Experiment-2

AIM-: TO GET A BETTER UNDERSTANDING OF PLOTTING IN MATLAB

Plot function syntax -:

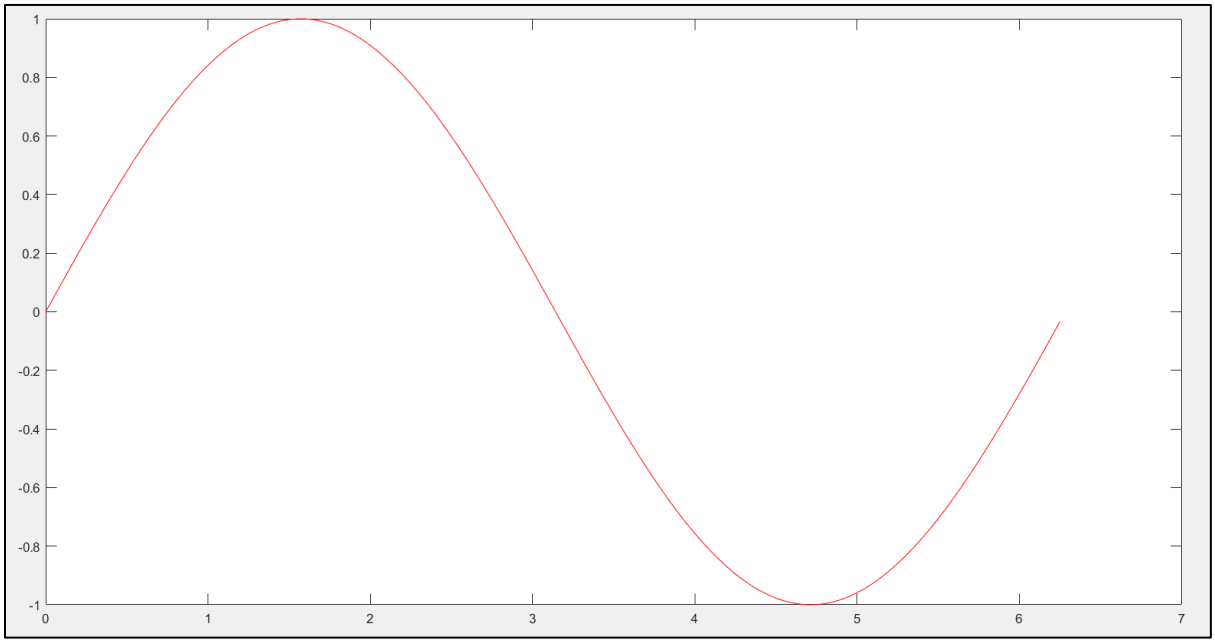
plot(x, y)

Where x means X-axis elements like array etc. while y means Y-axis element.

Try the below given code for better understanding

```
t= [0:0.05:2*pi];
x = sin(t);
plot(t,x);
```

The following code will plot the below given graph in the figure window.



MATLAB allows you to add title, labels along the x-axis and y-axis, grid lines and also to adjust the axes to spruce up the graph. Let's understand it in a bit detail.

Some other commands regarding plotting in MATLAB: -

1) The **subplot()** function in MATLAB allows you to insert multiple plots on a grid within a single figure.
2) The **xlabel** and **ylabel** commands generate labels along x-axis and y-axis.
3) The **title** command allows you to put a title on the graph.
4) The **grid on** command allows you to put the grid lines on the graph.
5) The **axis equal** command allows generating the plot with the same scale factors and the spaces on both axes.
6) The **axis square** command generates a square plot.

7) Command '**hold on'** is used to retain the plot in current axes. By doing so, the new plot is added to the existing axes...

8) Command '**hold off'** is used to change the hold on state back to off
9) In Matlab, **legends** are used to label the plotted data for every parameter that is mentioned. For labels, it uses one of the properties of data series which is known as display name. The legend updates automatically whenever we include any new or remove data series from the current axes. If there are no current axes present, then there is no legend, and it is empty.

