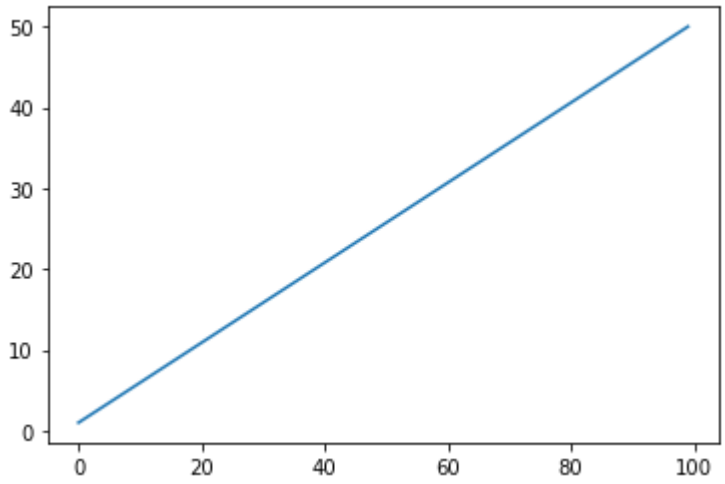
2D Plotting

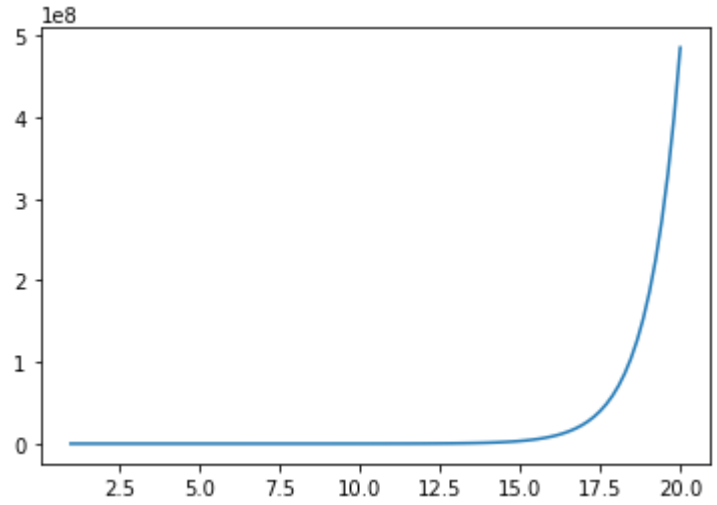
In [60]:
```
# import the library NumPy
import numpy as np

# import the library matplotlib
import matplotlib.pyplot as plt
```

In [64]:
```
X = np.linspace(1,50,100)

plt.plot(X)

plt.show()
```

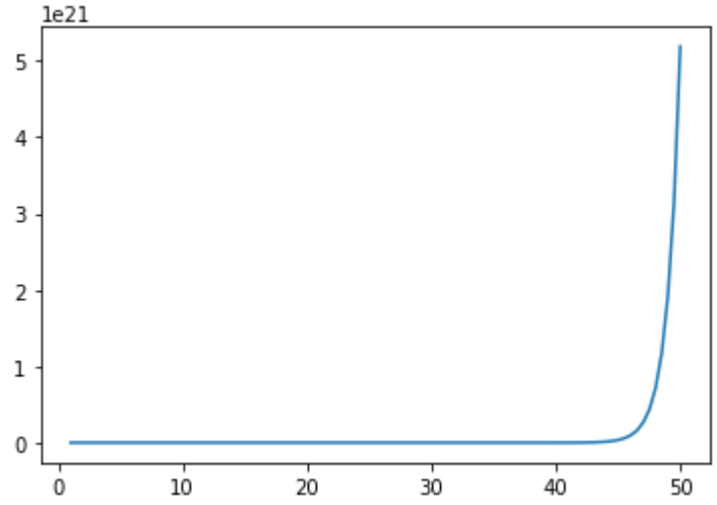


Q. Write a python program to get graph of exponential function.

In [3]:
```
X = np.linspace(1,20,100)

Y = np.exp(X)

plt.plot(X,Y)

plt.show()
```



