Enable | Enlighten | Enrich
(Deemed to be University)
(Under Section 3 of UGC Act 1956)

KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University Established Under Section 3 of UGC Act 1956)
Pollachi Main Road, Eachanari (Po),
Coimbatore –641 021
DEPARTMENT Of MATHEMATICS

Subject: CALCULUS PRACTICALS **Subject Code: 17MMP111**

L	T	P	C
0	0	3	2

List of Practical (using MATLAB)
(Any 8 programs)

1. Plotting of graphs of function e^{ax+b}, log(ax + b), 1/(ax + b), sin(ax + b), cos(ax + b), |ax + b| and to illustrate the effect of a and b on the graph.

2. Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.

3. Sketching parametric curves (Eg. Trochoid, cycloid, epicycloids, hypocycloid).

4. Obtaining surface of revolution of curves.

5. Tracing of conics in cartesian coordinates/ polar coordinates.

6. Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone, elliptic, paraboloid, hyperbolic paraboloid using cartesian coordinates.

7. Matrix addition.

8. Matrix multiplication.

9. Inverse of a matrix.

10. Transpose of a matrix.

Enable | Enlighten | Enrich
(Deemed to be University)
(Under Section 3 of UGC Act 1956)

KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University Established Under Section 3 of UGC Act 1956)
Pollachi Main Road, Eachanari (Po),
Coimbatore –641 021
DEPARTMENT OF MATHEMATICS

Subject: CALCULUS PRACTICALS **Subject Code: 17MMU111**

L	T	P	C
0	0	3	2

List of Practical (using MATLAB)

1. Plotting of graphs of function e^{ax+b}, log(ax + b), 1/(ax + b), sin(ax + b), cos(ax + b), |ax + b| and to illustrate the effect of a and b on the graph.

2. Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.

3. Sketching parametric curves (Eg. Trochoid, cycloid, epicycloids, hypocycloid).

4. Obtaining surface of revolution of curves.

5. Tracing of conics in cartesian coordinates/ polar coordinates.

6. Matrix multiplication.

7. Inverse of a matrix.

8. Transpose of a matrix.

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed University Established Under Section 3 of UGC Act 1956)

Pollachi Main Road, Eachanari(po),

Coimbatore – 641 021.

DEPARTMENT OF MATHEMATICS

B.Sc Mathematics

INDEX

NO.	DATE	CONTENT
1.	17.07.17	Plotting of graphs of function $e^{ax + b}$, log(ax + b), 1/(ax + b), sin(ax + b), cos(ax + b), |ax + b| and to illustrate the effect of a and b on the graph.
2.	24.07.17	Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.
3.	31.07.17	Sketching parametric curves (Eg. Trochoid, cycloid, epicycloids, hypocycloid).
4.	07.08.17	Obtaining surface of revolution of curves.
5.	28.08.17	Tracing of conics in cartesian coordinates/ polar coordinates.
6.	11.09.17	Matrix multiplication.
7.	18.09.17	Inverse of a matrix.
8.	23.09.17	Transpose of a matrix.

EX.NO:1	PLOTTING OF GRAPHS OF FUNCTIONS

AIM:

To plot the given function in MATLAB script file with five examples.

ALGORITHM:

Step 1: Start the program

Step 2: Get the function from the user to plot.

Step 3: Using inline fitting function code for dot operation.

Step 4: Using ezplot fitting function code for plotting the given function.

Step 5: Stop the process.

PROGRAM CODING:

```
clc
clear all;
a=1
b=1
syms x
f=input (‘Enter the function to Plot’);
g=inline(f)
ezplot(f)
% To illustrate a:
clc
clear all
syms x a
a=1;
f=input(‘Enter the function to Plot:’);
g=inline(f)
ezplot(f)
```

```
%To illustrate b:
clc
clear all;
syms x b
b=1;
f=input('Enter the function to plot');
g=inline(f)
ezplot(f)
```

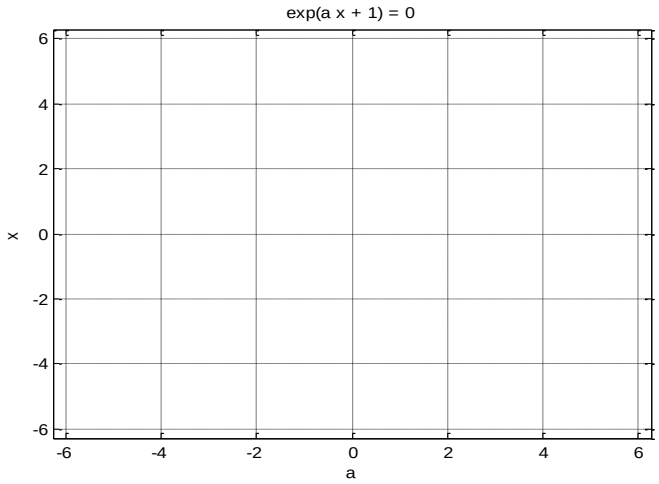
OUTPUT:

i) Enter the function to plot:

exp(a*x+b)

g=Inline function:

g(x) = exp(ax+1.0)

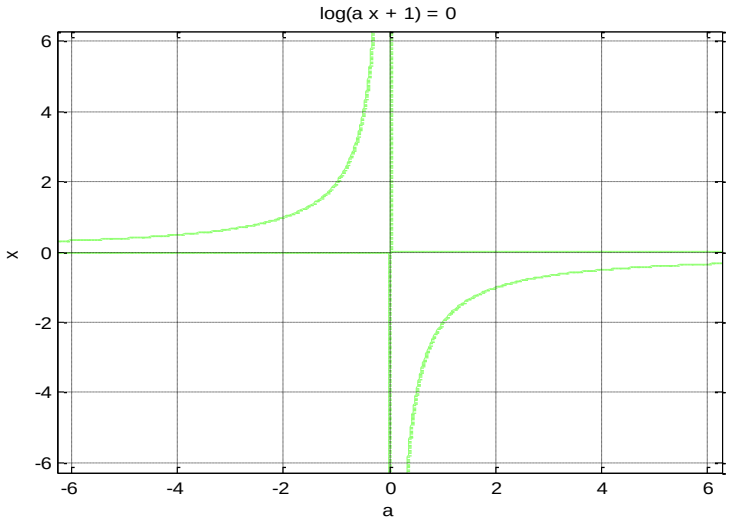


ii) Enter the function to plot:

log(a*x+b)

g=Inline function:

g(x) = log(ax+1.0)

