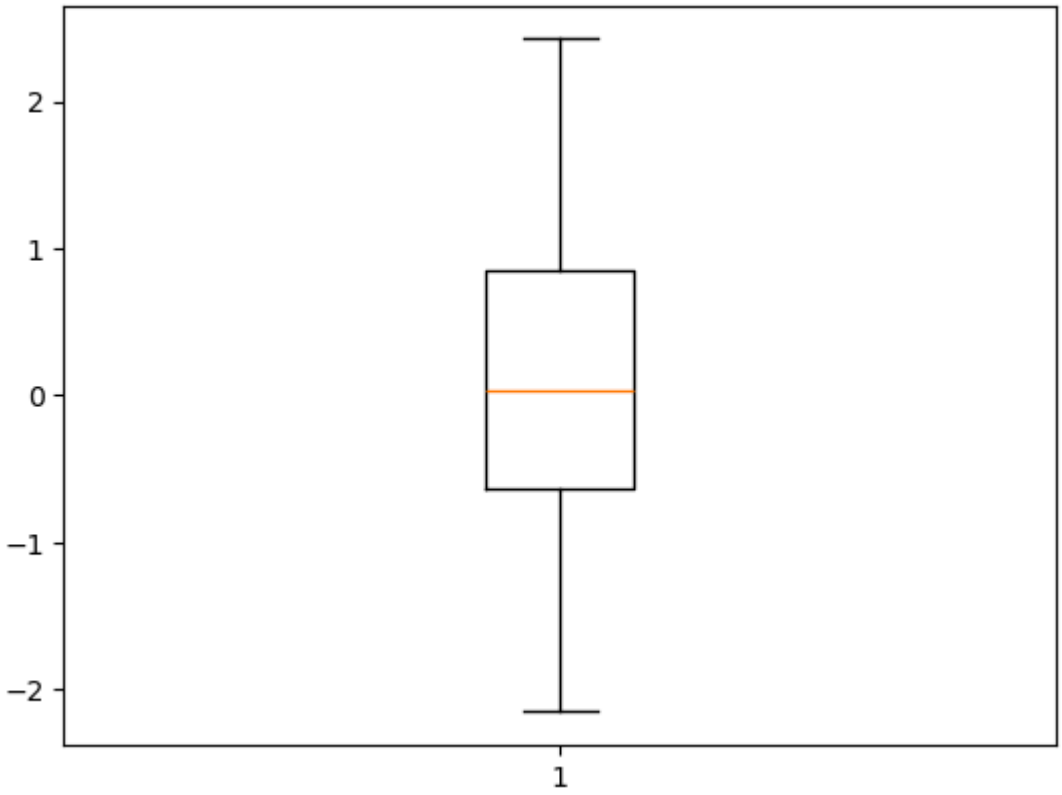
```
plt.bar(z2, A, color = 'b')
plt.bar(z2, B, color = 'r', bottom = A)
plt.show()
```



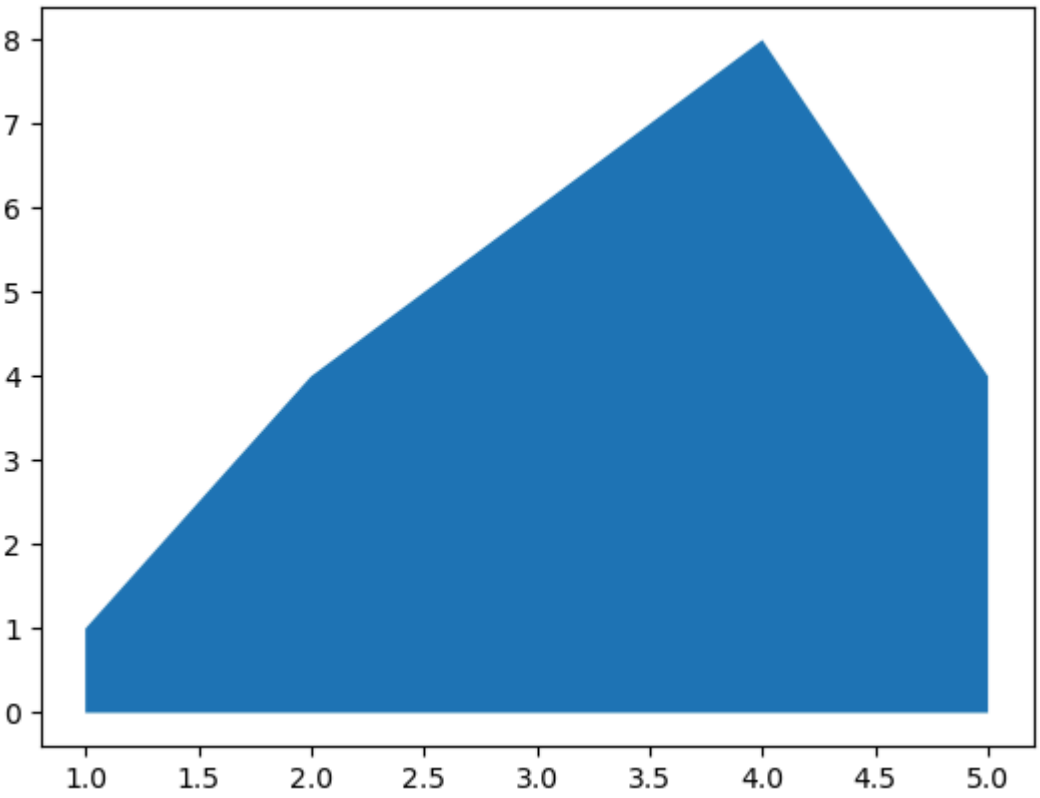
In [56]:
```
plt.figure(figsize=(7,7))
x10 = [35, 25, 20, 20]
labels = ['Geography', 'Economy', 'Polity', 'History']
plt.pie(x10, labels=labels);
plt.show()
```