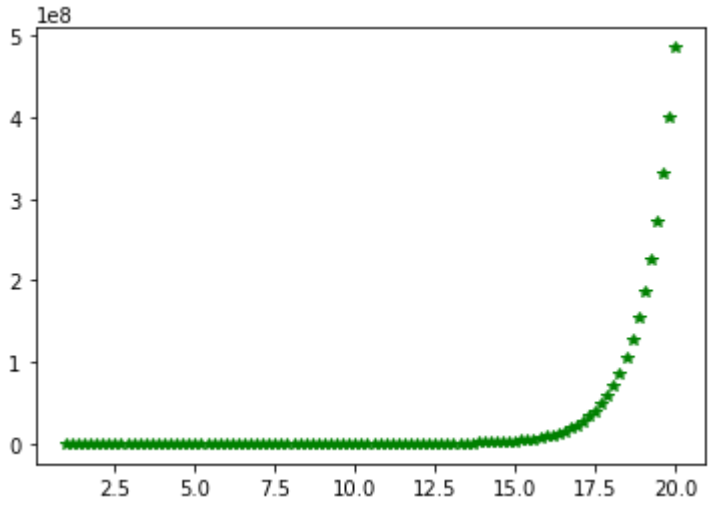
In [67]:
```
x = np.linspace(1,50,100)
plt.plot(x,np.exp(x))
plt.show()
```



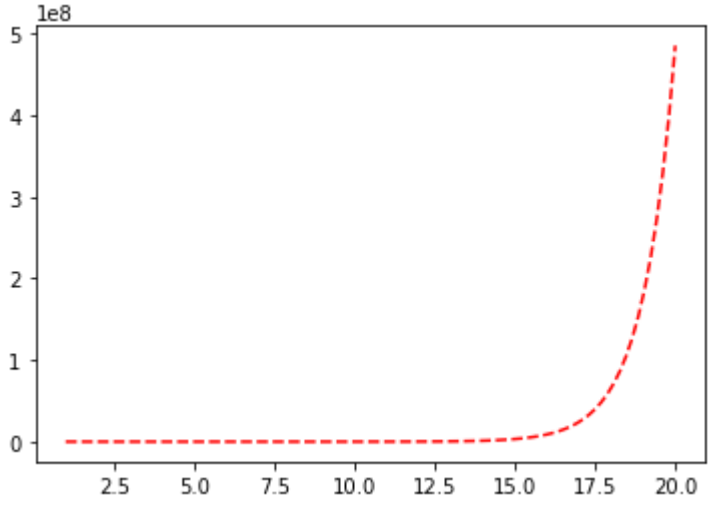
From the plot, it can be observed that as X increases, Y increases exponential.

The above plot can be represented not only by a solid line, but also a dotted line with varied thickness. The points can be marked explicitly using any symbol.

In [69]:
```
X = np.linspace(1,20,100)

Y = np.exp(X)

plt.plot(X,Y, 'g*')

plt.show()
```

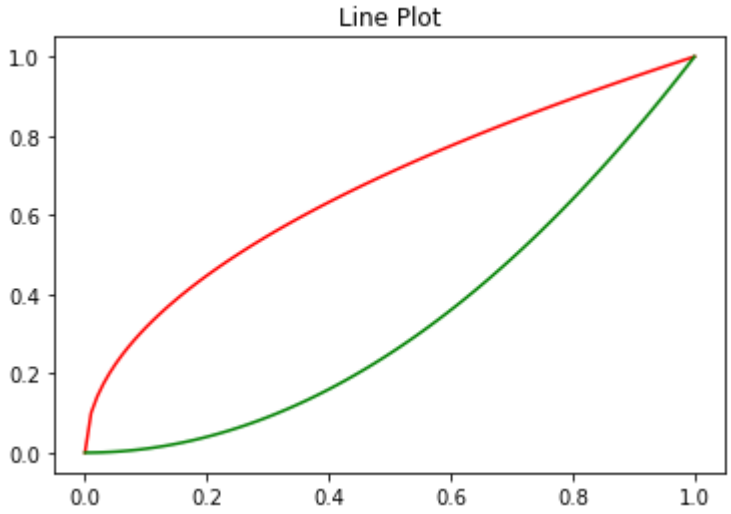


In [68]:
```
X = np.linspace(1,20,100)
plt.plot(X, np.exp(X),color='red', linestyle='dashed')
plt.show()
```