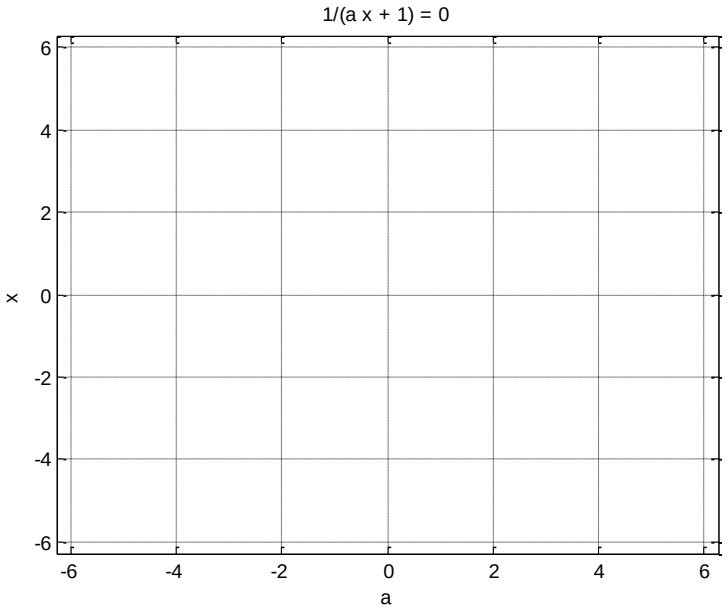


iii) Enter the function to plot:

1/a*x+b

g=Inline function:

g(x) =1/ (ax+1.0)

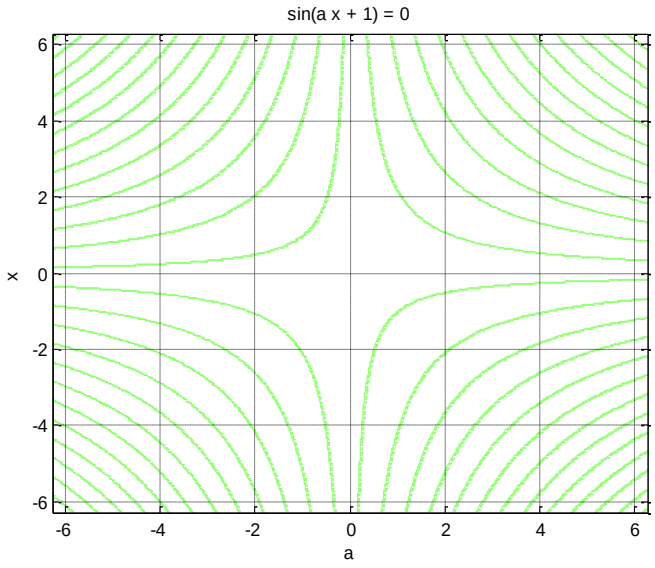


iv) Enter the function to plot:

sin(a*x+b)

g=Inline function:

g(x) = sin(ax+1.0)

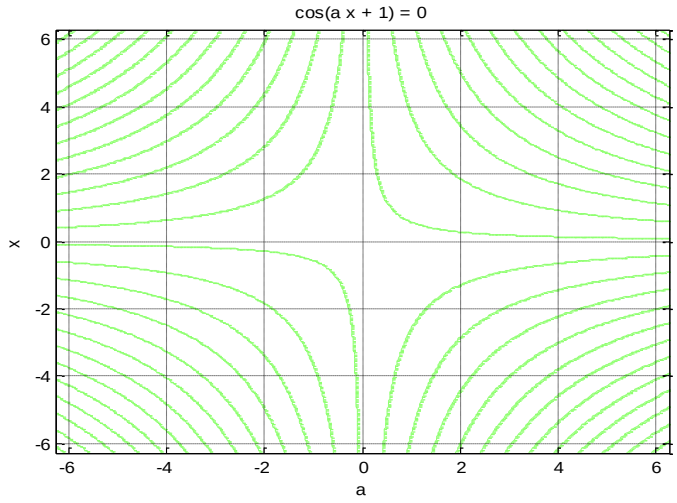


v) Enter the function to plot:

cos(a*x+b)

g=Inline function:

g(x) = cos(ax+1.0)

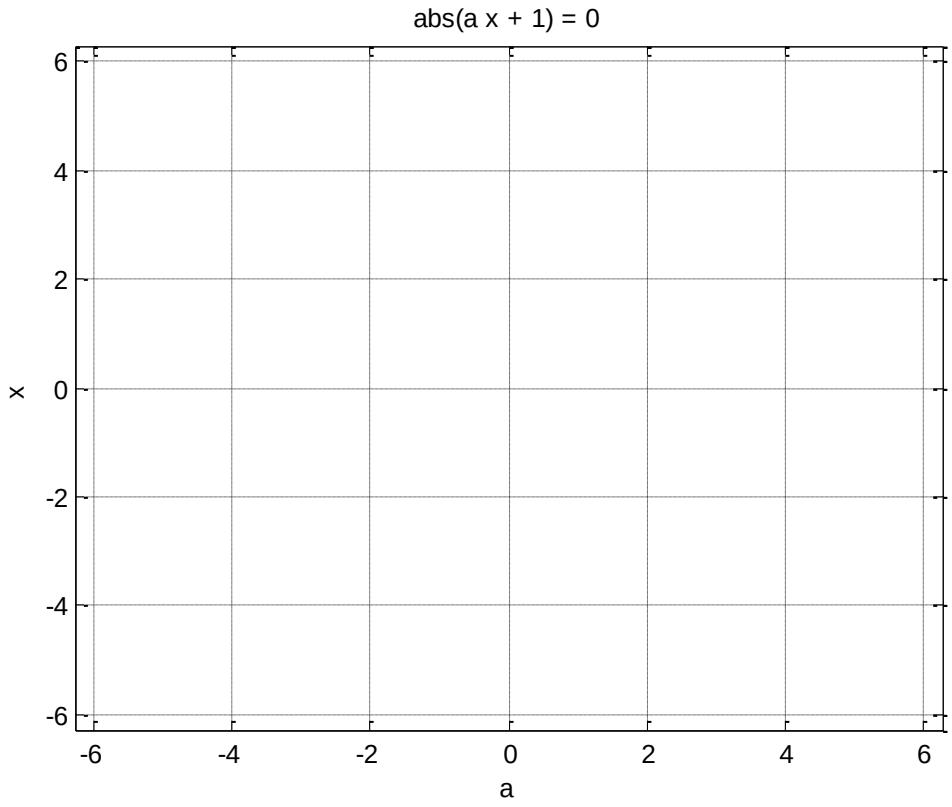


vi) Enter the function to plot:

abs(a*x+b)

g=Inline function:

g(x) = abs(ax+1.0)