Notations:-

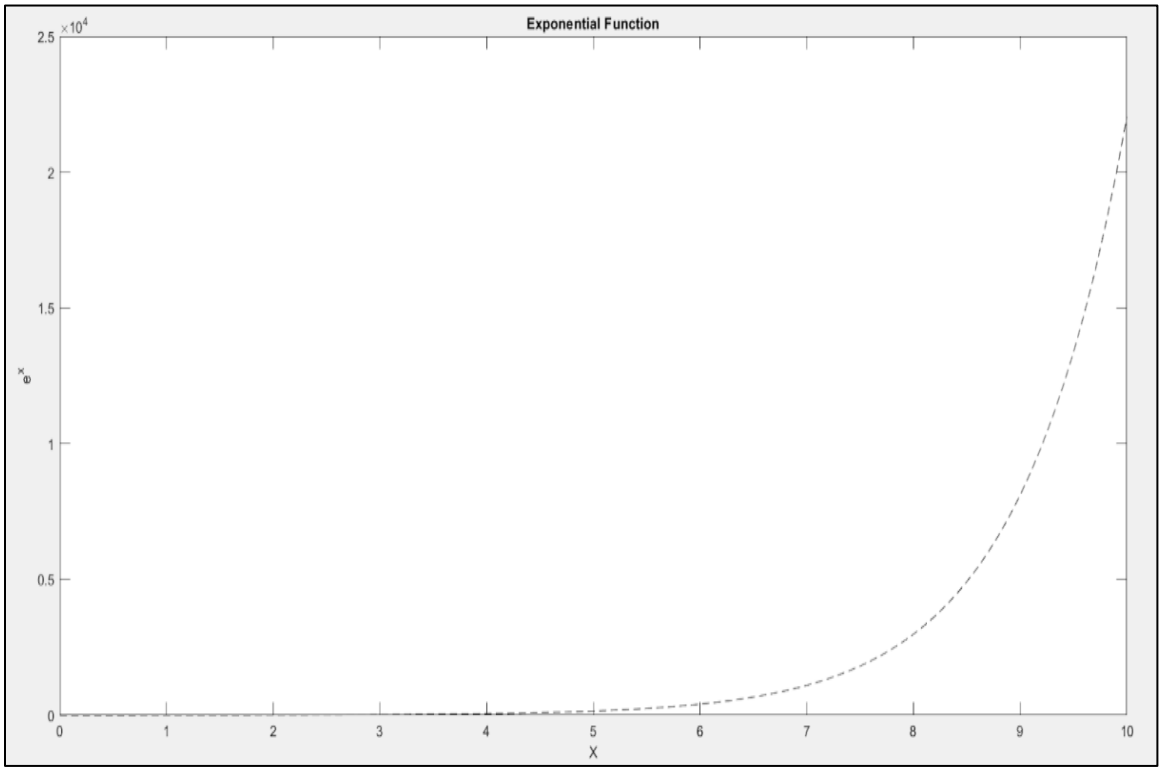
Symbol	Color	Symbol	Line Style	Symbol	Marker
k	Black	–	Solid	+	Plus sign
r	Red	−−	Dashed	o	Circle
b	Blue	:	Dotted	*	Asterisk
g	Green	−.	Dash-dot	.	Point
c	Cyan	none	No line	×	Cross
m	Magenta			*s*	Square
y	Yellow			*d*	Diamond

Examples: -

Code :-

```
x= [0:0.1:10];
y=exp(x);
plot(x,y,'Black--');
xlabel("X");
ylabel("e^x");
title("Exponential Function")
```