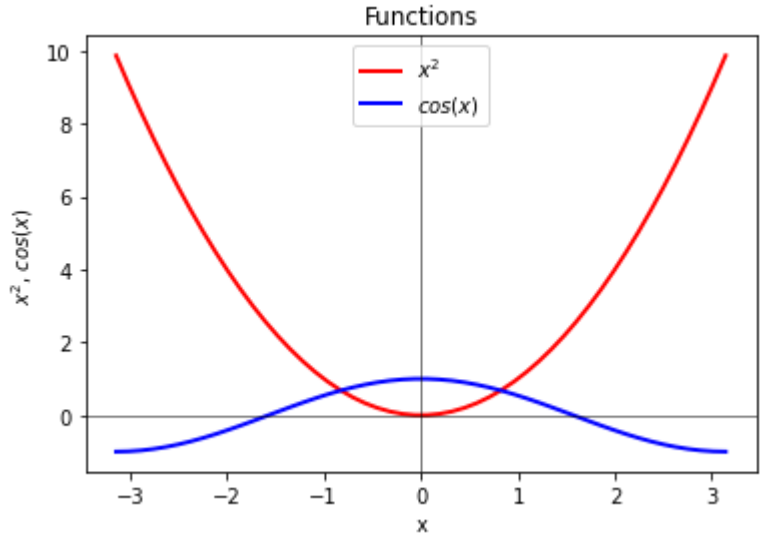
Q.Write a python program to plot the graphs of x^2 and $\sqrt{(x)}$ in one plot.

In [46]:
```
X = np.linspace(0,1,100)

Y = np.sqrt(X)
Z = np.square(X)

plt.plot(X,Y, 'r')
plt.plot(X,Z,'g')
plt.title('Line Plot')

plt.show()
```



Q. Plot the graphs of the functions x^2 and $cos(x)$ in a single plot.

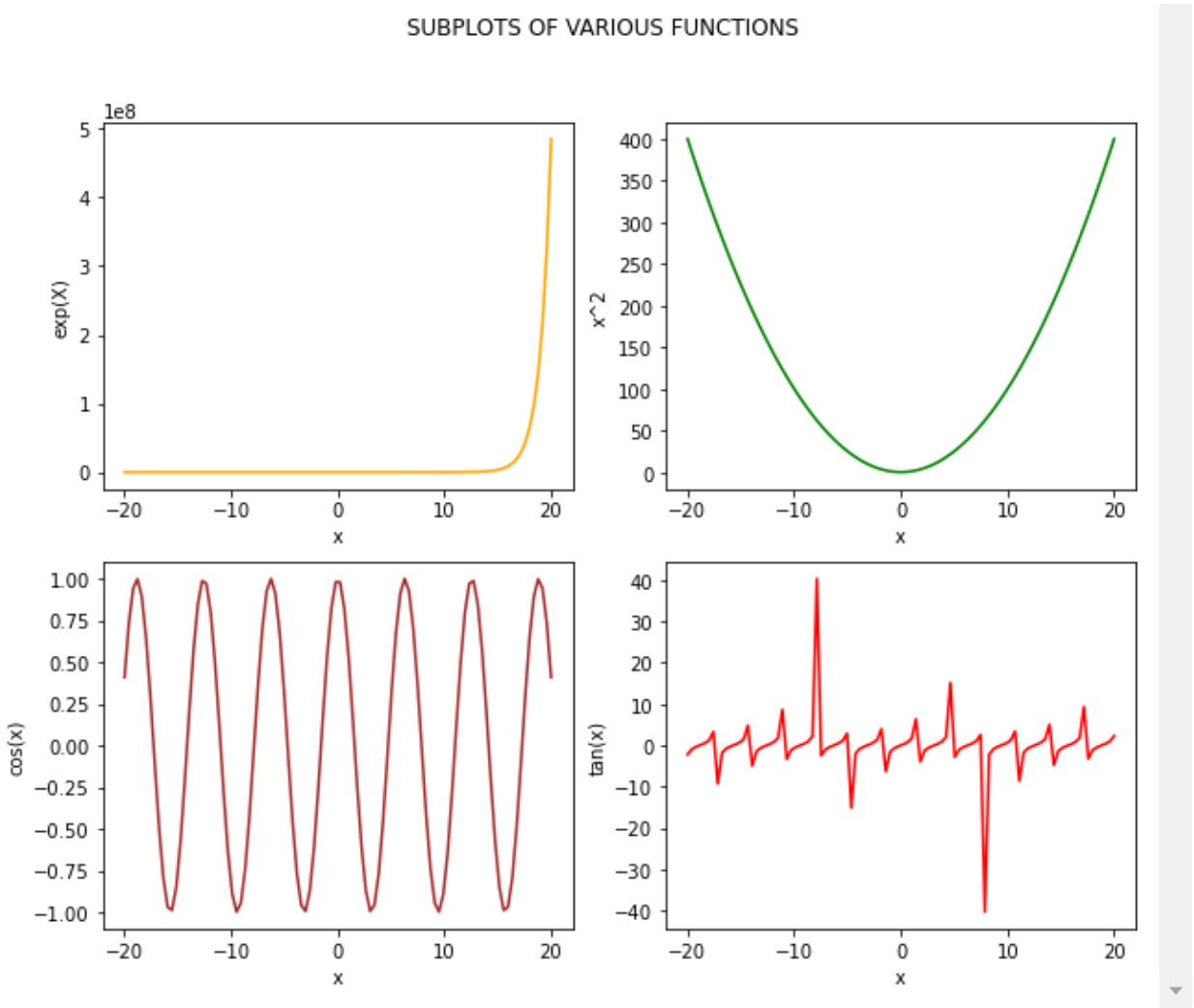
In [73]:
```
import numpy as np
import matplotlib.pyplot as plt

X = np.linspace(-np.pi, np.pi)
Y1 = X**2
Y2 = np.cos(X)

plt.plot(X, Y1, lw=2, color='red',label='$x^2$')
plt.plot(X, Y2, lw=2, color='blue',label='$cos(x)$')

plt.title('Functions')
plt.xlabel('x')
plt.ylabel('$x^2$, $cos(x)$')

plt.axhline(0, lw=0.5, color='black')
plt.axvline(0, lw=0.5, color='black')
plt.legend()
None
```