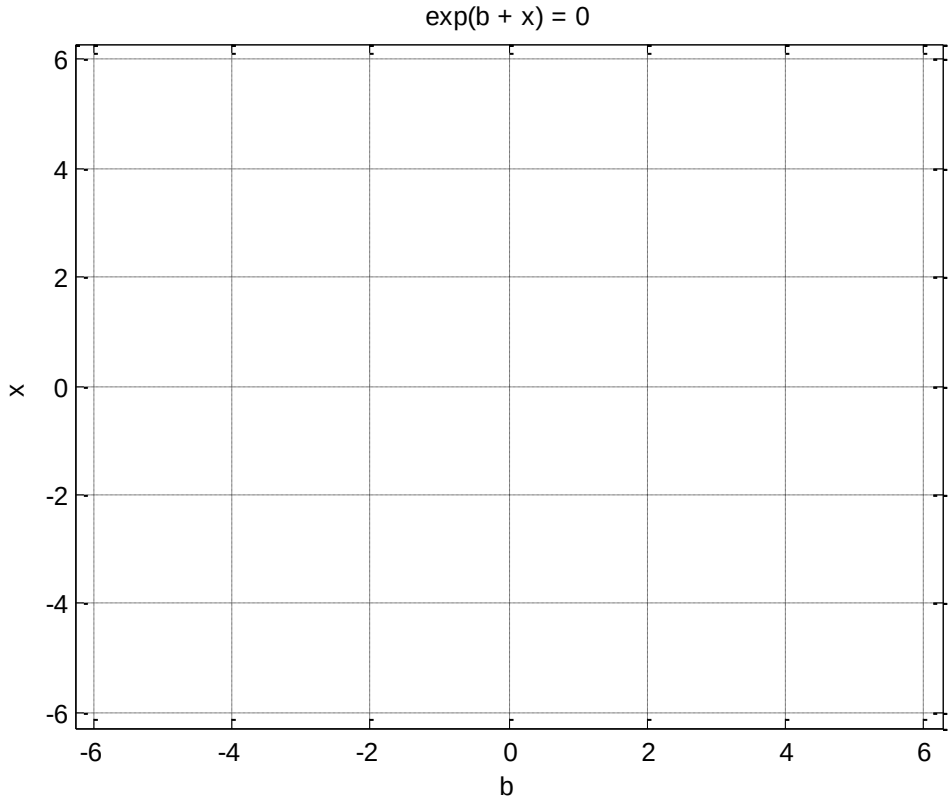


i) Enter the function to plot:

exp(a*x+b)

g=Inline function:

g(x) = exp(x+b)

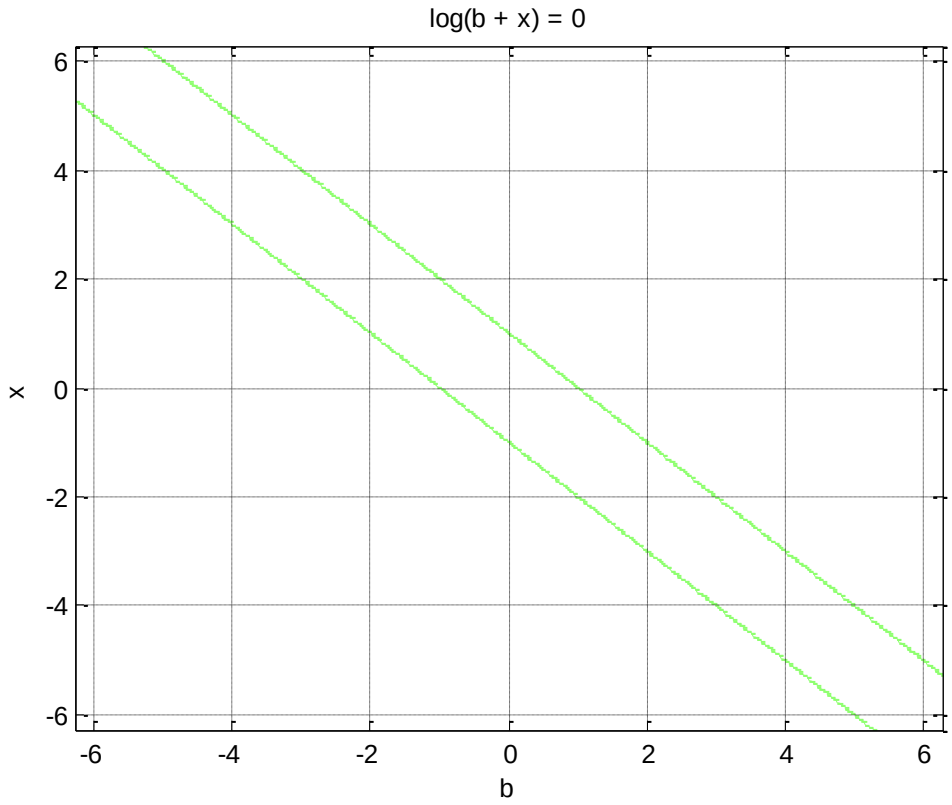


ii) Enter the function to plot:

log(a*x+b)

g=Inline function:

g(x) = log(x+b)

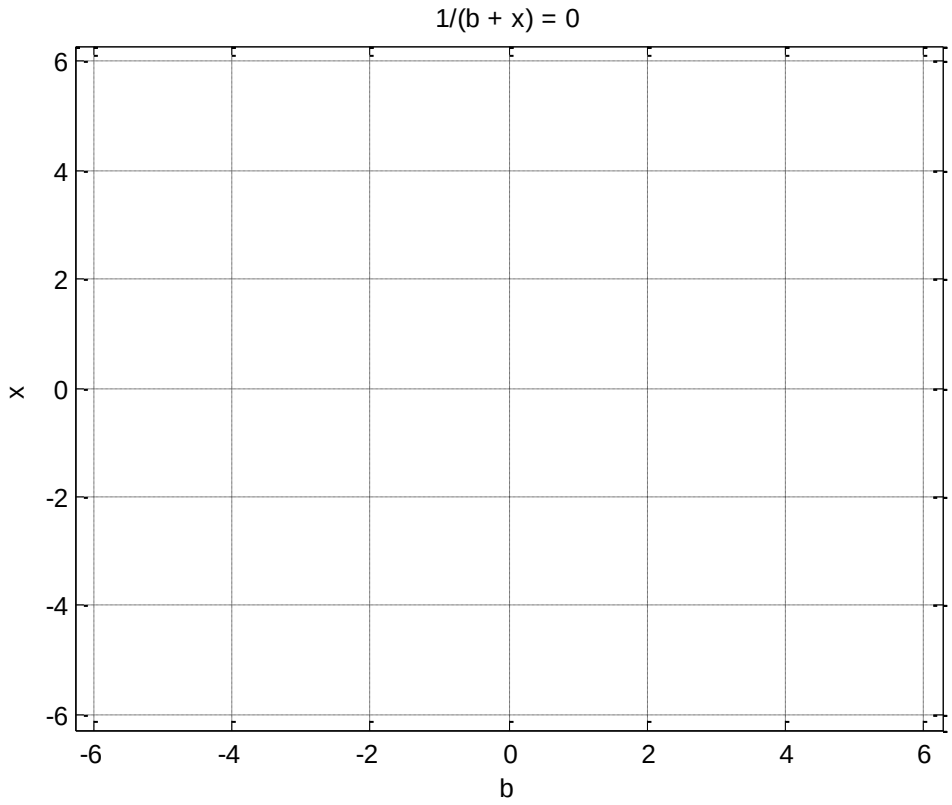


iii) Enter the function to plot:

1/(a*x+b)

g=Inline function:

g(x) = 1/ (x+b)