In [57]:
```
data3 = np.random.randn(100)
plt.boxplot(data3)
plt.show();
```

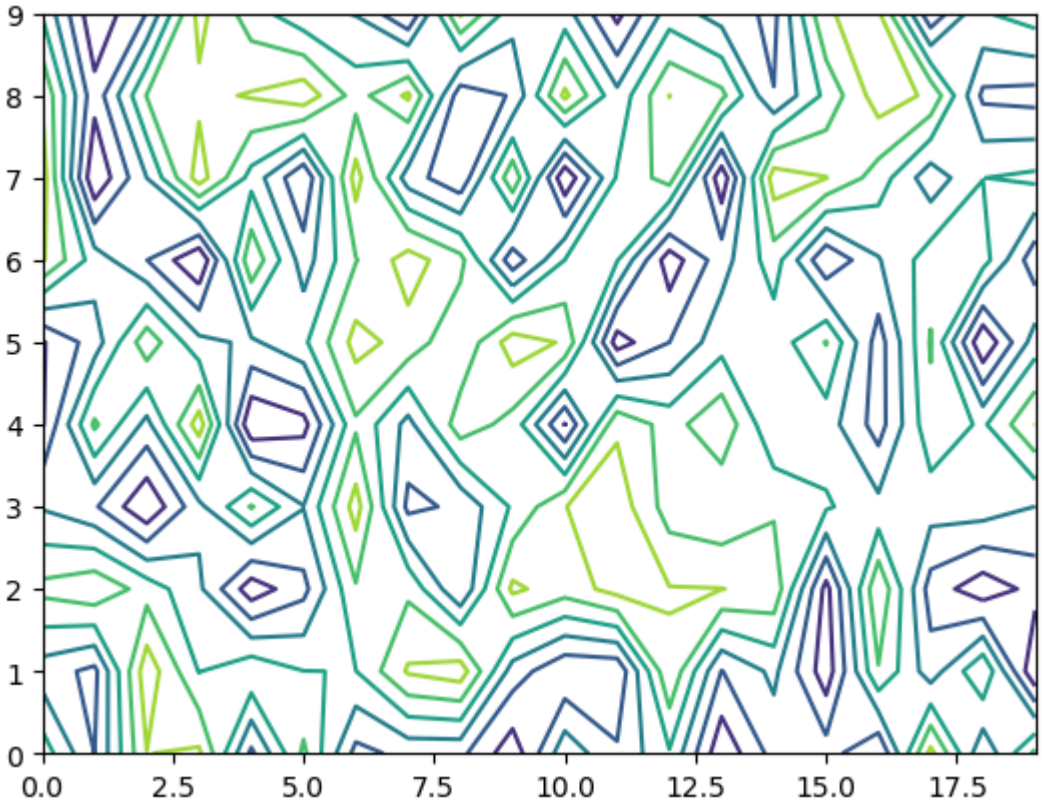


In [58]:
```
# Create some data
x12 = range(1, 6)
y12 = [1, 4, 6, 8, 4]
# Area plot
plt.fill_between(x12, y12)
plt.show()
```



In [59]:
```
# Create a matrix
matrix1 = np.random.rand(10, 20)
```

```
cp = plt.contour(matrix1)
plt.show()
```