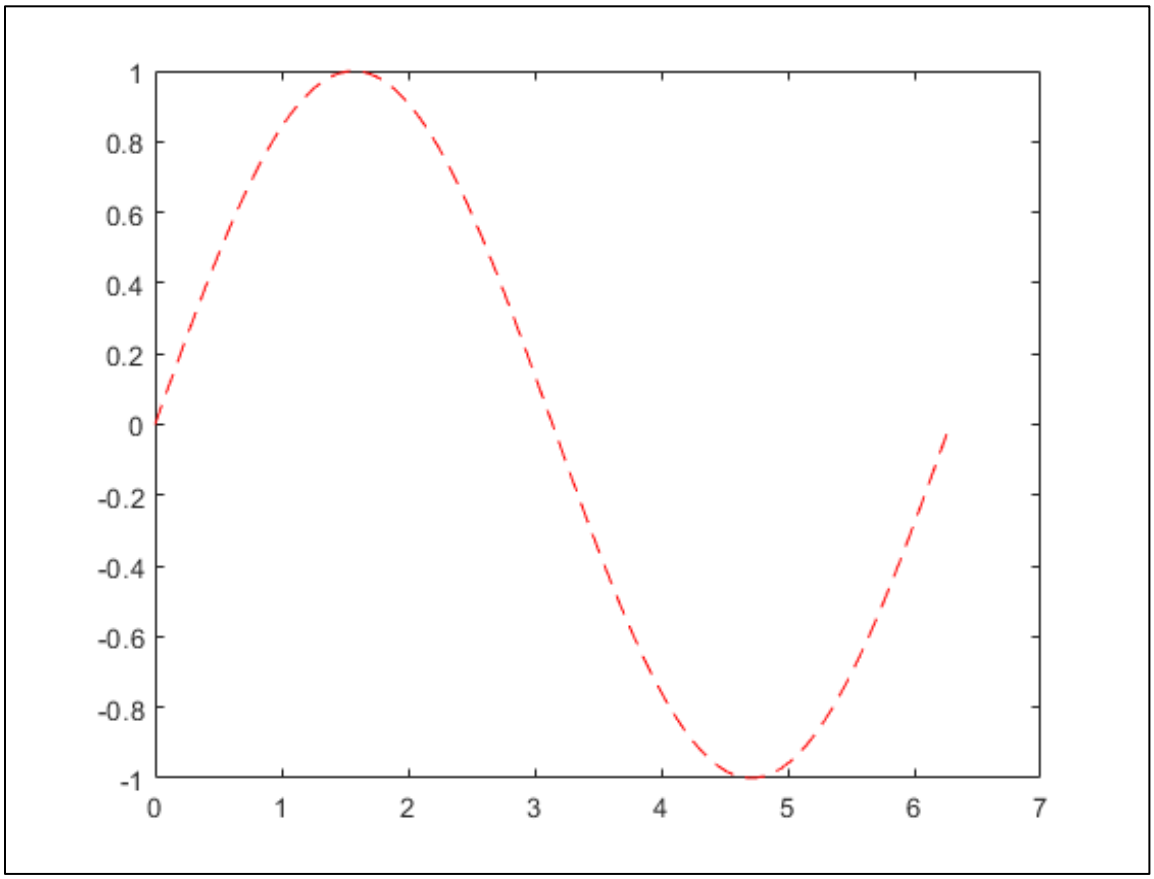
Output:-



Code:-

```
x = linspace(0,2*pi);
y = sin(x);
plot(x,y,"r--")
```

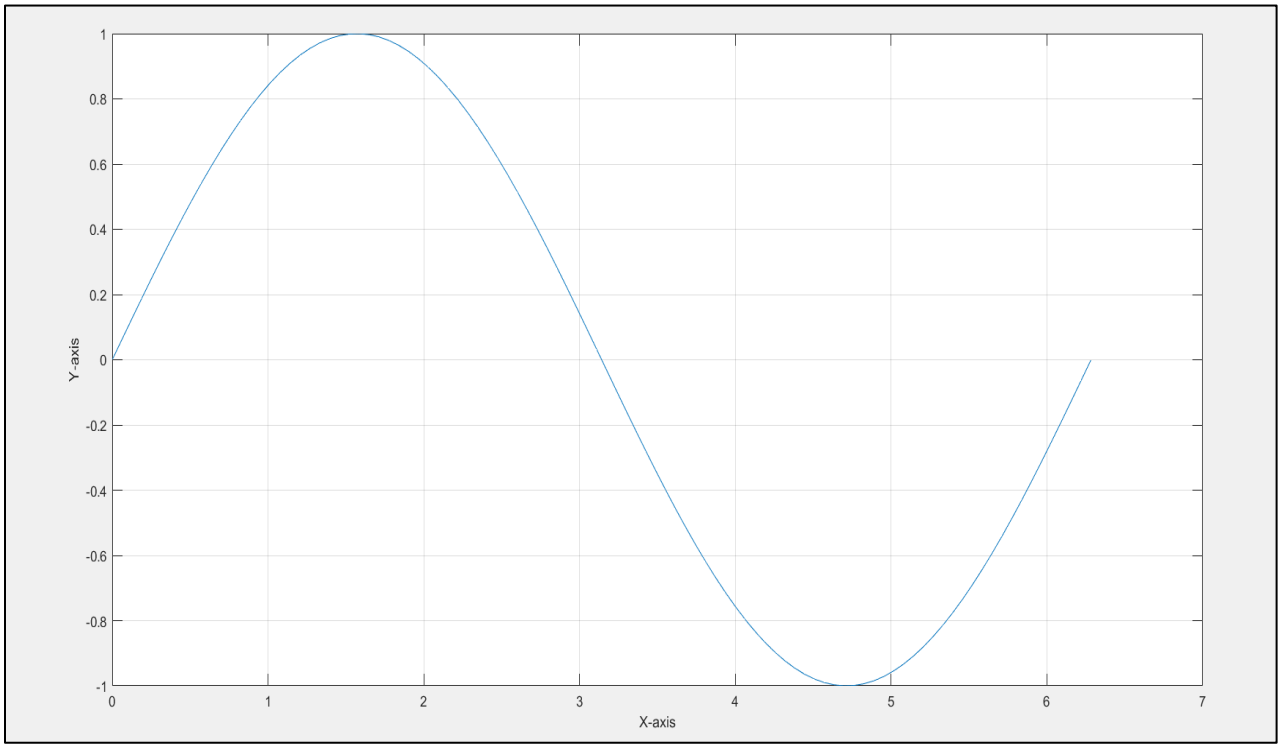
Output-:



Code:-

```
x=linspace(0,2*pi,100);
y=sin(x);
plot(x,y,"r--")
grid on
xlabel('X-axis')
ylabel('Y-axis')
title("Sin X versus x")
title("Sin X versus x")
title("Sin X versus x")
```