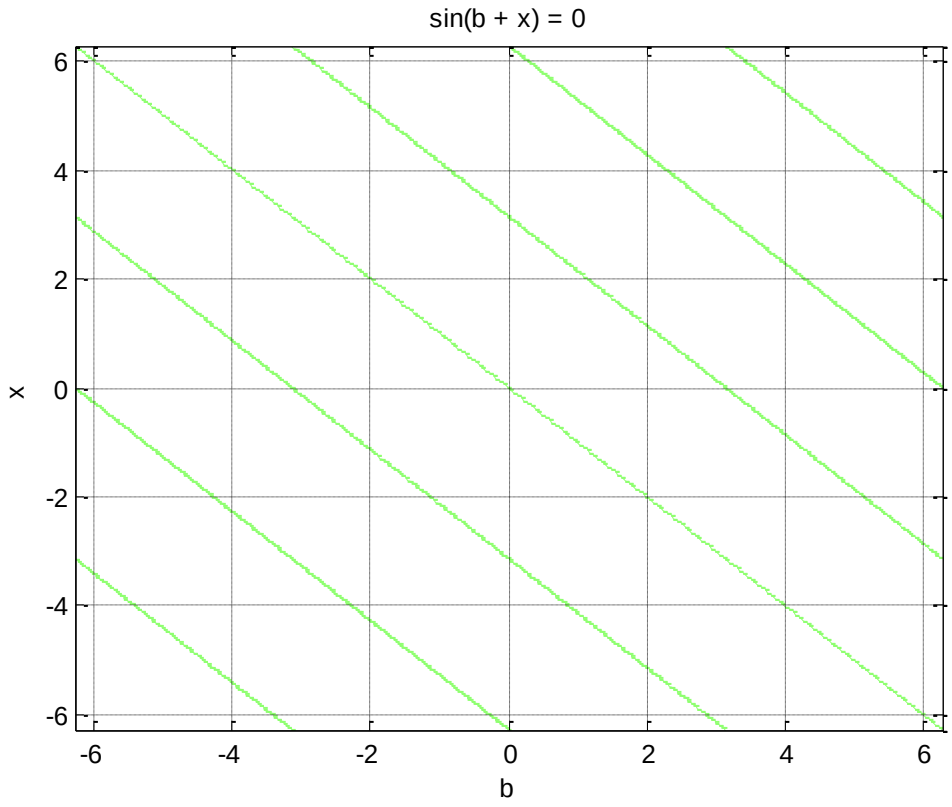


iv) Enter the function to plot:

sin(a*x+b)

g=Inline function:

g(x)= sin(x+b)

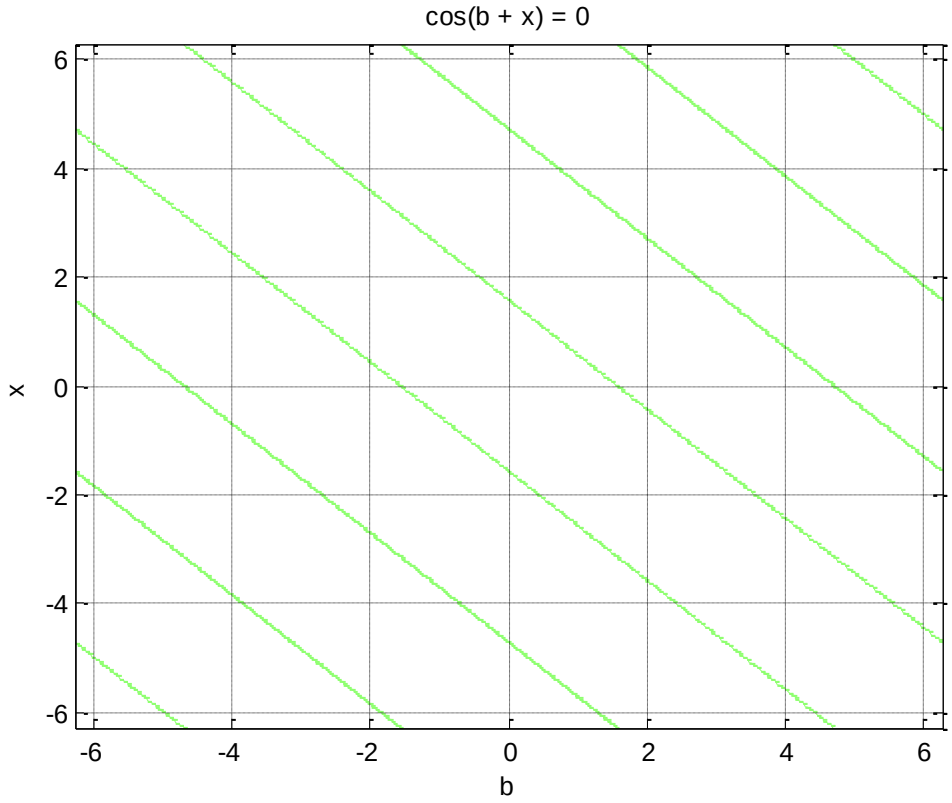


v) Enter the function to plot:

cos(a*x+b)

g=Inline function:

g(x) = cos(x+b)

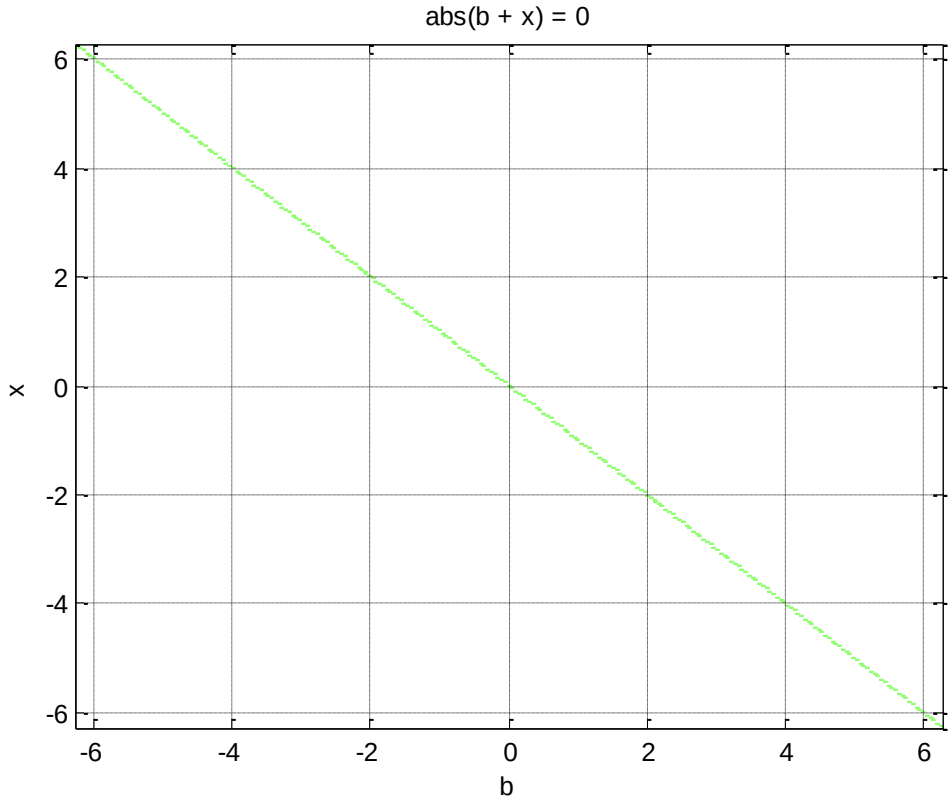


vi) Enter the function to plot:

abs(a*x+b)

g=Inline function:

g(x) = abs(x+b)



RESULT:

Thus the program has been done and the output has been verified.

EX.NO :2	PLOTTING OF GRAPHS OF POLYNOMIALS

AIM:

To plot the given polynomials in MATLAB script file with examples.

ALGORITHM:

Step 1: Start the program.

Step 2: Using the polyfit fitting function to fit the polynomial of order 4 and 5.

Step 3: Using polyder fitting function to find the first and second derivative of the polynomials.

Step 4: Use the plot command to plot the polynomials.

Step 5: Stop the process.

PROGRAM CODING:

```
x=[1 7 0 -5 9];
y=[1 -6 5 3 -2];
p=polyfit(x,y,4)
q=polyfit(x,y,5)
x₂=polyder(p)
y₂=polyder(q)
x₃=polyder(x₂)
y₃=polyder(y₂)
plot(p)
hold all
plot(q)
hold all
plot(x₂)
hold all
plot(y₂)
hold all
plot(x₃)
hold all
```

plot(y_3)

grid on

OUTPUT:

p= -0.0068 0.1154 -0.1281 -3.9805 5.000

q= Column 1 through 6

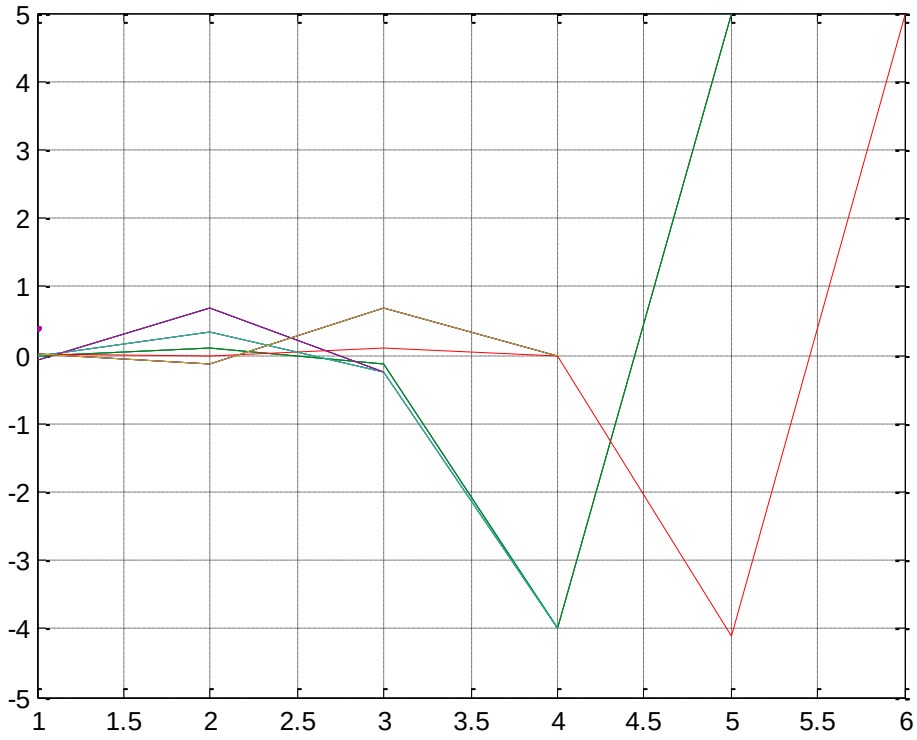
q = 0.0004 -0.0115 0.1131 0 -4.1020 5.0000

x_2= -0.0274 0.3461 -0.2562 -3.9805

y_2= 0.0019 -0.0459 0.3392 0 -4.1020

x_3= -0.0821 0.6923 -0.2562

y_3= 0.0077 -0.1377 0.6784 0



RESULT

Thus the program has been done and the output has been verified.

EX.NO:3	SKETCHING PARAMETRIC CURVES

AIM:

To sketch the parametric curves. [Eg: Trochoid , Cycloid , Epicycloid , Hypocycloid]

ALGORITHM:

Step 1: Start the program.

Step 2: Get the parametric equation from the user.

Step 3: Use linspace built in function to fix the range of‘t’.

Step 4: Use plot command for plotting x and y.

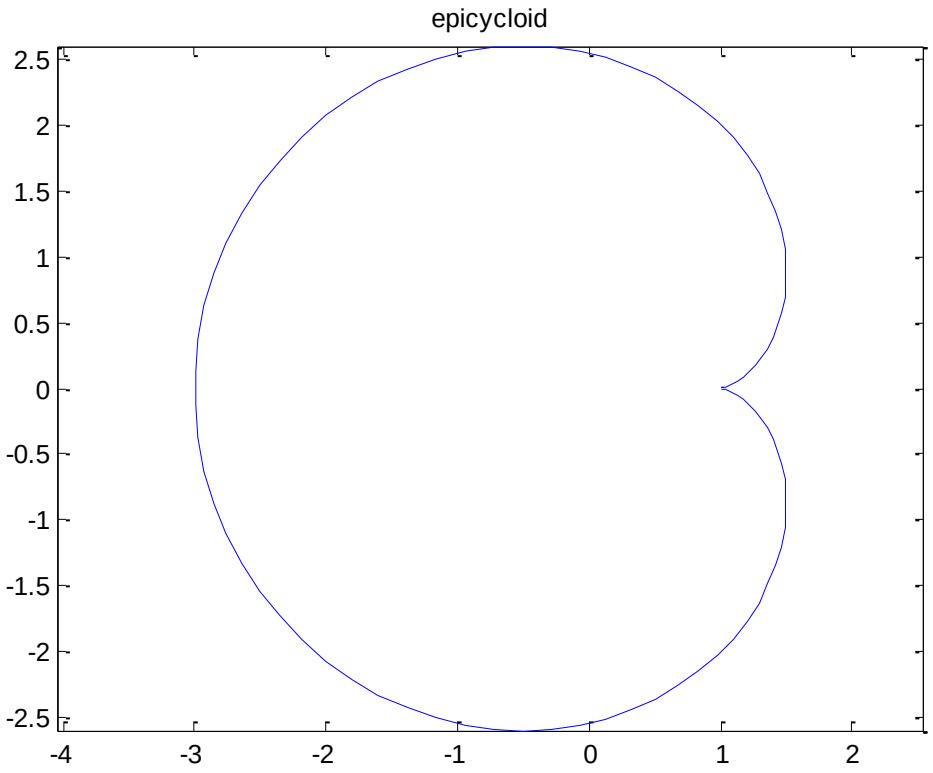
Step 5: Run the program.