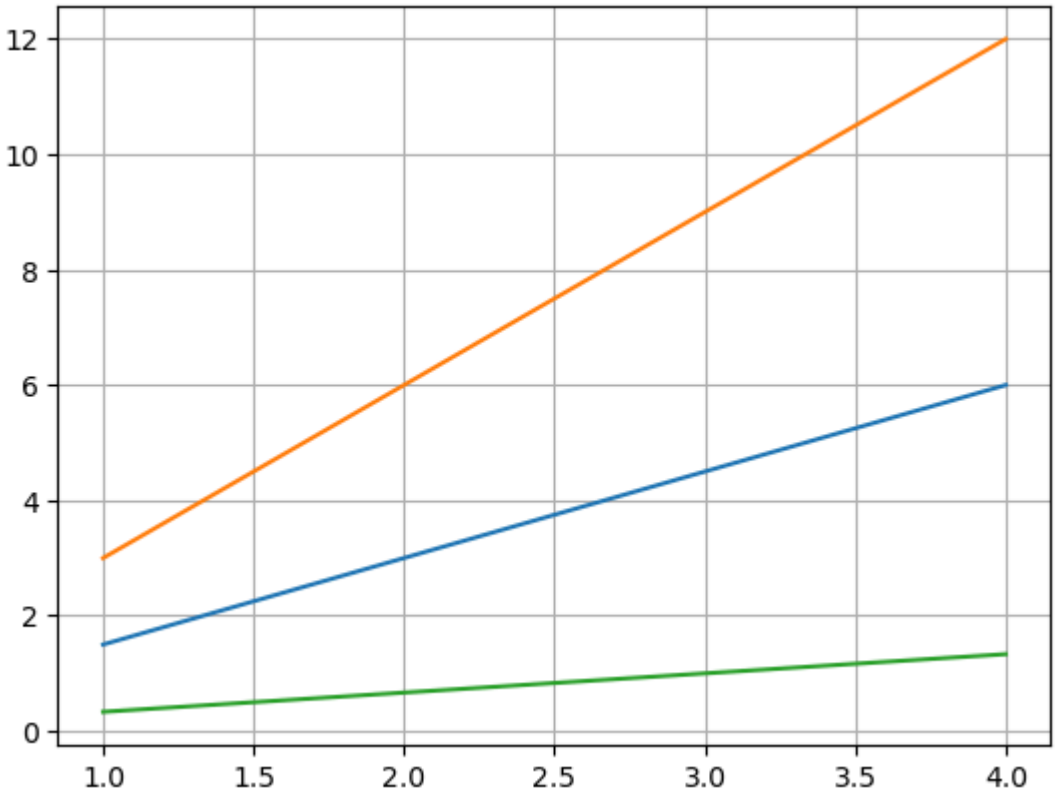
In [60]:
```
# View list of all available styles
print(plt.style.available)
```

```
['Solarize_Light2', '_classic_test_patch', '_mpl-gallery', '_mpl-gallery-nogrid',
'bmh', 'classic', 'dark_background', 'fast', 'fivethirtyeight', 'ggplot', 'graysc
ale', 'seaborn-v0_8', 'seaborn-v0_8-bright', 'seaborn-v0_8-colorblind', 'seaborn-
v0_8-dark', 'seaborn-v0_8-dark-palette', 'seaborn-v0_8-darkgrid', 'seaborn-v0_8-d
eep', 'seaborn-v0_8-muted', 'seaborn-v0_8-notebook', 'seaborn-v0_8-paper', 'seabo
rn-v0_8-pastel', 'seaborn-v0_8-poster', 'seaborn-v0_8-talk', 'seaborn-v0_8-tick
s', 'seaborn-v0_8-white', 'seaborn-v0_8-whitegrid', 'tableau-colorblind10']
```