Q. Plot the graph of i) e^x, ii) x^2, iii) $cosx$, iv) $tanx$ as subplots.

In [2]:
```
from matplotlib.pylab import *
figure(figsize=(10,8))
suptitle('SUBPLOTS OF VARIOUS FUNCTIONS')

subplot(221) # 2 tall, 2 wide, plot number 1.
x=linspace(-20,20,100)
plot(x,exp(x),color='Orange')
xlabel('x')
ylabel('exp(X)')

subplot(222) # 2 tall, 2 wide, plot number 2.
x=linspace(-20,20,100)
plot(x,x**2,color='Green')
xlabel('x')
ylabel('x^2')

subplot(223) # 2 tall, 2 wide, plot number 3.
x=linspace(-20,20,100)
plot(x,cos(x),color='Brown')
xlabel('x')
ylabel('cos(x)')

subplot(224) # 2 tall, 2 wide, plot number 4.
x=linspace(-20,20,100)
plot(x, tan(x),color='Red')
xlabel('x')
ylabel('tan(x)')
```

Out[2]:
```
Text(0, 0.5, 'tan(x)')
```



Q. Consider the average heights and weights of persons stored in the following lists:

height = [121.9,124.5,129.5,134.6,139.7,147.3, 152.4, 157.5,162.6]

weight= [19.7,21.3,23.5,25.9,28.5,32.1,35.7,39.6, 43.2]

Let us plot a line chart where:

i. x axis will represent weight

ii. y axis will represent height

iii. x axis label should be “Weight in kg”

iv. y axis label should be “Height in cm”

v. colour of the line should be green

vi. use * as marker

vii. Marker size as10

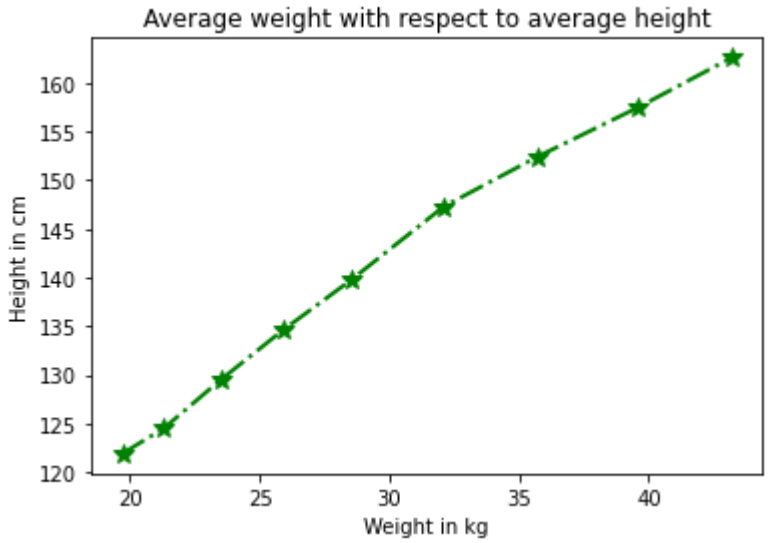
viii. The title of the chart should be “Average

weight with respect to average height".

ix. Line style should be dashed

x. Linewidth should be 2.