Step 6: Stop the process.

PROGRAM CODING:

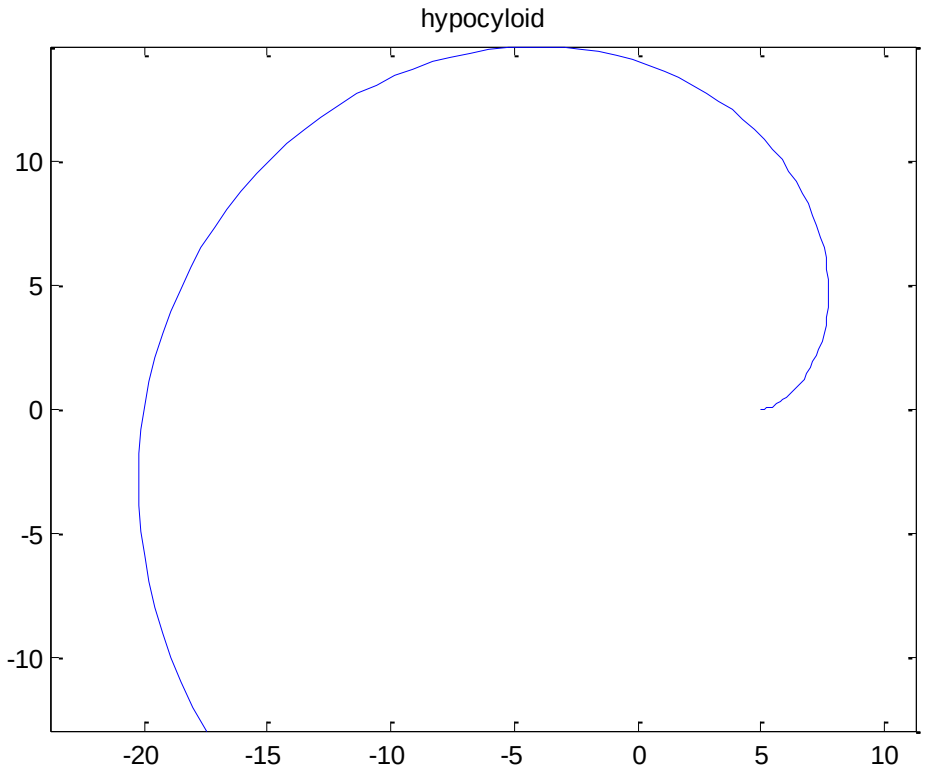
%Sketching parametric curve – Epicycloid:

```
a=1; b=1;
t=linspace(0,2*pi);
x=(a+b)*cos(t)-b*cos([(a+b)/b]*t);
y=(a+b)*sin(t)-b*sin([(a+b)/b]*t);
plot(x,y)
axis('equal')
title('Epicycloid')
```



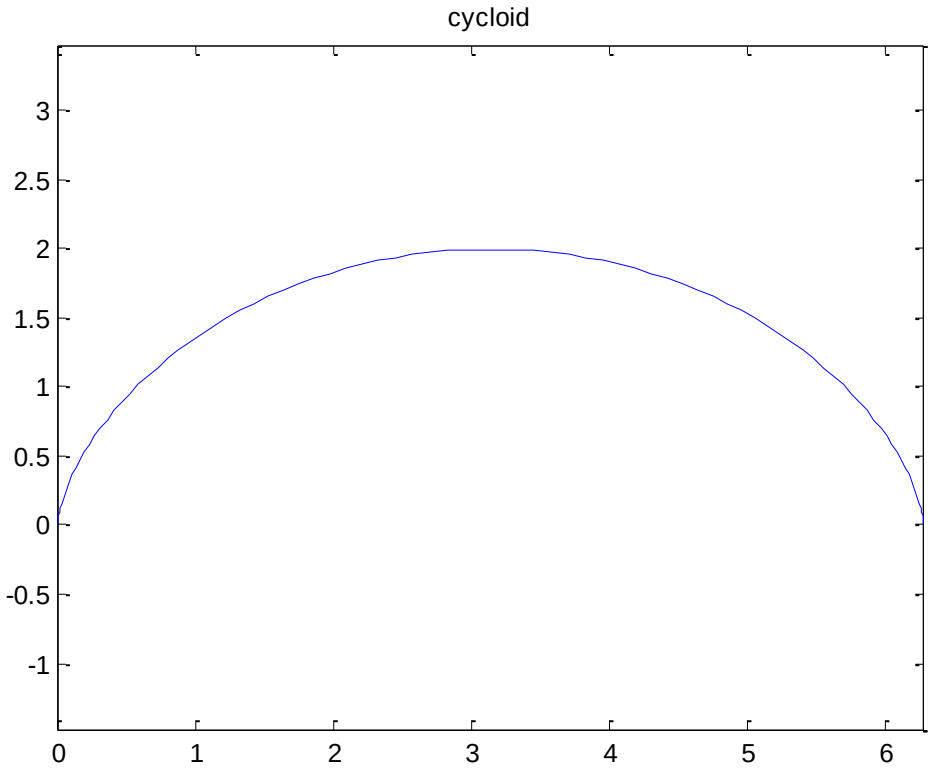
%Sketching parametric curves – Hypocycloid:

```
a=5; b=15;
t=linspace(0,2*pi);
x=(a-b)*cos(t)+b*cos([(a-b)/b]*t);
y=(a-b)*sin(t)-b*sin([(a-b)/b]*t);
plot(x,y)
axis('equal')
title('Hypocycloid')
```



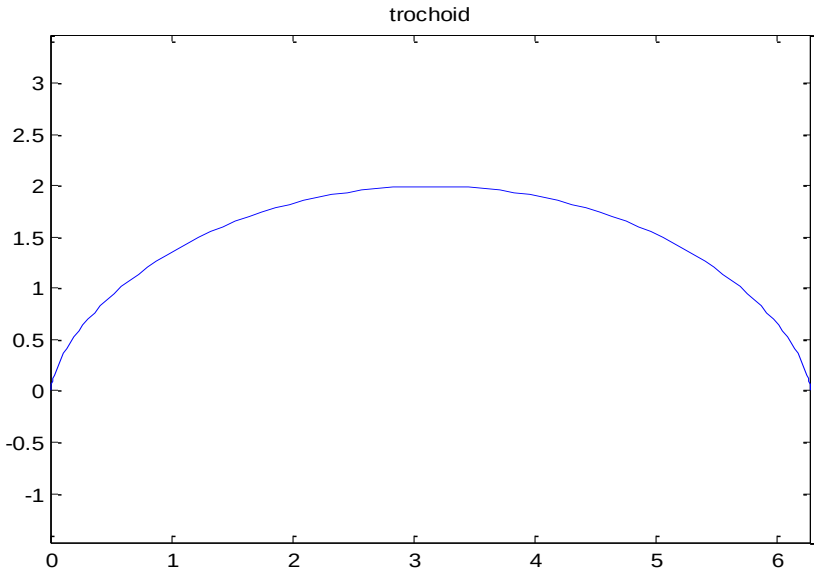
% Sketching parametric curve – Cycloid:

```
r=1;
t=linspace(0,2*pi);
x=r*(t-sin(t));
y=r*(1-cos(t));
plot(x,y)
axis('equal')
title('Cycloid')
```



% Sketching parametric curve – Trochoid:

```
a=1; b=1;
t=linspace(0,2*pi);
x=a*t-b*sin(t);
y=a-b*cos(t);
plot(x,y)
axis('equal')
title('Trochoid')
```



RESULT

Thus the program has been done and the output has been verified.