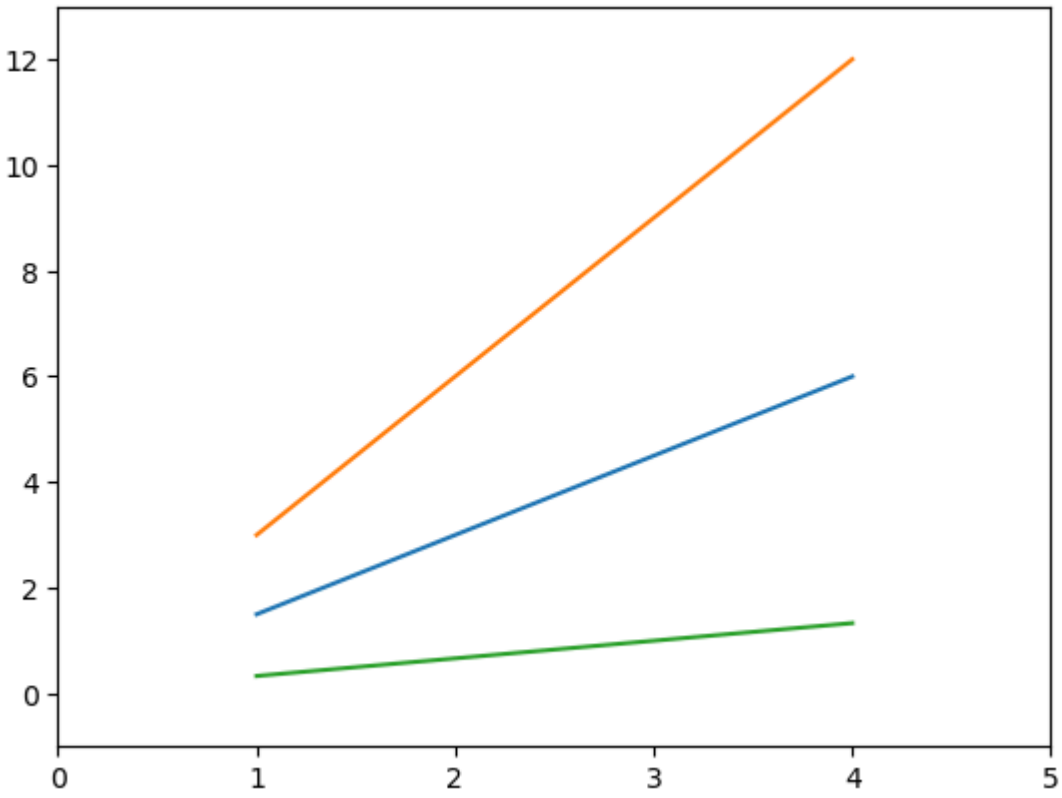
In [61]:
```
# Set styles for plots
plt.style.use('seaborn-bright')
```

```
---------------------------------------------------------------------------
FileNotFoundError                         Traceback (most recent call last)
File ~\anaconda3\Lib\site-packages\matplotlib\style\core.py:137, in use(style)
    136 try:
--> 137     style = _rc_params_in_file(style)
    138 except OSError as err:

File ~\anaconda3\Lib\site-packages\matplotlib\__init__.py:870, in _rc_params_in_f
ile(fname, transform, fail_on_error)
    869 rc_temp = {}
--> 870 with _open_file_or_url(fname) as fd:
    871     try:

File ~\anaconda3\Lib\contextlib.py:137, in _GeneratorContextManager.__enter__(sel
f)
    136 try:
--> 137     return next(self.gen)
    138 except StopIteration:

File ~\anaconda3\Lib\site-packages\matplotlib\__init__.py:847, in _open_file_or_u
rl(fname)
    846 fname = os.path.expanduser(fname)
--> 847 with open(fname, encoding='utf-8') as f:
    848     yield f

FileNotFoundError: [Errno 2] No such file or directory: 'seaborn-bright'

The above exception was the direct cause of the following exception:

OSError                                   Traceback (most recent call last)
Cell In[61], line 2
      1 # Set styles for plots
----> 2 plt.style.use('seaborn-bright')

File ~\anaconda3\Lib\site-packages\matplotlib\style\core.py:139, in use(style)
    137         style = _rc_params_in_file(style)
    138     except OSError as err:
--> 139         raise OSError(
    140             f"{style!r} is not a valid package style, path of style "
    141             f"file, URL of style file, or library style name (library "
    142             f"styles are listed in `style.available`)") from err
    143 filtered = {}
    144 for k in style:  # don't trigger RcParams.__getitem__('backend')

OSError: 'seaborn-bright' is not a valid package style, path of style file, URL o
f style file, or library style name (library styles are listed in `style.availabl
e`)
```

In [62]:
```
x15 = np.arange(1, 5)
plt.plot(x15, x15*1.5, x15, x15*3.0, x15, x15/3.0)
plt.grid(True)
plt.show()
```