In [53]:
```
import matplotlib.pyplot as plt


height=[121.9,124.5,129.5,134.6,139.7,147.3,152.4,157.5,162.6]
weight=[19.7,21.3,23.5,25.9,28.5,32.1,35.7,39.6,43.2]


plt.xlabel('Weight in kg')
plt.ylabel('Height in cm')
plt.title("Average weight with respect to average height")


plt.plot(weight, height, marker='*',  markersize=10, color='green', linewidth=2,
plt.show()
```



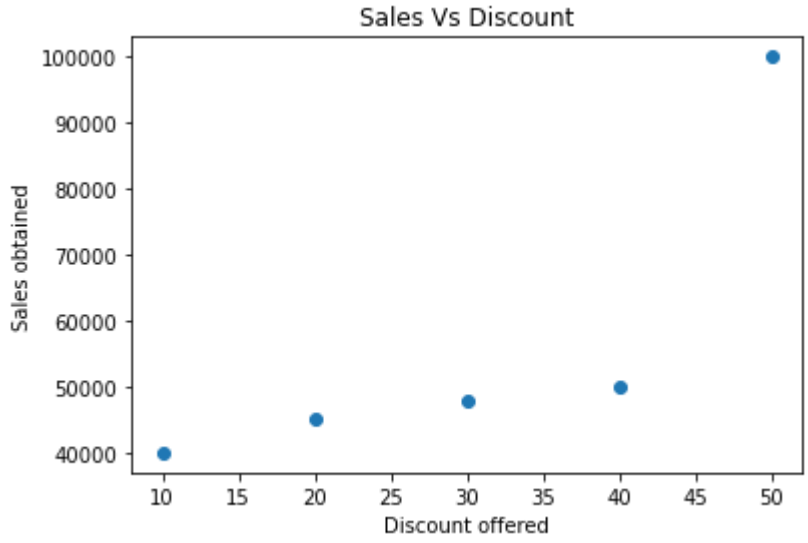
Scatter Plot

A scatter plot is a set of points plotted on horizontal and vertical axes. The scatter plot can be used to study the correlation between the two variables. One can also detect the extreme data points using a scatter plot.

Q.

A shop which sells designer Kurtas, gave discounts ranging from 10% to 50% over a period of 5 weeks, during the sales season. They made a sales of 40000,45000,48000,50000,100000 (in Rs) respectively. They recorded sales for each type of discount in an array. Draw a scatter plot to show a relationship between the discount offered and sales made.

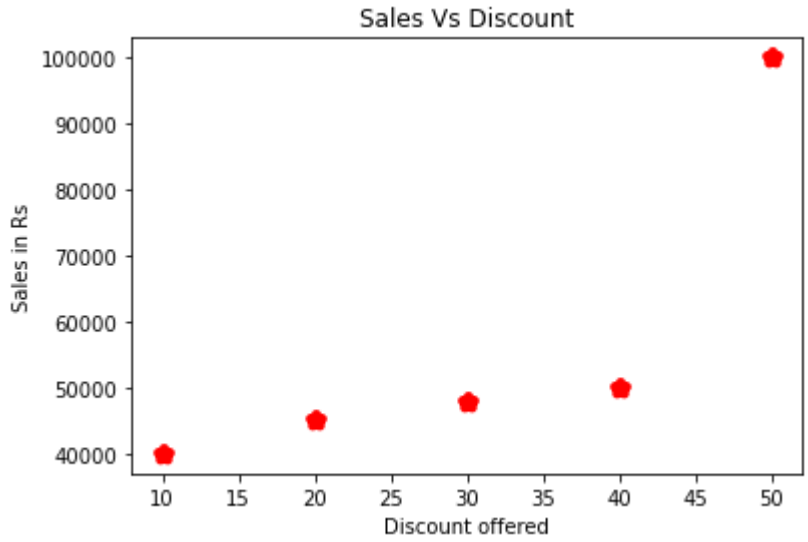
In [47]:
```
import numpy as np
import matplotlib.pyplot as plt

Discount = np.array([10,20,30,40,50])
Sales = np.array([40000,45000,48000,50000,100000])

plt.scatter(x=Discount,y = Sales)

plt.title('Sales Vs Discount')
plt.xlabel('Discount offered')
plt.ylabel('Sales obtained')

plt.show()
```



Customising Scatter chart

i) Change the width
ii) Colour
iii) Marker

In [52]:
```
import numpy as np
import matplotlib.pyplot as plt

Discount = np.array([10,20,30,40,50])
Sales = np.array([40000,45000,48000,50000,100000])


plt.scatter(x=discount,y=saleInRs, color='red',linewidth=5,marker='*')

plt.title('Sales Vs Discount')
plt.xlabel('Discount offered')
plt.ylabel('Sales in Rs')

plt.show()
```



In [ ]: