

## Matplotlib Exercises (worth 90 points)

Follow the instructions to recreate the plots using this data:

### Data

```
In [4]: import numpy as np
x = np.arange(0,50)
y = x*2
z = x**2
```

### Exercise 1 (a) (worth 5 points)

- Import required libraries to be able to use matplotlib
- Add one line of code to be able to see and display the plots in jupyter notebook.

```
In [5]: #import the required library to be able to use matplotlib
import matplotlib.pyplot as plt

#add one line of code to be able to display the plot inside jupyter notebook
%matplotlib inline
print("I am Preston")
```

I am Preston

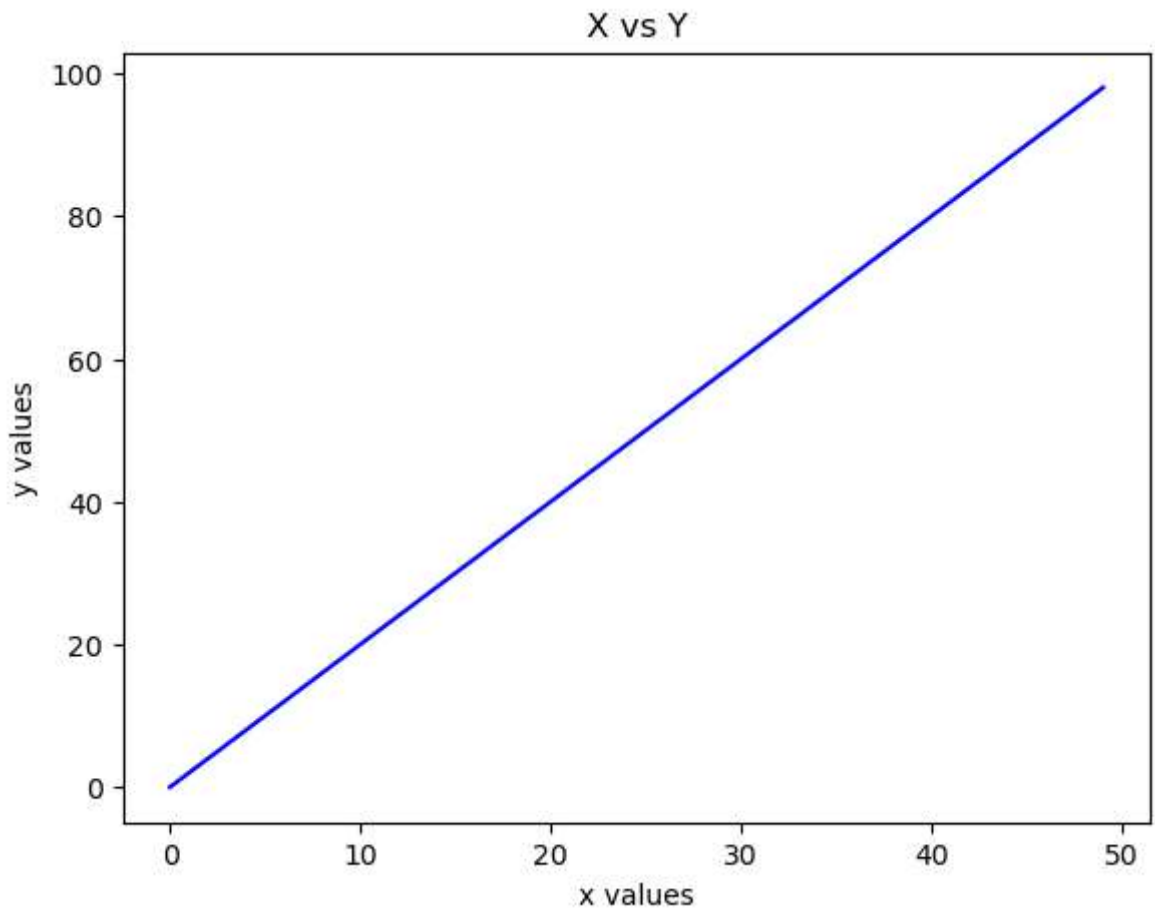
### Exercise 1 (b) (worth 15 points)

**\*\* Follow along with these steps:\*\***

- Create a figure object called fig
- Add an axes (named axes1) to the figure canvas at [0,0,0.8,0.8].
- Plot (x,y) on that axes axes1
- Set the labels
- Set the title to match the plot below:

```
In [11]: fig=plt.figure()
axes1=fig.add_axes([0,0,0.8,0.8])
axes1.plot(x,y,'b')
axes1.set_xlabel('x values')
axes1.set_ylabel('y values')
axes1.set_title('X vs Y')
print("I am Preston")
```

I am Preston



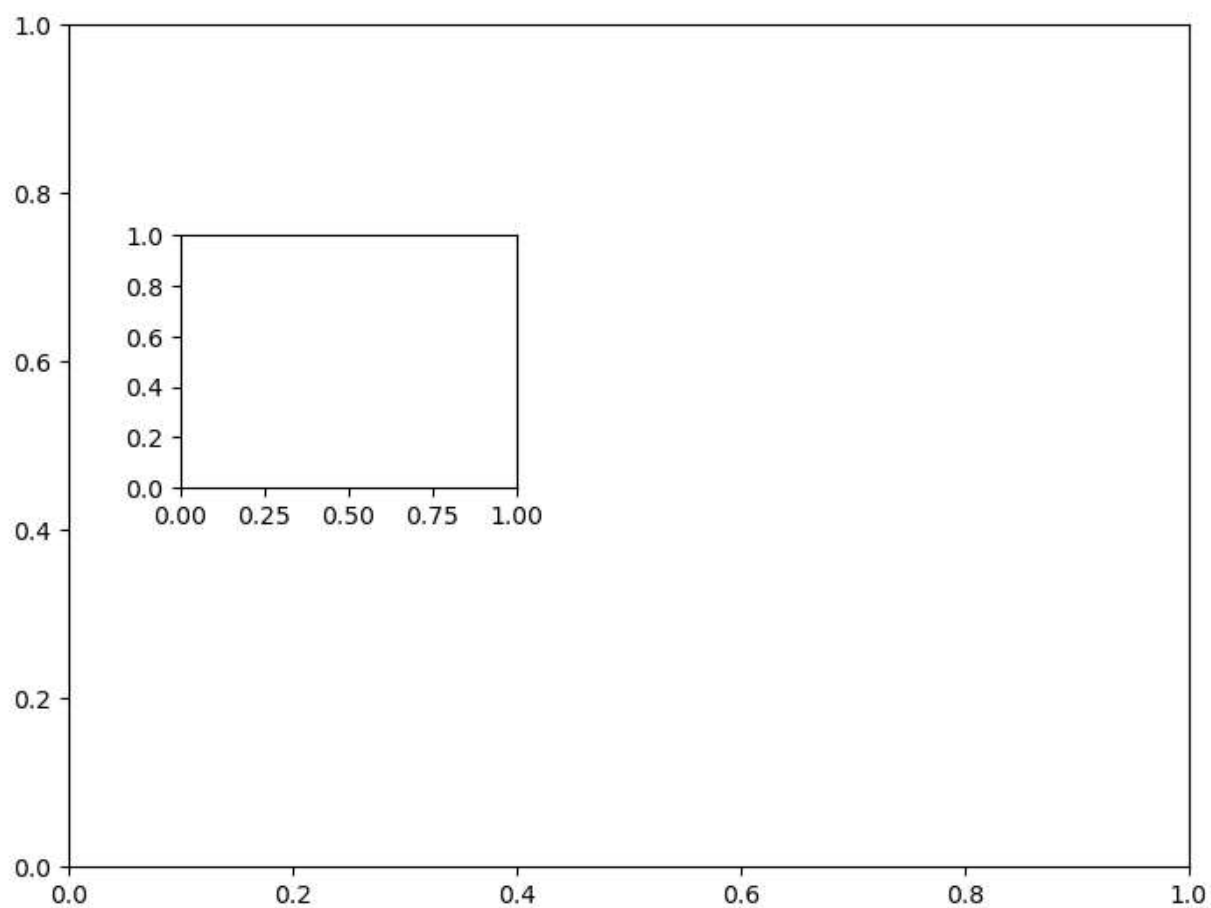
In [ ]:

**Exercise 2 (a) (worth 10 points)**

- Create a figure object. Call it fig.
- Add two axes on it. Name them axes1 and axes2 respectively
- axes1 is located at [0,0,1,1]
- axes2 is located at [0.1, 0.45,0.3,0.3]

```
In [12]: fig=plt.figure()
axes1=fig.add_axes([0,0,1,1])
axes2=fig.add_axes([0.1,0.45,0.3,0.3])
print("I am Preston")
```

I am Preston

**Exercise 2 (b) (10 points)**

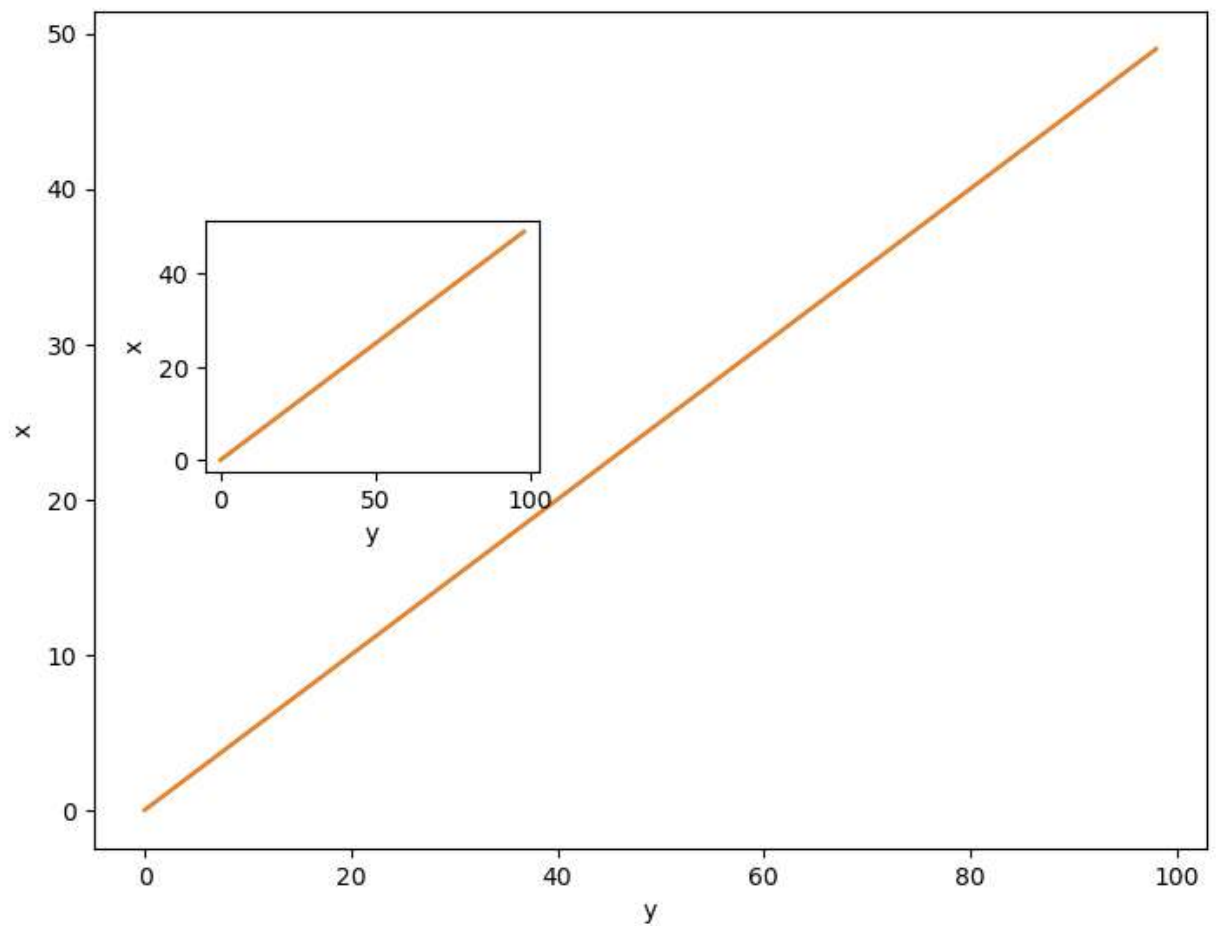
- Plot **y vs x** on both axes (axes1 and axes2)
- Set the x label and y label for both plots
- Call your figure object to show it

```
In [14]: axes1.plot(y,x)
axes1.set_xlabel('y')
axes1.set_ylabel('x')

axes2.plot(y,x)
axes2.set_xlabel('y')
axes2.set_ylabel('x')

fig
```

Out[14]:



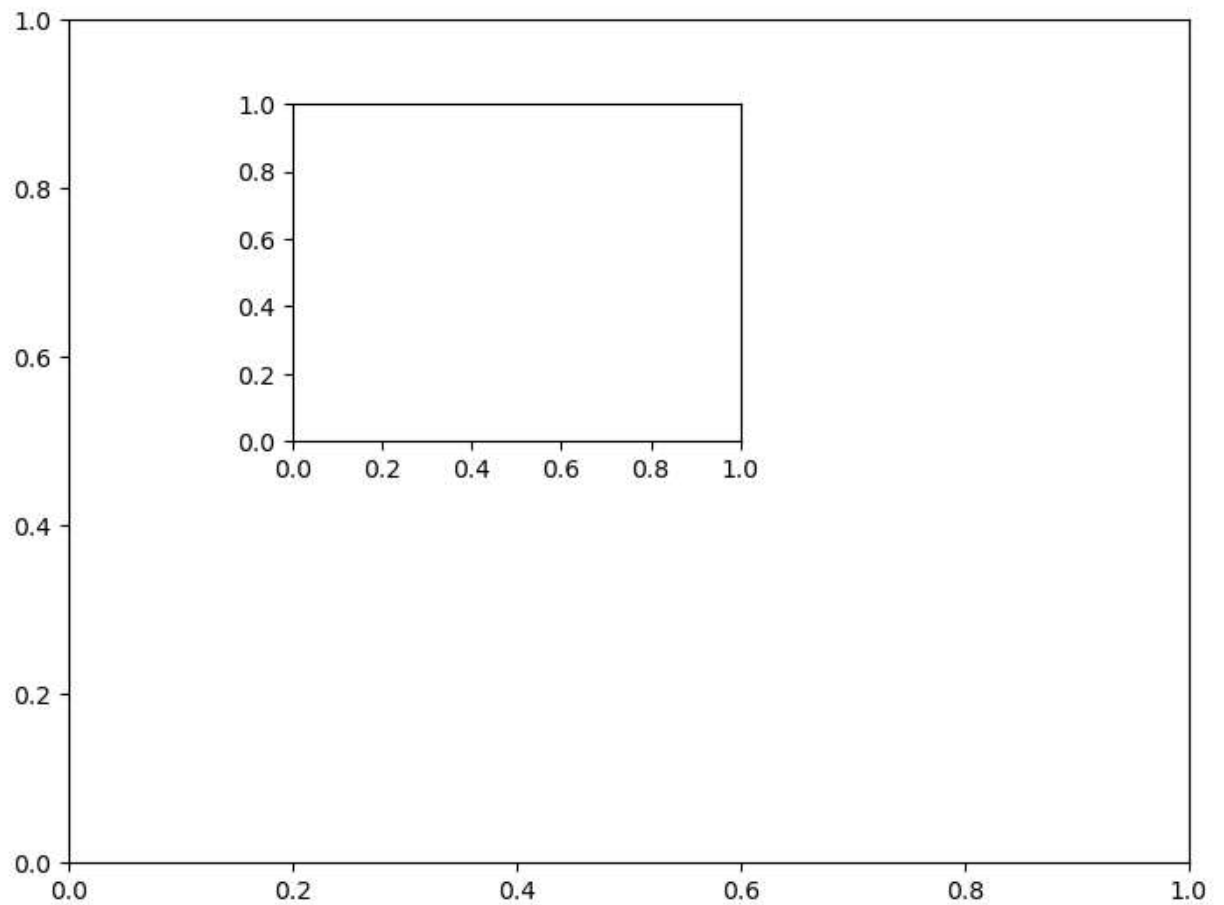
### Exercise 3 (a) (Worth 5 points)

- Create a figure object name it fig.
- Add two axes (ax1 and ax2) to the figure object at [0,0,1,1] and [0.2,0.5,.4,.4]

```
In [17]: fig=plt.figure()
ax1=fig.add_axes([0,0,1,1])
ax2=fig.add_axes([0.2,0.5,.4,.4])

print("I am Preston")
```

I am Preston



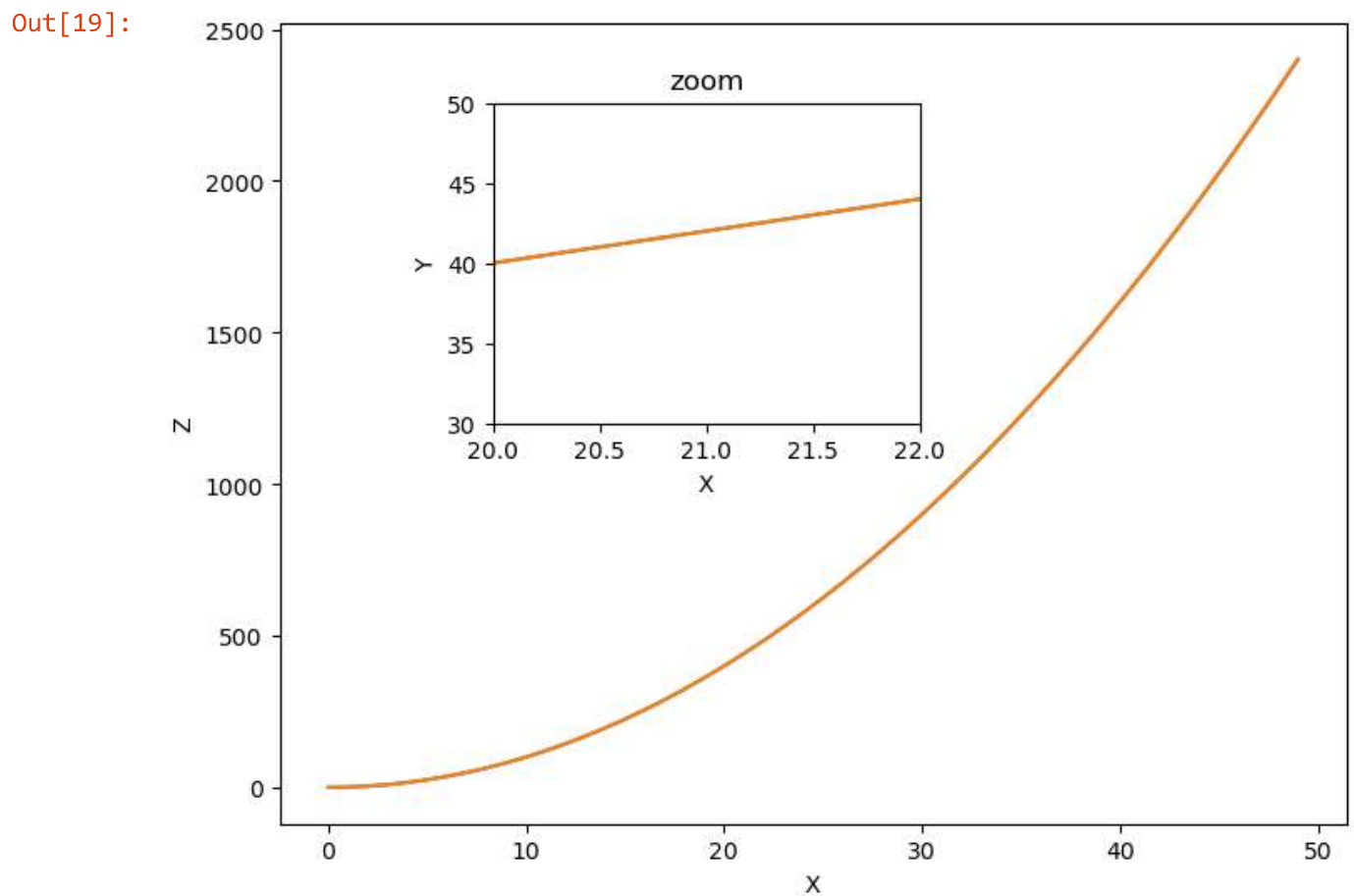
### Exercise 3 (b) (Worth 15 points)

- Now use x,y, and z arrays to recreate the plot below.
- Notice the x limits and y limits on the inserted plot print("I am Preston")

```
In [19]: ax1.plot(x,z)
ax1.set_xlabel('X')
ax1.set_ylabel('Z')

ax2.plot(x,y)
ax2.set_xlabel('X')
ax2.set_ylabel('Y')
ax2.set_title('zoom')
ax2.set_xlim(20,22)
ax2.set_ylim(30,50)

fig
```



In [20]:

```
print("I am Preston")
```

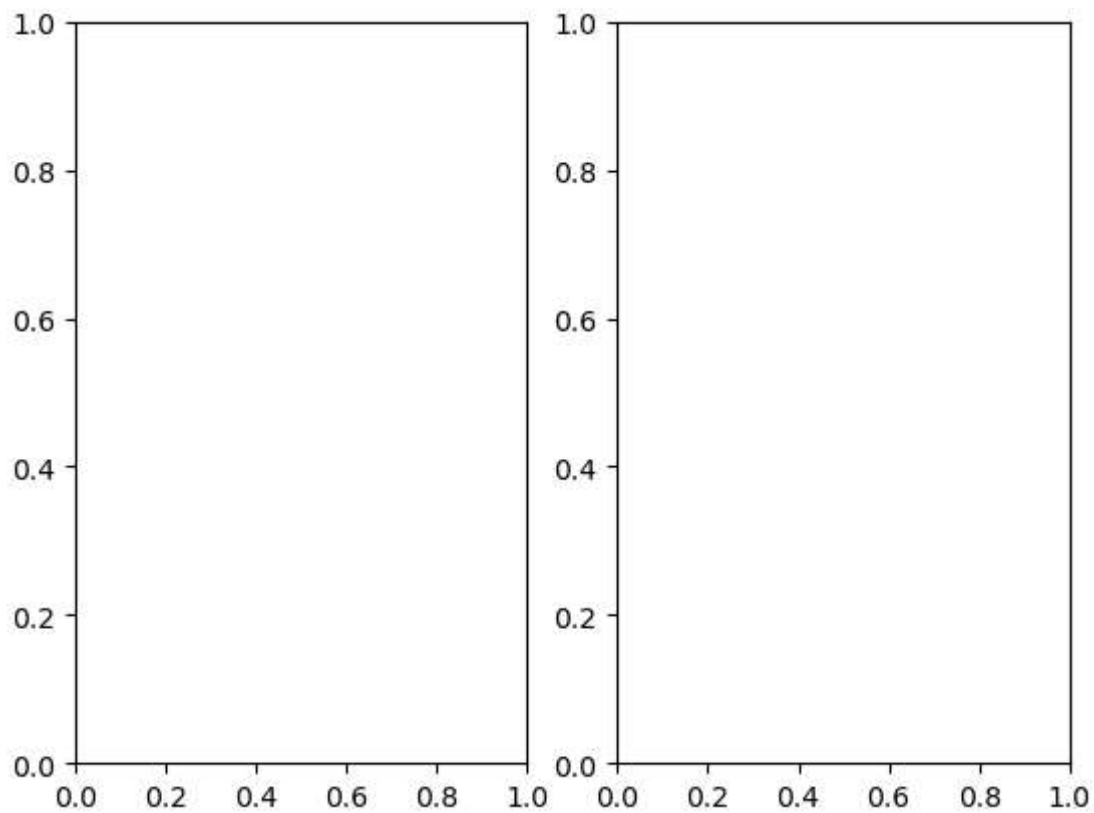
I am Preston

**Exercise 4 (a) (Worth 5 points)**

- create figure and axes objects in one line of code. We need one row and two columns subplots
- In other words empty canvas of 1 by 2 subplots

In [28]: *# Empty canvas of 1 by 2 subplots*

```
fig, axes=plt.subplots(nrows=1,ncols=2)
```

In [21]: 

```
print("I am Preston")
```

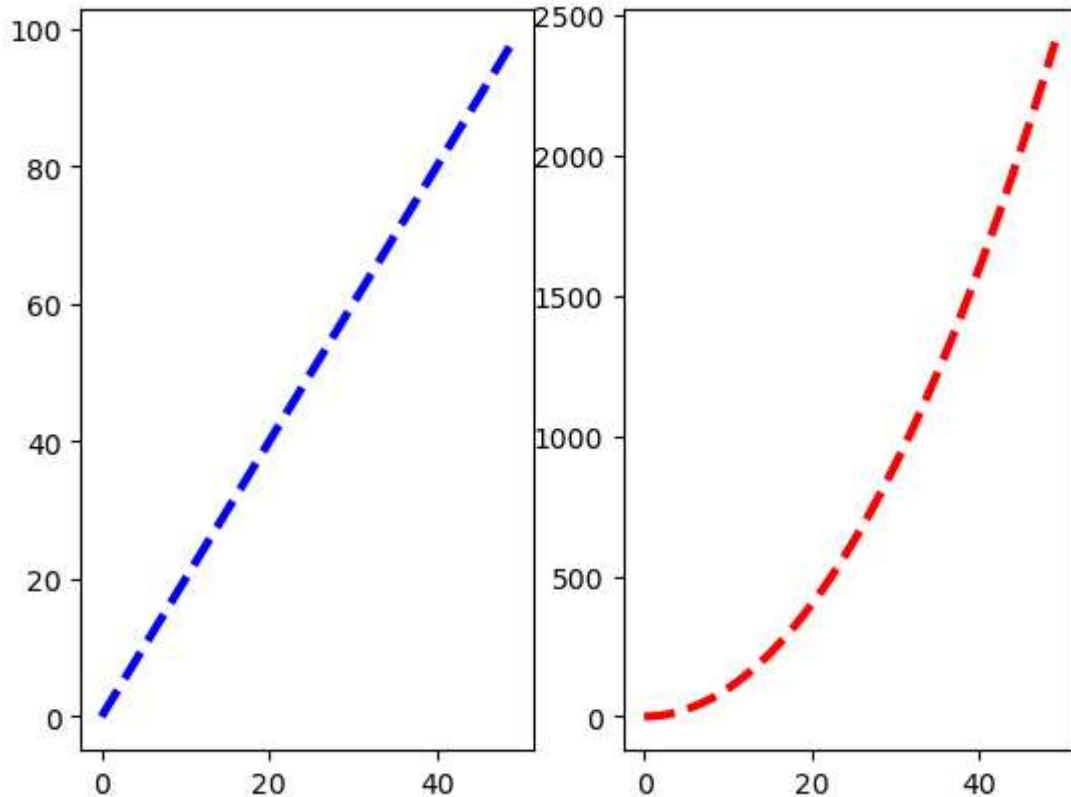
I am Preston

**Exercise 4 (b) (Worth 10 points)**

- Now plot (x,y) and (x,z) on the axes. Play around with the linewidth and style\*\*

```
In [29]: axes[0].plot(x,y,color="blue",lw=3,ls='--')
axes[1].plot(x,z,color="red",lw=3,ls='--')
fig
```

Out[29]:



```
In [22]: print("I am Preston")
```

I am Preston

#### Exercise 4 (c) (Worth 15 points)

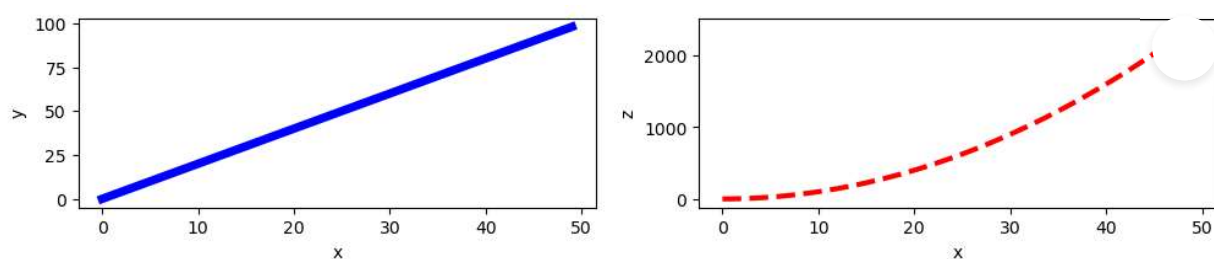
- Resize the figure in exercise 4 (b) to have a width of 12 and height 2.
- Note this is the whole canvas size
- Now plot (x,y) and (x,z) on the axes as you did in exercise 4 (b).
- Play around with the linewidth and style



```
In [34]: fig, axes=plt.subplots(nrows=1,ncols=2,figsize=(12,2))
axes[0].plot(x,y,color="blue",lw=5)
axes[0].set_xlabel('x')
axes[0].set_ylabel('y')

axes[1].plot(x,z,color="red",lw=3,ls='--')
axes[1].set_xlabel('x')
axes[1].set_ylabel('z')
```

Out[34]: Text(0, 0.5, 'z')



```
In [23]: print("I am Preston")
```

I am Preston

```
In [ ]:
```