Output:-

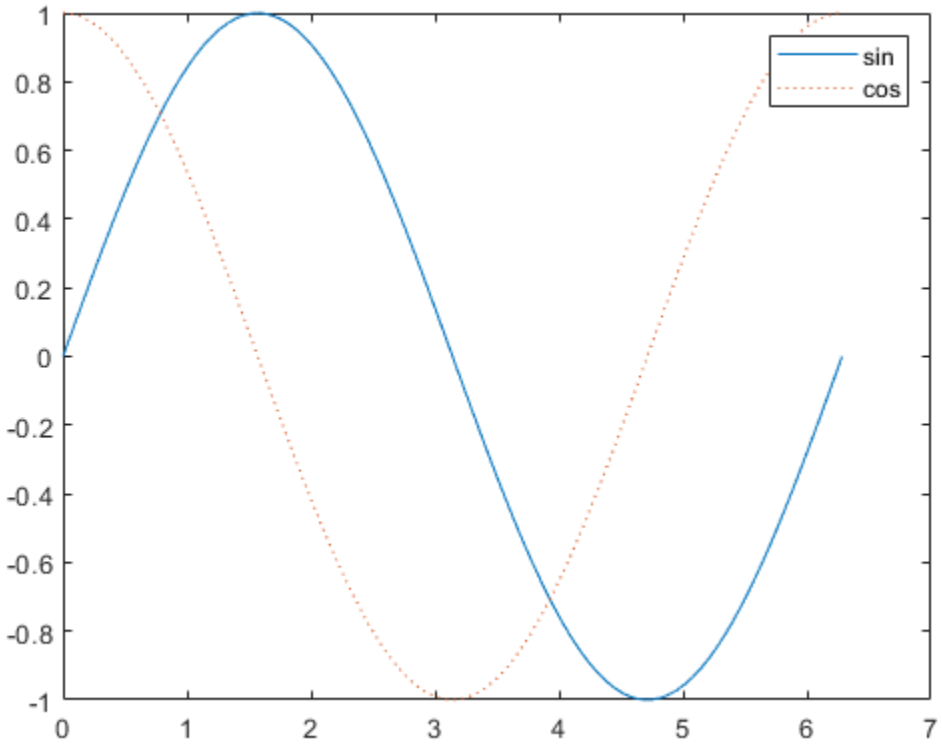


[Note: Try using stem(x,y) instead of plot(x,y) and note your observations]

Code:-

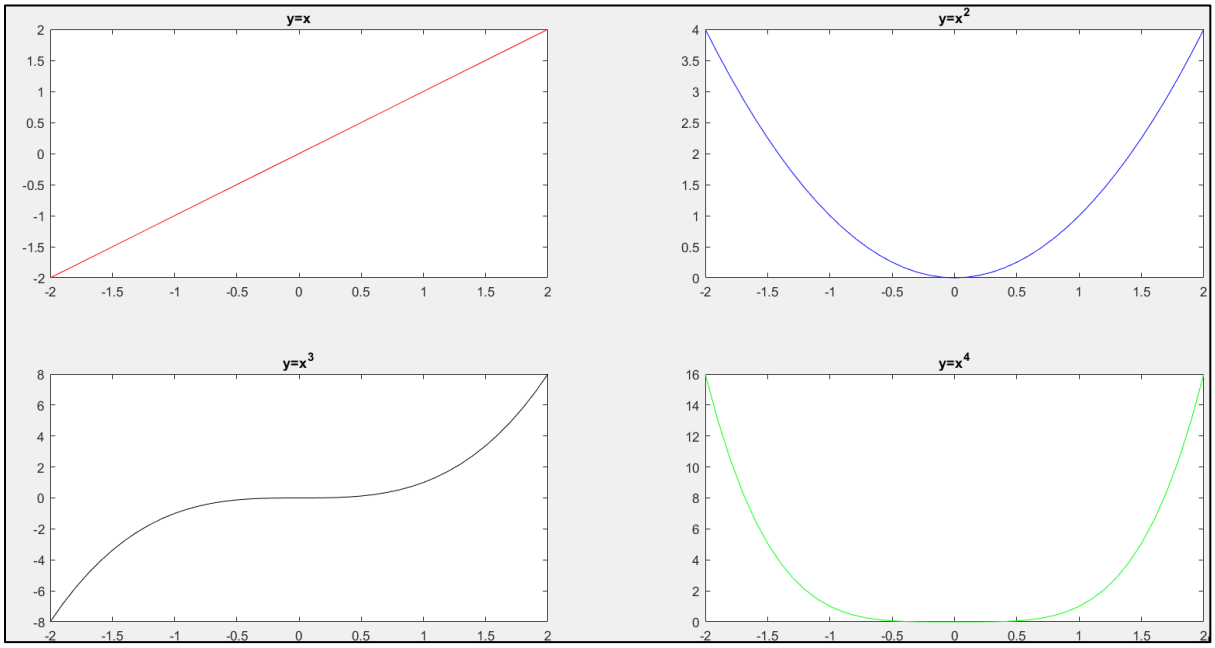
```
x = linspace(0,2*pi);
y = sin(x);
plot(x,y);
hold on;
y2 = cos(x);
plot(x,y2,":");
legend("sin","cos");
hold off;
```