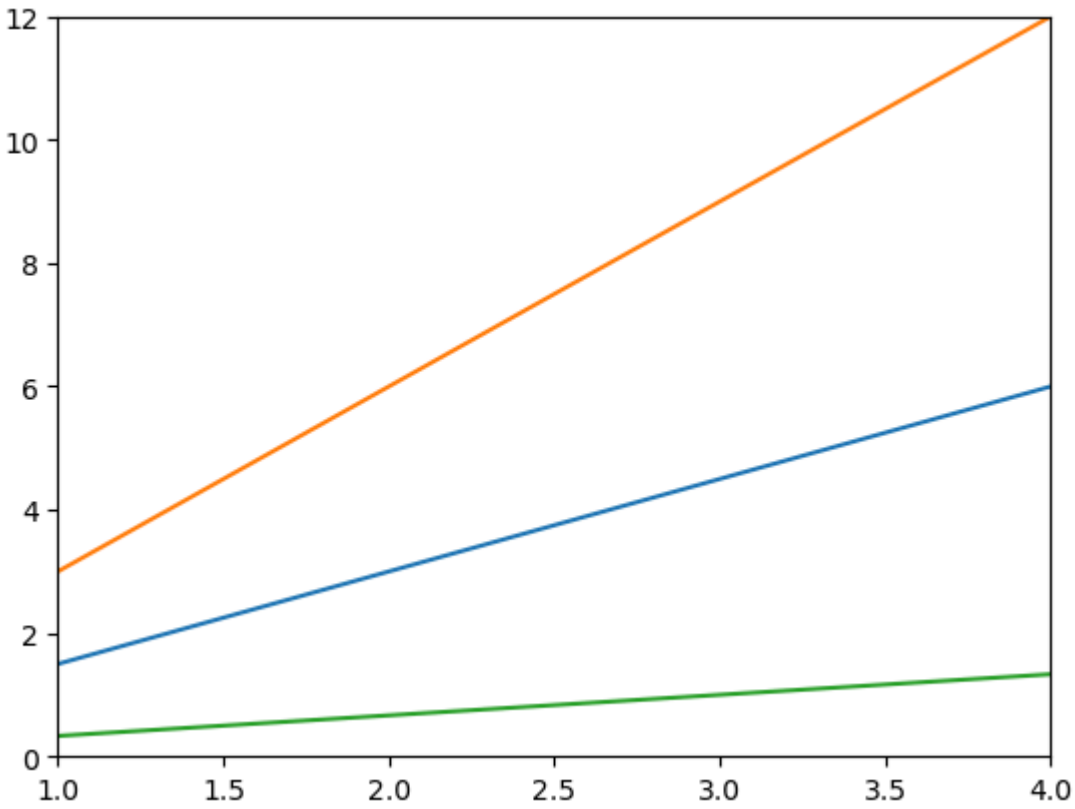


In [63]:
```
x15 = np.arange(1, 5)
plt.plot(x15, x15*1.5, x15, x15*3.0, x15, x15/3.0)
plt.axis() # shows the current axis limits values
plt.axis([0, 5, -1, 13])
plt.show()
```

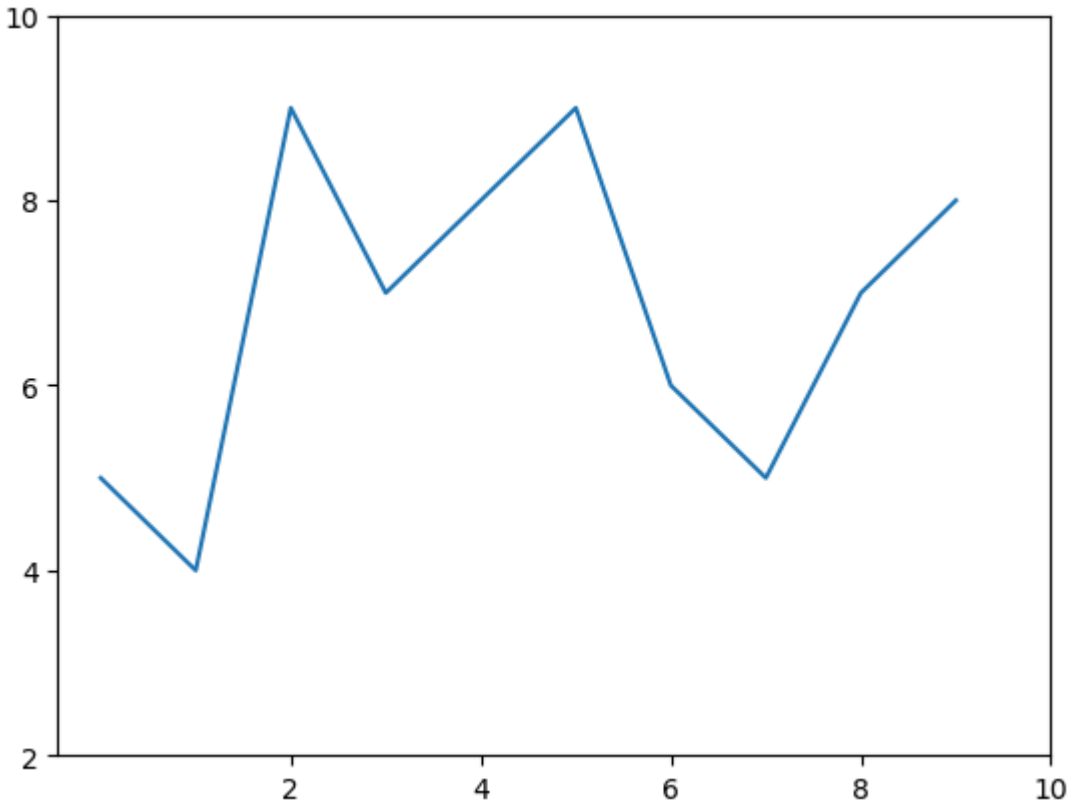


In [64]:
```
x15 = np.arange(1, 5)
plt.plot(x15, x15*1.5, x15, x15*3.0, x15, x15/3.0)
plt.xlim([1.0, 4.0])
```

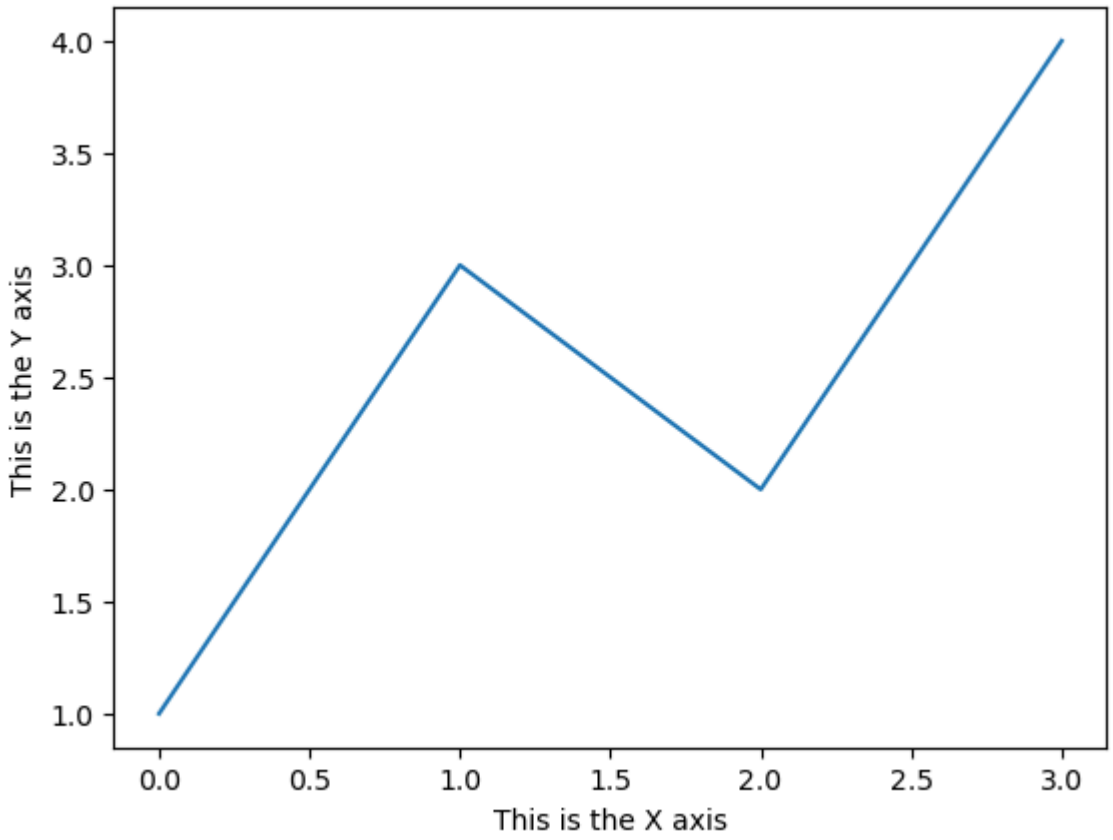
```
plt.ylim([0.0, 12.0])
plt.show()
```