EX.NO:4	**SURFACE OF REVOLUTION OF CURVES**

AIM:

To obtain the surface of revolution of curves.

ALGORITHM:

Step-1: Start the program.

Step-2: Get the set of (x,y) points ones the domain of the function using meshgrid.

Step-3: Using ‘surf’ function to display the surface in 3-0.

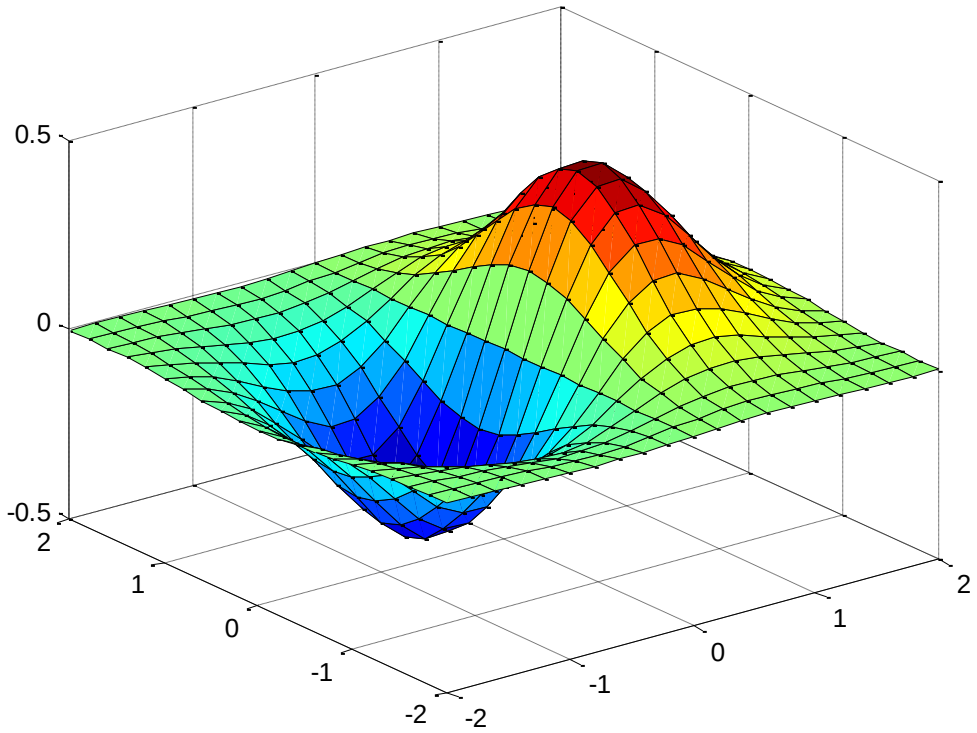
Step-4: The Mesh function produces wire frames surface that colour the lines connecting the defining points.

Step-5: Stop the process.

PROGRAM CODING:

```
% Obtain Surface of revolution of curves
[x,y]=meshgrid (0.2:2:2);
z=x*exp(-x.^2-y.^2);
surf(x,y,z)
```

OUTPUT**:**



RESULT

The Program has been done and the output has been verified.

EX.NO:5	TRACE OF CONICS

AIM:

To obtain the conic and to connect from Cartesian to polar co-ordinate.

ALGORITHM:

Step-1: Start the program.

Step-2: Get the parabola equation from the user.

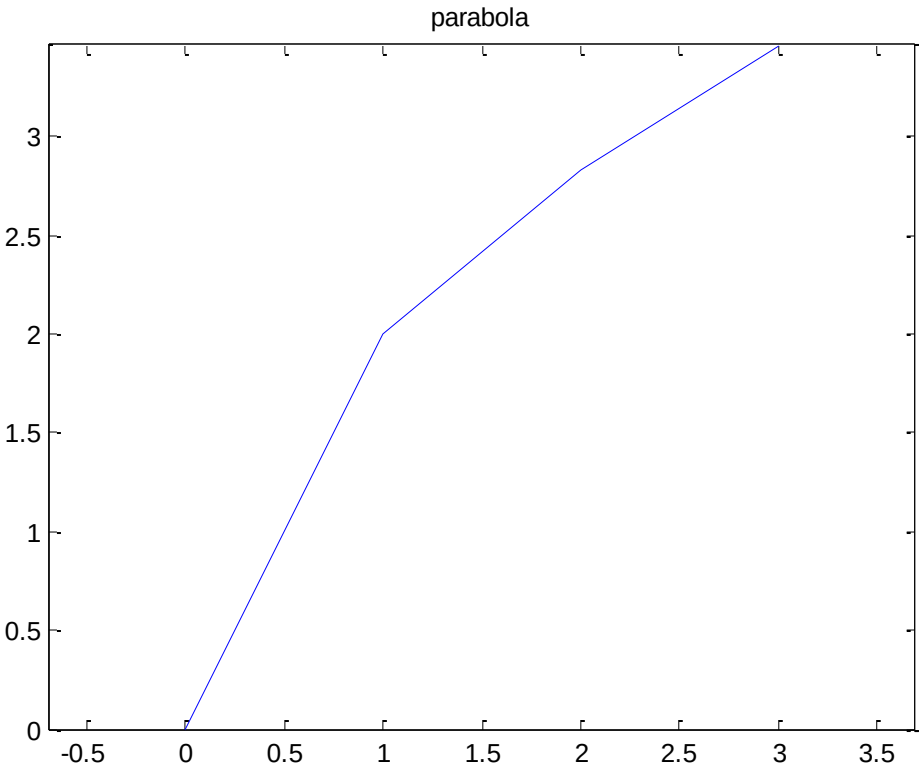
Step-3: Fix the range of x.

Step-4: Use plot command for plotting the points.

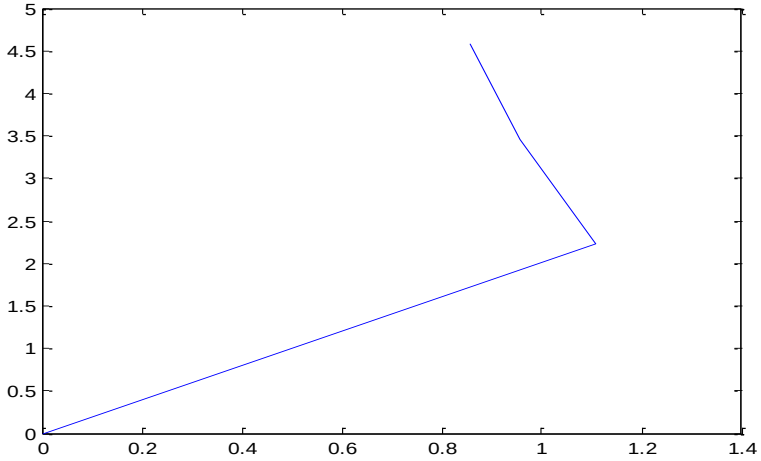
Step-5: Stop the process.

PROGRAM CODING:

```
% Tracing of conics in Cartesian in co-ordinate parabola,
a=1;
x=0:.1:pi.
y=sqrt(4*a*x);
plot(x,y)
axis('equal')
title('parabola')
```



```
%Tracing of conversion from to polar parabola,
a=1;
x=0:.1:pi
Y=sqrt(4*a*x);
plot(x,y)
axis('equal')
title('parabola,)
[theta,rho]=cart2pol(x,y)
Plot(theta,rho)
```



OUTPUT:

X= Columns 1 through 7

0 0.1000 0.2000 0.3000 0.4000 0.5000 0.6000

Columns 8 through 14

0.7000 0.8000 0.9000 1.000 1.1000 1.2000 1.3000

Columns 15 through 21

1.4000 1.5000 1.6000 1.7000 1.8000 1.9000 2. 000

Columns 22 through 28

2.1000 2.2000 2.3000 2.4000 2.5000 2.6000 2.7000

Columns 29 through 31

2.8000 2.9000 3.000 3.1000

RESULT:

Thus the program has been done and the output has been verified.

EX.NO:6	MATRIX MULTIPLICATION

AIM:

To Multiply the matrices of given order.

ALGORITHM:

Step-1: Start the program.

Step-2: Define the matrices of order three.

Step-3: Multiply the matrices by using the special operator '*' in MATLAB.

Step-4: Run the program and verify the result.

Step-5: Stop the process.

PROGRAM CODING:

```
% Matrix Multiplication

clc

clear all;
A= [1 2 3;  4 5 6 ;  7 8 9];

B= [0 4 5; 7 6 8; 1 2 3];

D= A*B
```

OUTPUT:

$$\begin{bmatrix} 17 & 22 & 30 \\ 41 & 58 & 78 \\ 65 & 94 & 126 \end{bmatrix}$$

RESULT:

Thus the above program has been done and the output has been verified.

EX.NO:7	INVERSE OF A MATRIX

AIM:

To find the inverse of the matrix of the given order.

ALGORITHM:

STEP:1 Start the program

STEP:2 Define the matrix of order three

STEP:3 Use the ‘inv’ build in function to get the inverse of matrix.

STEP:4 Run the program and verify the result

STEP:5 Stop the process.

PROGRAM CODING:

```
% matrix  inverse
clc
Clear all
A=[1 2 3;4 5 6;7 8 9]
e=inv(A)
```

OUTPUT:

e=1.0e+0.16*

$$\begin{bmatrix} -0.4504 & 0.9007 & -0.4504 \\ 0.9007 & -1.8014 & 0.9007 \\ -0.4504 & 0.9007 & -0.4504 \end{bmatrix}$$

RESULT:

Thus the above program has been done and the output has been verified.

EX.NO:8	TRANSPOSE OF A MATRIX

AIM:

To transpose the matrices of given order.

ALGORITHM:

Step-1: Start the program

Step-2: Define the matrices of order three

Step-3: Transpose the matrices in MATLAB

Step-4: Run the program and verify the results

Step-5: Stop the process

PROGRAM CODING:

```
% Matrix transpose
Clc
Clear all;
A= [5 6 8 ; 9  7  3 ; 6 5 2];
B= A.'
```

OUTPUT:

```
A= [5 6 8 ; 9  7  3 ; 6 5 2]
B= [5 9 6; 6 7 5; 8 3 2]
```

RESULT:

Thus the above program has been done and the output has been verified.

KARPAGAM ACADEMY OF HIGHER EDUCATION
COIMBATORE-21
DEPARTEMENT OF MATHEMATICS
MODEL QUESTION PAPER

SUBJECT: CALCULUS **SUB CODE: 17MMU101**

1. Plotting the graphs of function e^{ax+b}, log(ax + b), 1/(ax + b) and to illustrate the effect of a and b on the graph using Matlab Program.

(OR)

2. Find the Matrix multiplication for the matrices $\begin{bmatrix}5 & 8 & 6\\2 & 3 & 7\\4 & 1 & 3\end{bmatrix}$ and $\begin{bmatrix}3 & 2 & 9\\4 & 1 & 7\\5 & 2 & 8\end{bmatrix}$ using Matlab Program.

1. Plotting the graphs of function sin(ax + b), cos(ax + b), |ax + b| and to illustrate the effect of a and b on the graph using Matlab Program.

(OR)

2. Find the Transpose of a matrix $\begin{bmatrix}8 & 3 & 5\\7 & 1 & 4\\9 & 2 & 3\end{bmatrix}$ using Matlab Program.

1. Plotting the graphs of polynomial $x^4+8x^3+9x^2-5x+7$and $x^5-5x^4+3x^3-2x+9$, the derivative graph, the second derivative graph and comparing them using Matlab Program.

(OR)

2. Find the Inverse of a matrix $\begin{bmatrix}2 & 2 & 7\\7 & 9 & 6\\1 & 5 & 8\end{bmatrix}$ using Matlab Program.

1. Sketching parametric curves for Trochoid and cycloid using Matlab Program.

(OR)

2. Obtaining surface of revolution of curves using Matlab Program.

1. Sketching parametric curves for epicycloids and hypocycloid using Matlab Program.

(OR)

2. Tracing of conics in cartesian coordinates/ polar coordinates using Matlab Program.

1. Sketching parametric curves for Trochoid and cycloid using Matlab Program.

(OR)

2. Find the Inverse of a matrix $\begin{bmatrix} 8 & 3 & 5 \\ 7 & 1 & 4 \\ 9 & 2 & 3 \end{bmatrix}$ using Matlab Program.

1. Tracing of conics in cartesian coordinates/ polar coordinates using Matlab Program.

(OR)

2. Find the Matrix multiplication for the matrix $\begin{bmatrix} 8 & 3 & 5 \\ 7 & 1 & 4 \\ 9 & 2 & 3 \end{bmatrix}$ and $\begin{bmatrix} 5 & 8 & 6 \\ 2 & 3 & 7 \\ 4 & 1 & 3 \end{bmatrix}$ using Matlab Program.

1. Plotting the graphs of polynomial $x^4+ 6x^3+3x^2+9$and $x^5+4x^4-6x^3-5x+6$, the derivative graph, the second derivative graph and comparing them using Matlab Program.

(OR)

2. Find the Inverse of a matrix $\begin{bmatrix} 5 & 8 & 2 \\ 9 & 1 & 6 \\ 8 & 4 & 6 \end{bmatrix}$ using Matlab Program.