Output:-



Code:-

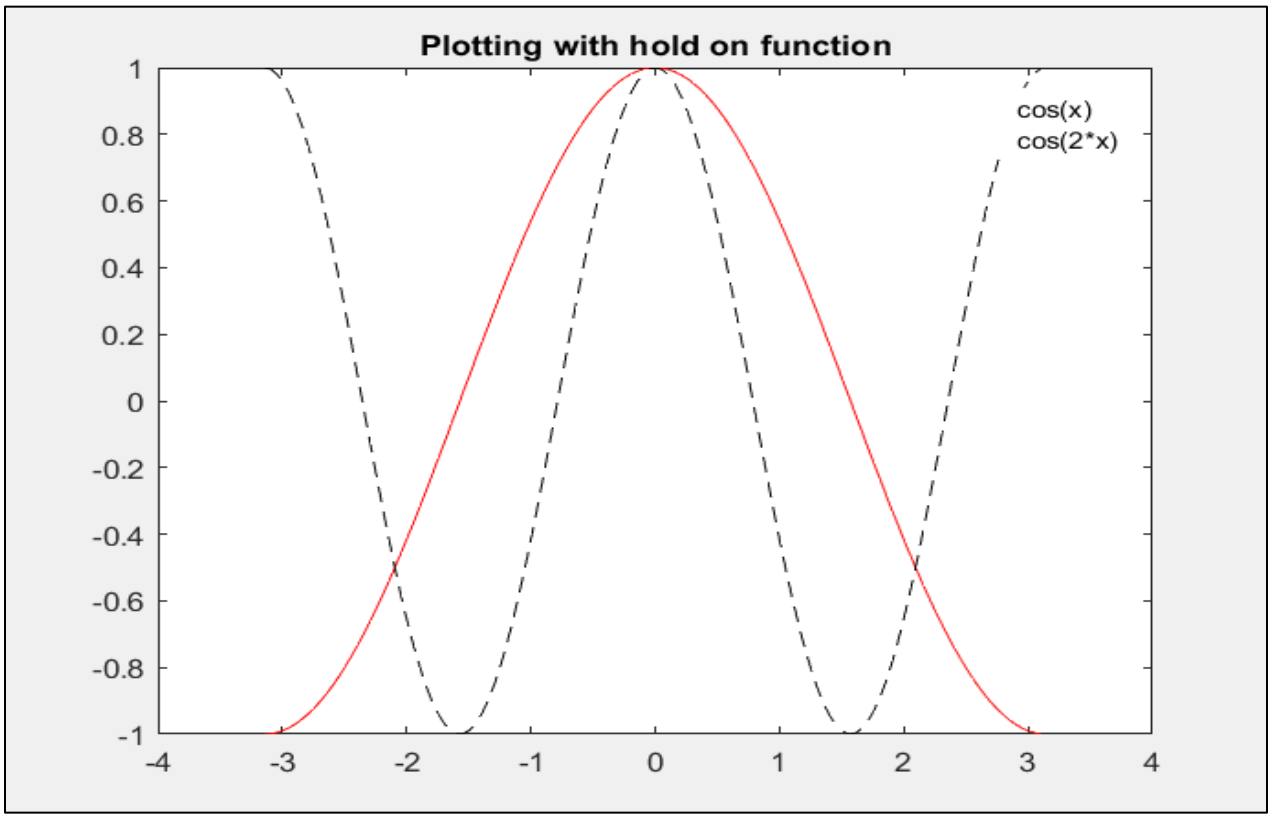
```
subplot(2,2,1)
x=[-2:0.1:2];
y=x;
plot(x,y,'red');
title('y=x');
subplot(2,2,2)
y2=x.^2;
plot(x,y2,'blue');
title('y=x^2');
subplot(2,2,3)
y3=x.^3;
plot(x,y3,'black');
title('y=x^3')
subplot(2,2,4)
y4=x.^4;
plot(x,y4,'green');
title('y=x^4')
```



Code:-

```
x=[-1*pi:0.05:pi];
y1=cos(x);
plot(x,y1,'red');
hold on;
y2= cos(2*x);
plot(x,y2,'black--');
title('Plotting with hold on function');
legend('cos(x)','cos(2*x)');
```

Output:-



Code:-

```
x = linspace(0,3*pi,200);
y = cos(x) + rand(1,200);
scatter(x,y,'red*')
```

Output**:-**