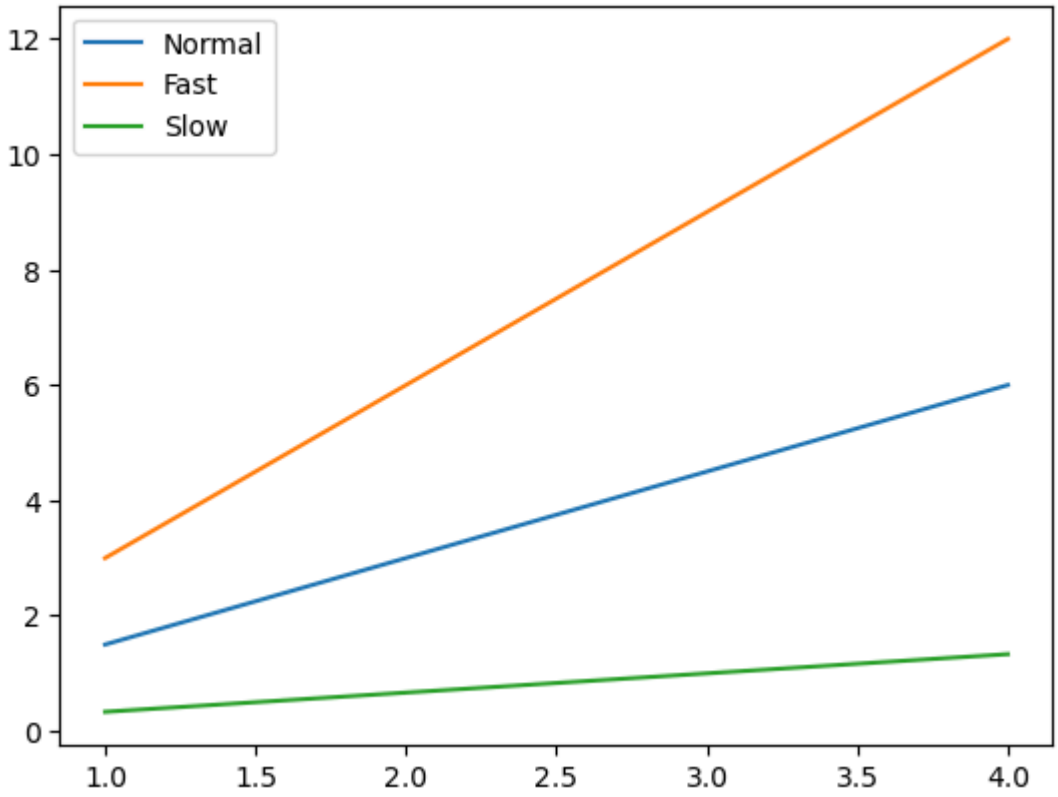
In [65]:
```
u = [5, 4, 9, 7, 8, 9, 6, 5, 7, 8]
plt.plot(u)
plt.xticks([2, 4, 6, 8, 10])
plt.yticks([2, 4, 6, 8, 10])
plt.show()
```



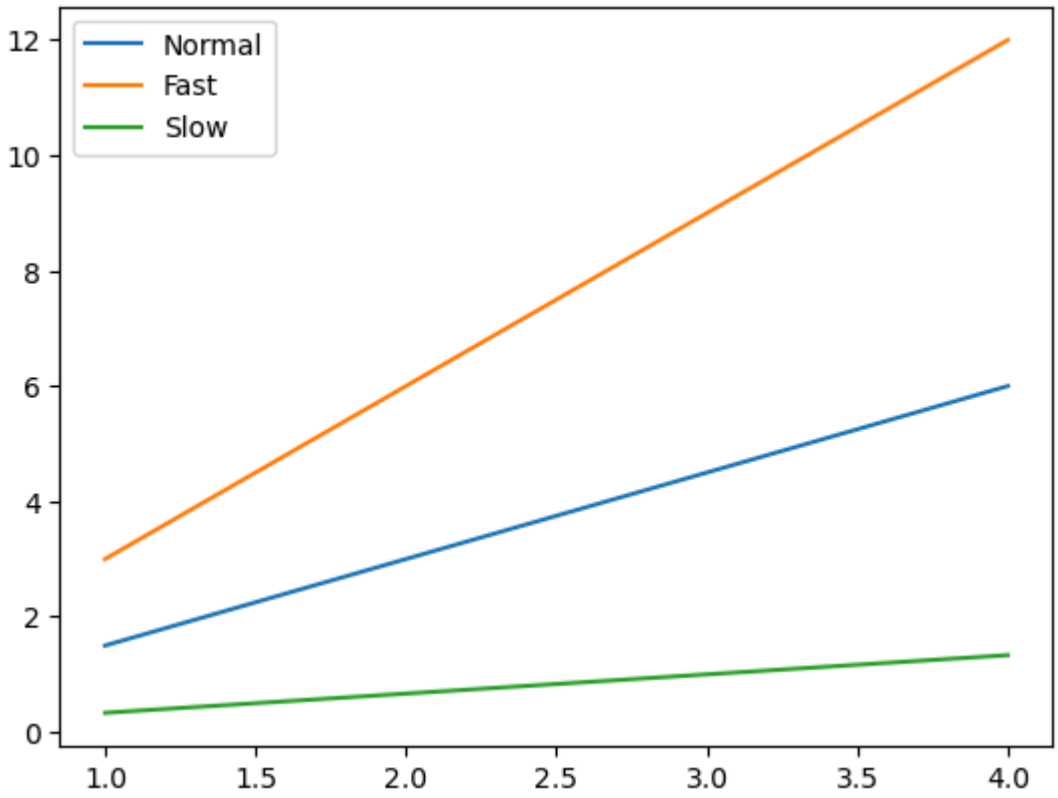
In [66]:
```
plt.plot([1, 3, 2, 4])
plt.xlabel('This is the X axis')
plt.ylabel('This is the Y axis')
plt.show()
```



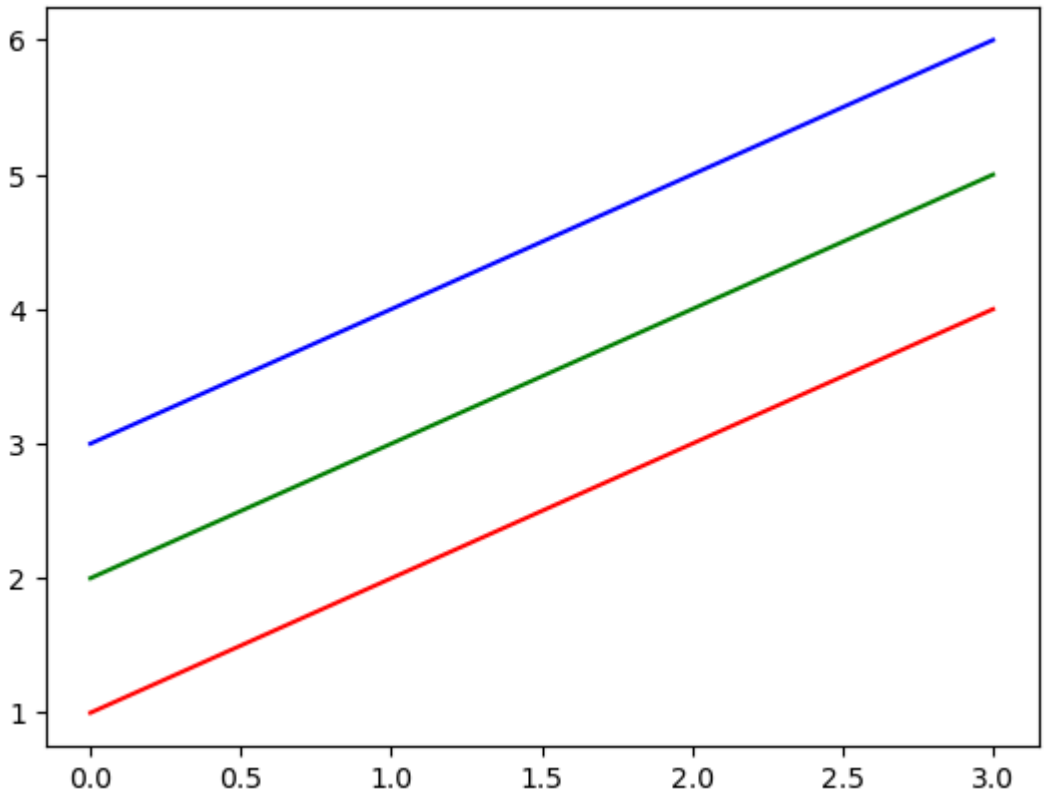
In [67]:
```
x15 = np.arange(1, 5)
fig, ax = plt.subplots()
ax.plot(x15, x15*1.5)
ax.plot(x15, x15*3.0)
ax.plot(x15, x15/3.0)
ax.legend(['Normal','Fast','Slow']);
plt.show()
```



In [69]:
```
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 [70]:
```
x16 = np.arange(1, 5)
plt.plot(x16, 'r')
plt.plot(x16+1, 'g')
plt.plot(x16+2, 'b')
plt.show()
```



In [ ]: