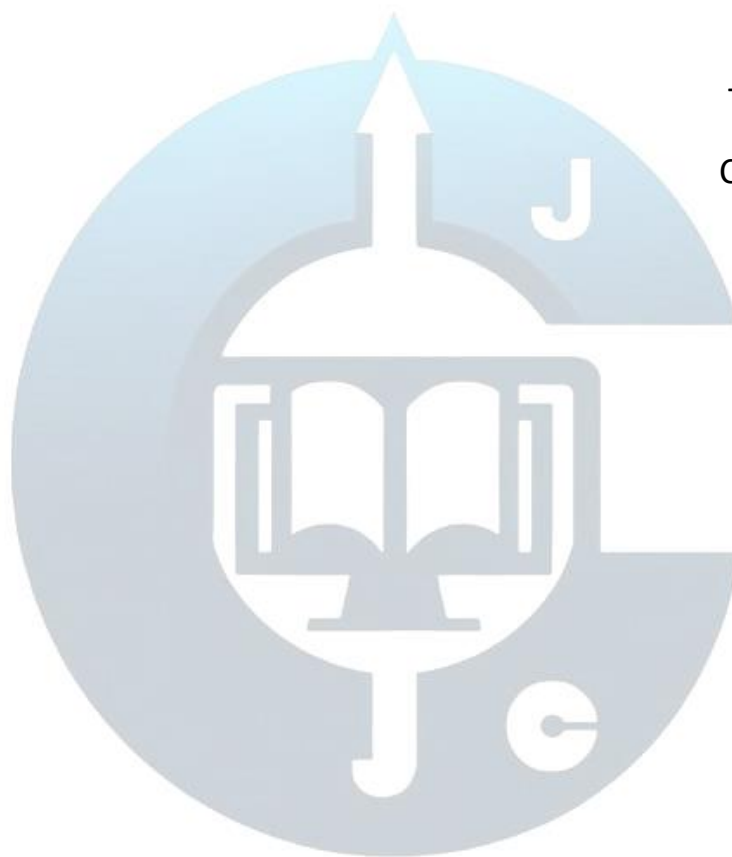


Certificate of Report Completion

This is to certify that the lab report entitled “Lab Reports of MATLAB for Mathematics II (CAMT 154)” is an academic report completely accomplished by Mr. **Your name**with roll number 22 submitted in partial fulfillment for requirements of degree of Bachelor in Computer Application(BCA) under my guidance and supervision to the best of my knowledge and the work performed here is manifestation of his/her own creation.



.....

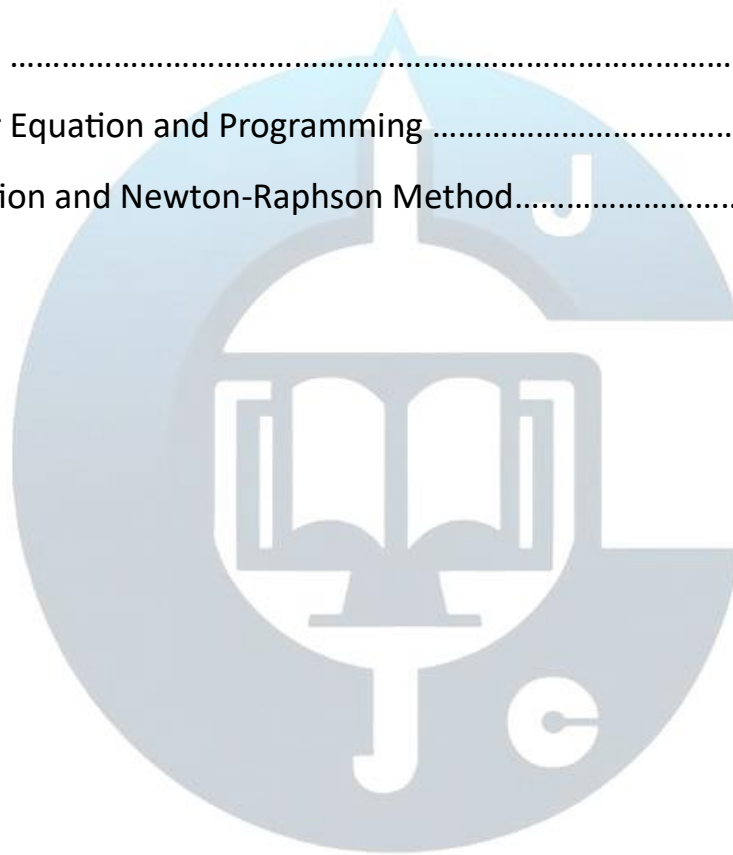
Teacher Name.....

College Name

Date

Table Of Content

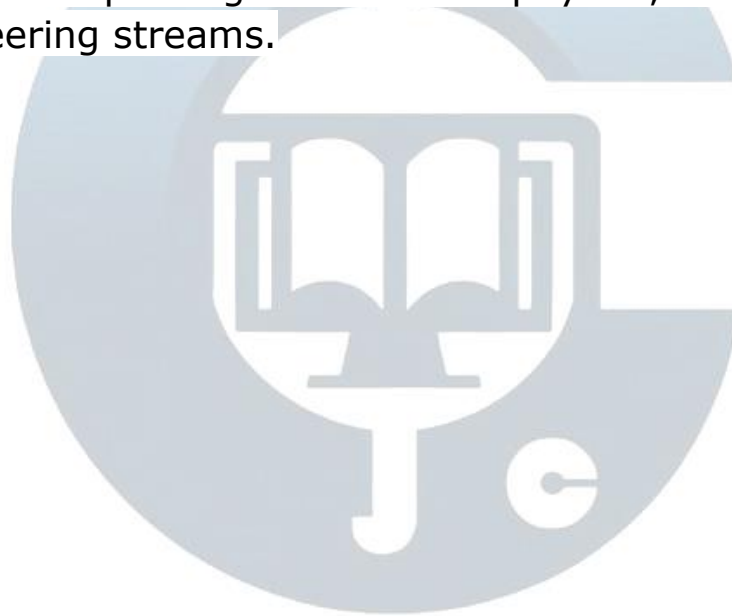
<i>Letter of recommendation</i>	1
<i>Table of Content</i>	2
Chapter 1: Introduction to Mat lab.....	3
Chapter 2: Limit and Continuity.....	4-6
Chapter 3: Derivative.....	7-8
Chapter 4: Integration	9-10
Chapter 5: Graph	11-14
Chapter 6: Linear Equation and Programming	15-16
Chapter 7: Bisection and Newton-Raphson Method.....	17-18



Introduction to MATLAB

MATLAB is a programming language developed by MathWorks. It started out as a matrix programming language where linear algebra programming was simple. It can be run both under interactive sessions and as a batch job. This tutorial gives you aggressively a gentle introduction of MATLAB programming language.

It is designed to give students fluency in MATLAB programming language. Problem-based MATLAB examples have been given in simple and easy way to make your learning fast and effective. MATLAB is widely used as a computational tool in science and engineering encompassing the fields of physics, chemistry, math and all engineering streams.



Limit and Continuity

Definition:

A finite number L is said to be a limit of a function at a point a if the value of $f(x)$ tends to L as a goes very very close to a . This is written as $\lim_{x \rightarrow a} f(x) = L$.

Lab sheet 1:

Solve the following question using matlab.

1. Calculate $\lim_{x \rightarrow 0} (x^3 + 5) / (x^4 + 7)$.

Code: syms x

```
limit ((x^3+5)/(x^4+7))
```

ans=5/7

2. Evaluate $\lim_{x \rightarrow \infty} 1/x$.

Code: syms x

```
limit (1/x,x,inf)
```

ans =0

3. Find the left- and right-hand limit of $\lim_{x \rightarrow 2} \left(\frac{|x-2|}{x-2} \right)$.

Code: syms x

```
limit(abs(x-2)/(x-2),x,2,'left')
```

ans = -1

```
syms x
```

```
limit(abs(x-2)/(x-2),x,2,'right')
```

ans =1

4. Find the limit of $\lim_{x \rightarrow 5} \left(\frac{x-5}{|x-2|} \right)$.

Code: syms x

```
limit ( abs( x-2)/(x-2) ,x , 2 , ' r i g h t ' )
```

ans: NAN

5. check the continuity of $\begin{cases} 4x + 3, & \text{for } -3 \leq x \leq -1 \\ x, & \text{for } -1 \leq x \leq 1 \end{cases}$.

Code: `x1=-3:1:-1;`

`eq1=(4*x1)+3;`

`x2=-1:1:1;`

`eq2=x2;`

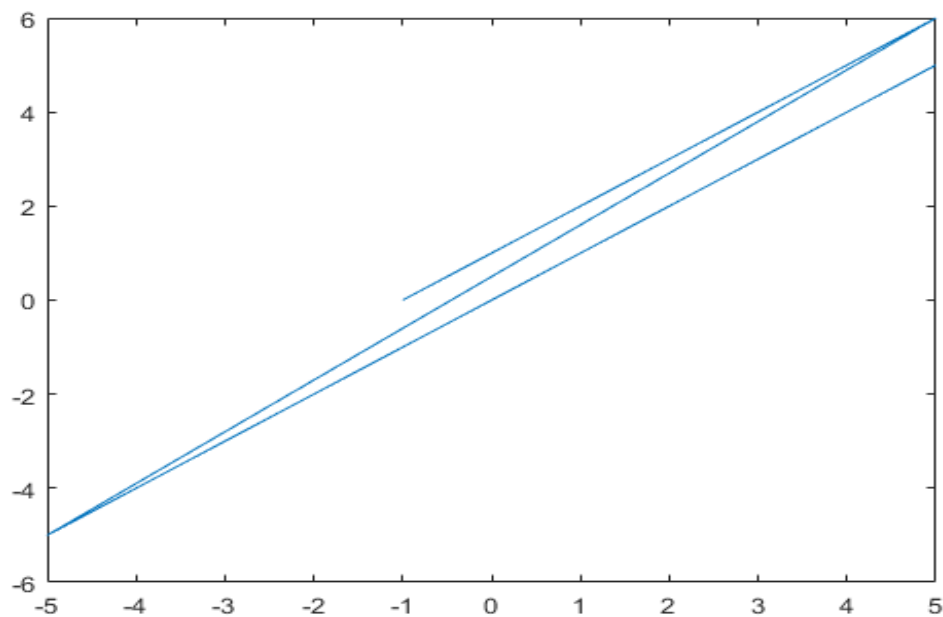
`figure`

`x=[x1 x2]`

`x = -3 -2 -1 -1 0 1`

`y=[eq1 eq2];`

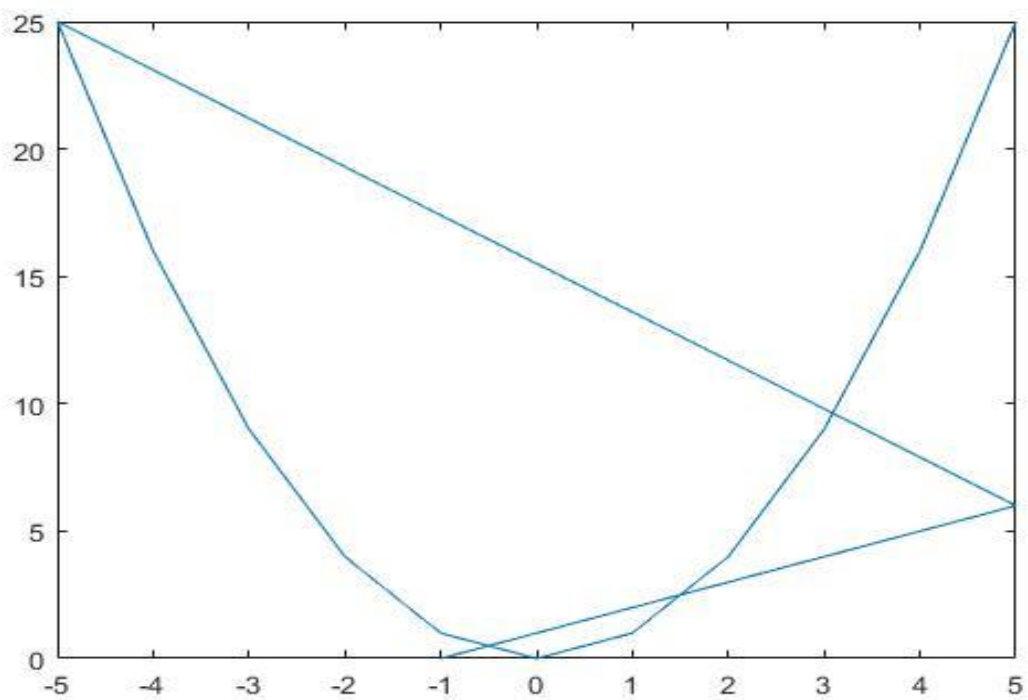
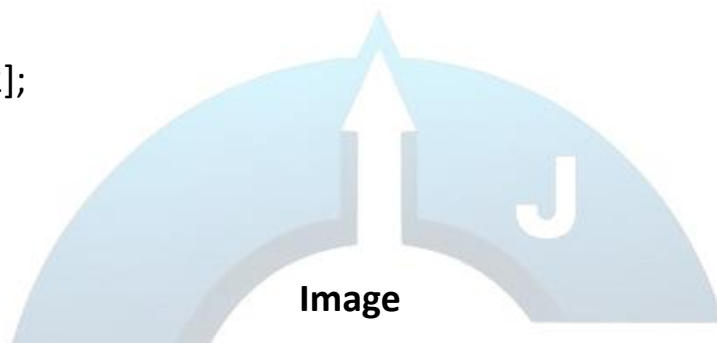
`plot(x,y)`



6. check

the continuity of $\begin{cases} x + 1, & \text{for } -1 \leq x \leq 5 \\ x, & \text{for } -5 \leq x \leq 5 \end{cases}$.

```
Code: x1=-1:1:5;  
      eq1=x1+1;  
      x2=-5:1:5;  
      eq2=x2;  
      figure  
      x=[x1 x2];  
      y=[eq1 eq2];  
      plot(x,y)
```



Derivative

Find the Derivative of the following using mat lab.

1. $F(x)=3x^2$

Code: syms x

`diff(3*x.^2)`

Ans: 6x

2. e^x

Code: syms x

`Diff(exp(x))`

Ans: exp(x)

3. $\frac{1}{x}$

Code: syms x

`diff(1/x)`

Ans: $-1/x^2$

4. $\log x$

Code: syms x

`diff (log(x))`

Ans: $1/x$

5. $\sin x \cdot \cos x$

Code: syms x

`diff (sin(x)*cos(x))`

Ans: $\cos(x)^2 - \sin(x)^2$

6. $e^x \cdot \tan x$

Code: syms x

`diff (exp(x)*tan(x))`

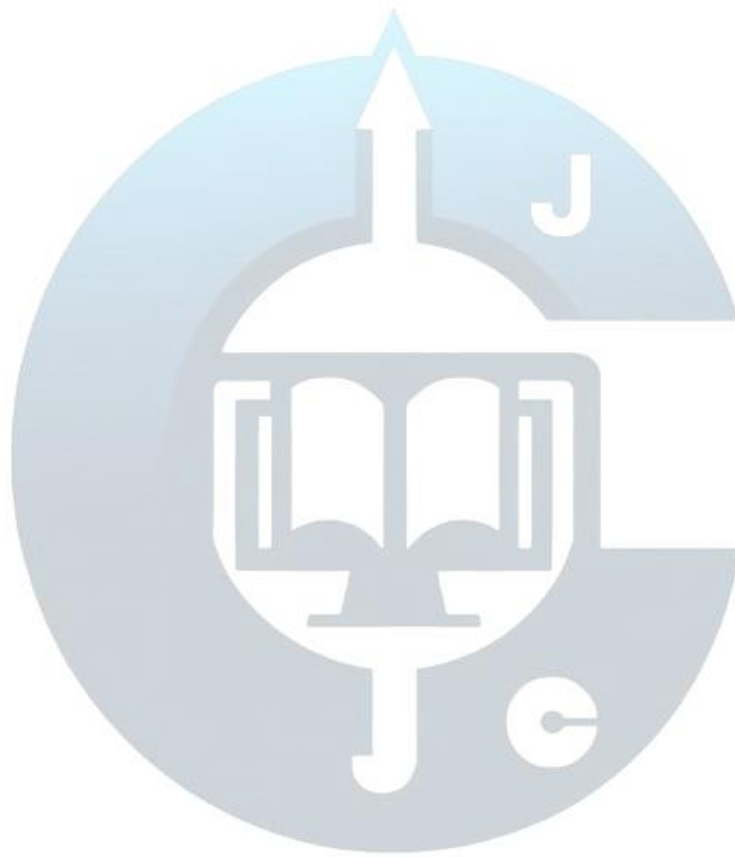
Ans: $\exp(x) \cdot \tan(x) + \exp(x) \cdot (\tan(x)^2 + 1)$

7. derivative of $(2x+3)/\sqrt{x}$

Code: `syms x`

`diff ((2*x+3)/sqrt(x))`

Ans: $2/x^{1/2} - (2x + 3)/(2x^{3/2})$



Integration

Find the integration of the following using mat lab

1. $2x^2$

Code: syms x
int (2*x.^2)

Ans: $(2*x^3)/3$

2. $\log(x)$

Code: syms x
int (log(x))

Ans: $x*(\log(x) - 1)$

3. $\sin 2x$

Code: syms x
int (sin(2*x))

Ans: $\sin(x)^2$

4. $\frac{1}{1+x^2}$

Code: syms x
int (1/(1+x^2))

Ans: $\text{atan}(x)$

5. $2x$

code: syms x
int(2*x)

Ans= x^2

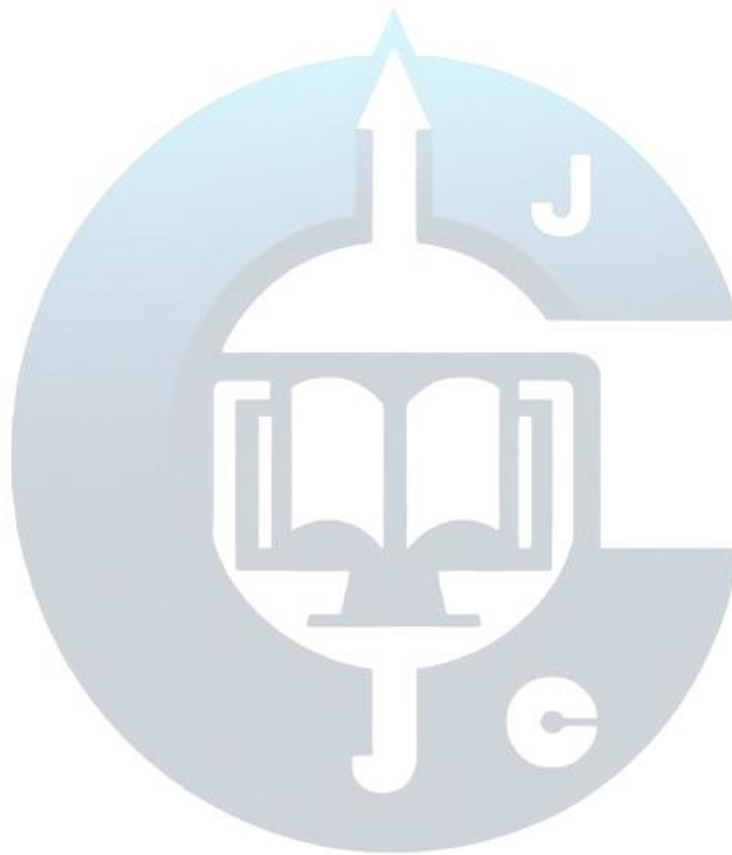
6. $\exp(2x)$

```
code: syms x
      y=exp(2*x);
      int(y)
Ans=exp(2*x)/2
```

7.cosx

```
code: syms x
      int(cos(x))

Ans =sin(x)
```



Graph

1. Draw the Graph of $f(x)=x^2+5x+6$ for x between -6 and 6

Code: `x=[-6:1:6];`

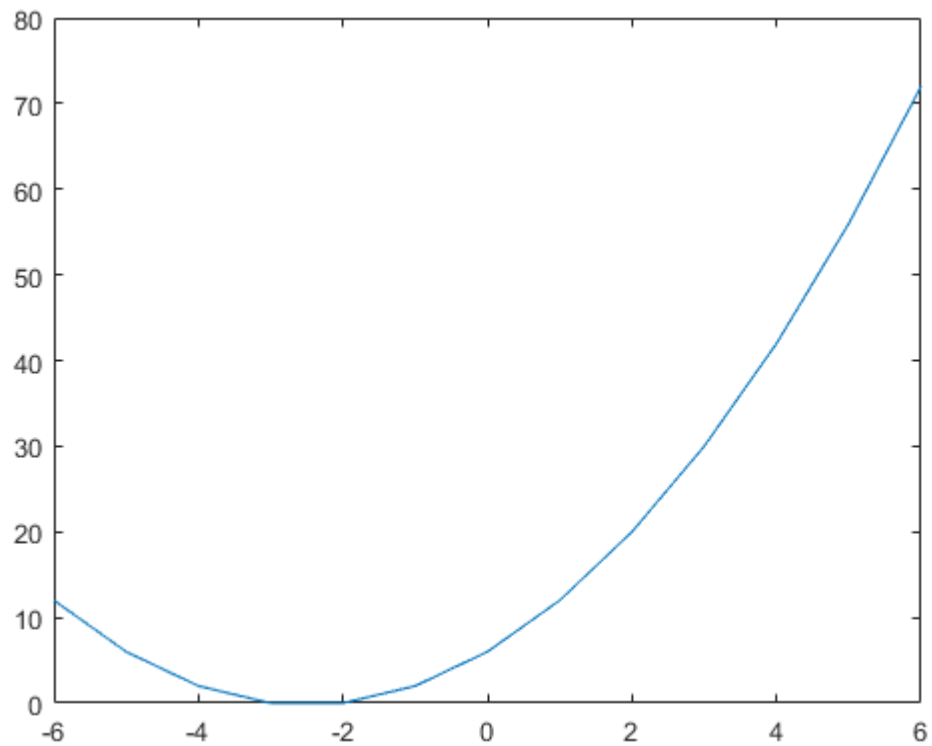
`y=x.^2+5*x+6;`

`plot(x,y)`

`xlabel ('x')`

`ylabel ('y')`

Image



2. Draw the graph of $y=\sin x$ from $-\pi$ to π

Code: `x=[-pi:pi/10:pi]`

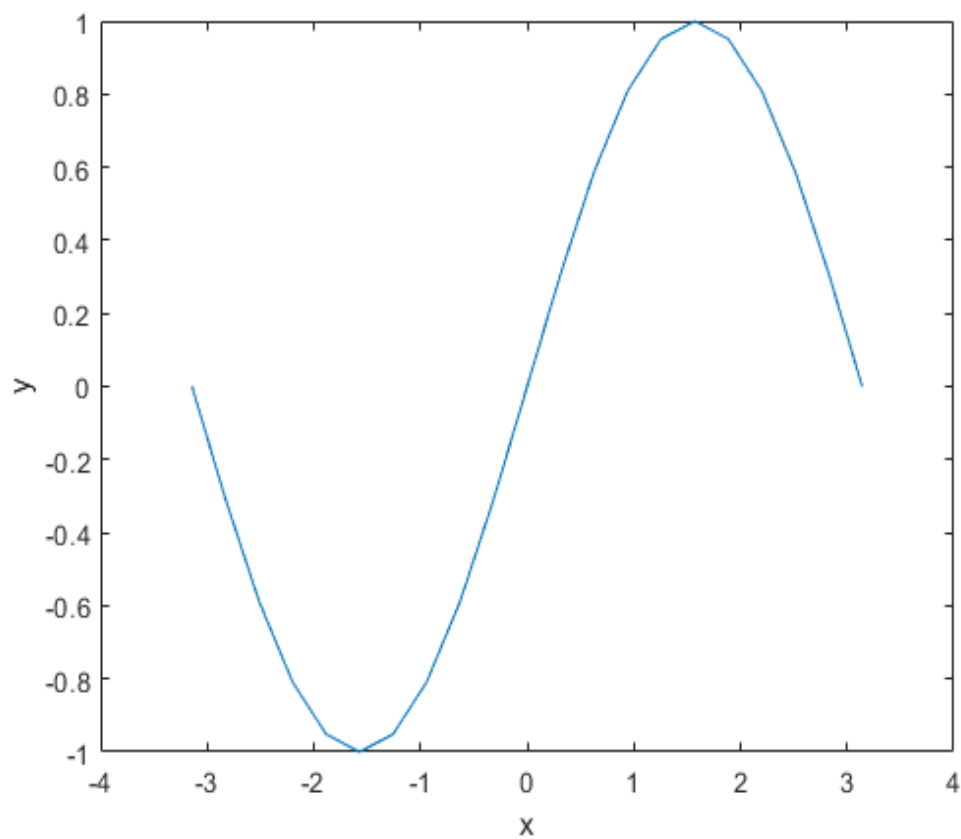
`y=sin (x);`

`plot(x,y)`

`xlabel ('x')`

`ylabel ('y')`

Image



3. Draw the graph of $y=\exp(x)$ from -10 to 10

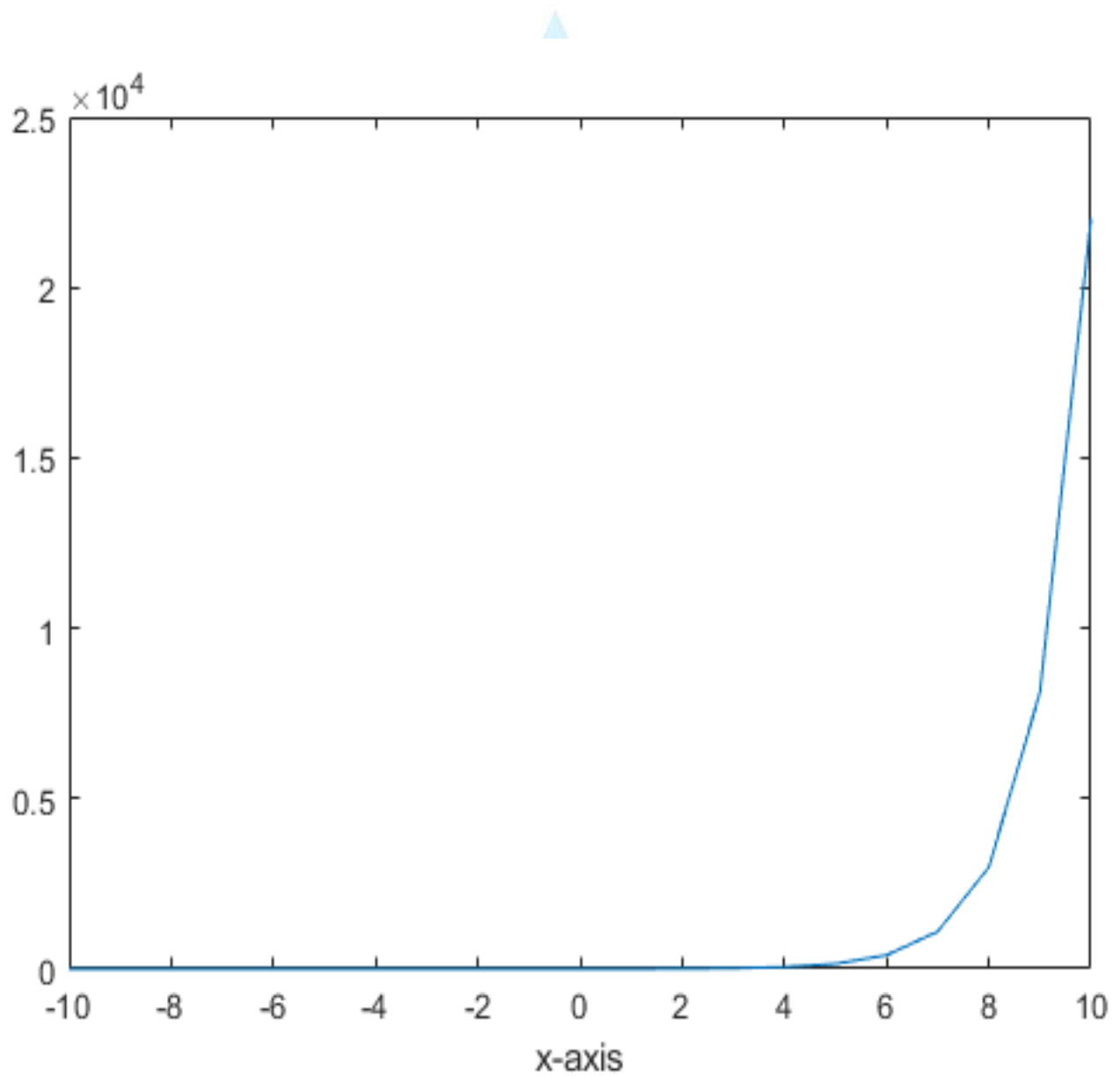
Code: `x=[-10:1:10];`

`y=exp(x);`

`plot(x,y);`

`xlabel('x-axis')`

Image

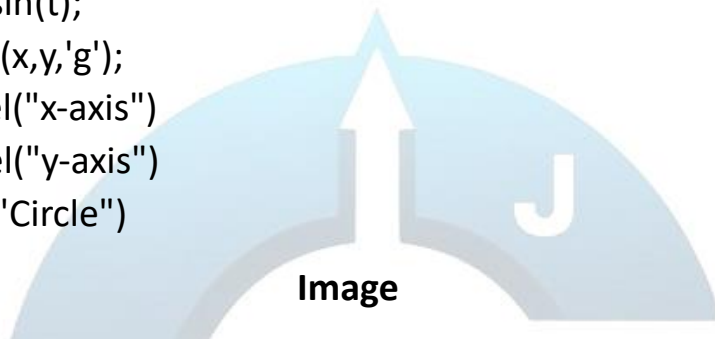


4. Draw the circle

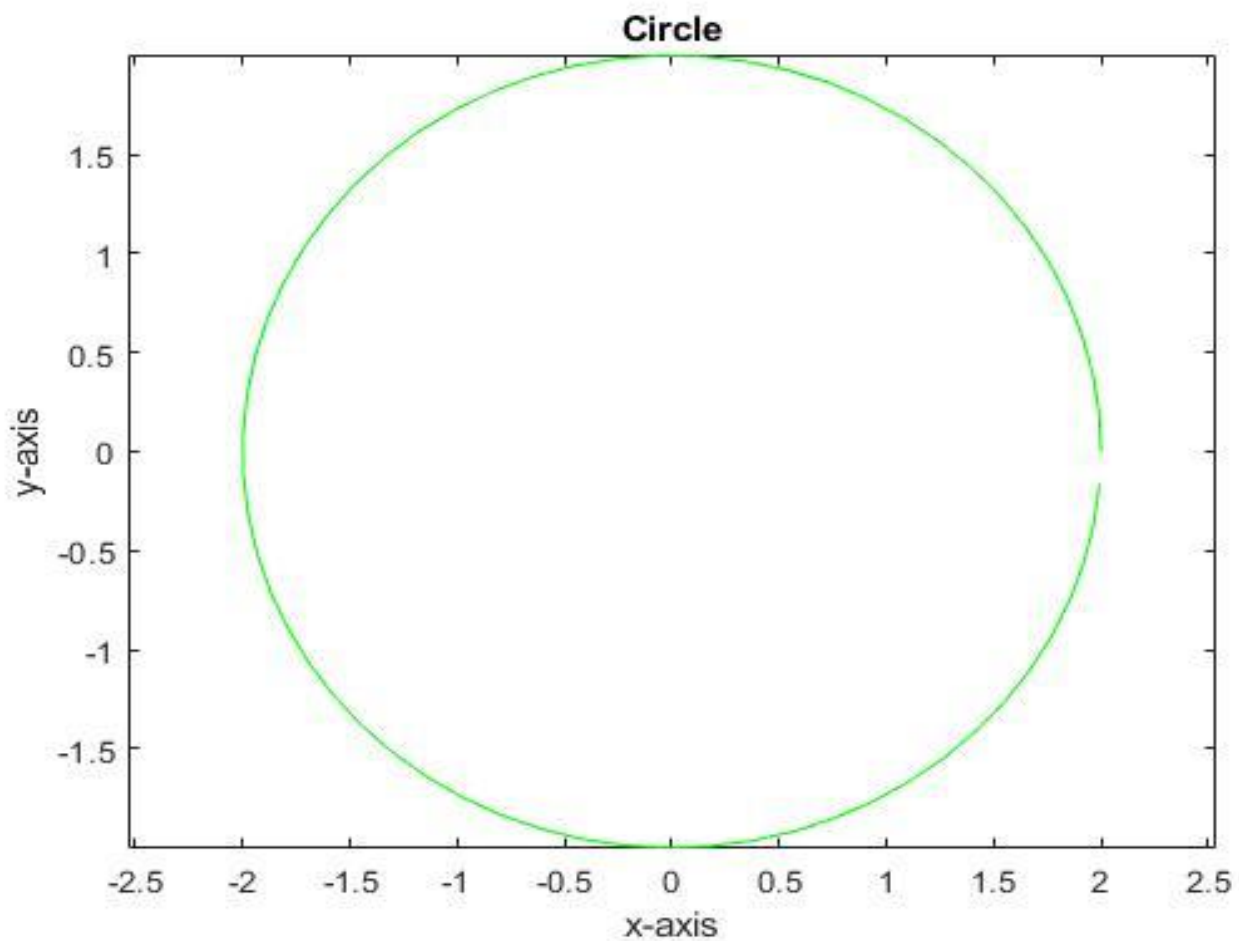
Code : `r=input("Enter the radius:")`

Enter the radius:2

```
r= 2  
t=[0:0.1:2*pi];  
x=r*cos(t);  
y=r*sin(t);  
plot(x,y,'g');  
xlabel("x-axis")  
ylabel("y-axis")  
title("Circle")
```



Image



Linear Equation and Programming Problem

Solve the following linear Equation:

1. $x-3y=5,$
 $-4x+y=1$

Code: $A=[1 \ -3;-4 \ 1];$
 $B=[5;1];$
 $X=inv(A)*B$

Ans: -0.7273

-1.9091

2. $x+2y$ and $3x-y=1$

Code: $A=[1 \ 2;3 \ -1];$
 $B=[5;1];$
 $x=inv(A)*B$

Ans: $x =$

1.0000

2.0000

Solve the following linear Programming Problems

1. $\max f= 7x+5y$
 $x+2y \leq 6, 4x+3y \leq 6, -x \leq 0, -y \leq 0$

Note: the minimum form
 $\max f = -\min f.$

Code: $f=[-7;-5];$
 $A=[1 \ 2;4 \ 3;0 \ -1;0 \ -1];$
 $B=[6;6;0;0];$
 $[x, fmin]=linprog(f,A,B)$

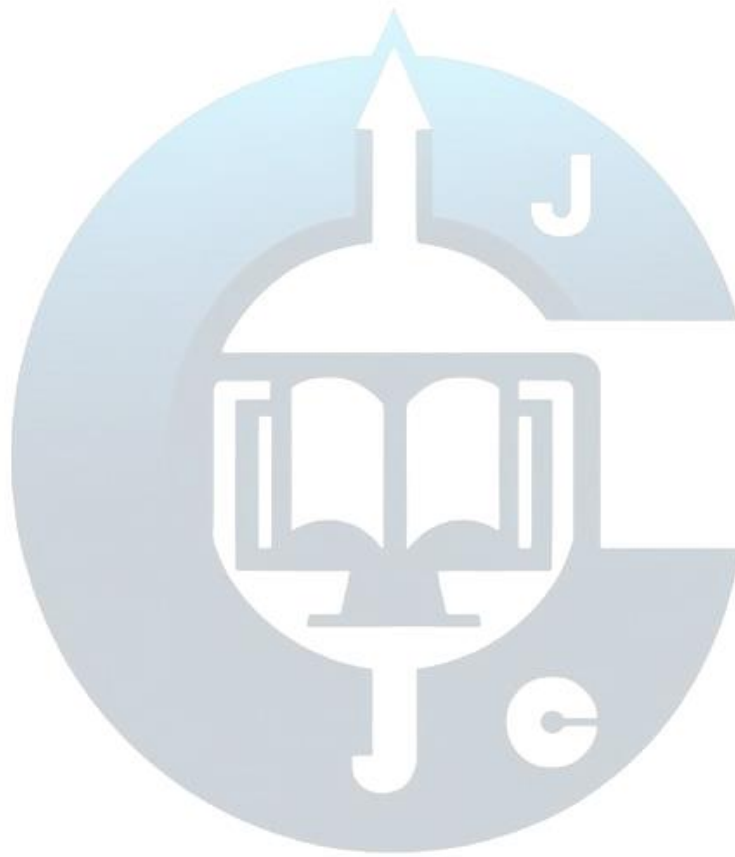
Ans: Optimal solution found.

$x =$

1.5000

0

$f_{\min} = -10.5000$



Bisection and Newton-Raphson Method

1. Find the root of $f(x)=x^3-2x-5$ corrected to two places of decimals in (2,3) interval.

Code: `f=@(x)x^3-2*x-5;
a=2;b=3;tol=0.001;
while abs(a-b)>=tol
m=(a+b)/2
if f(a)*f(m)<0;
b=m;
else
a=m;
end
root=m
end`

Ans: m = 2.5000
root = 2.5000
m = 2.2500
root = 2.2500
m = 2.1250
root = 2.1250
m = 2.0625
root = 2.0625
m = 2.0938
root = 2.0938
m = 2.1094
root = 2.1094
m = 2.1016
root = 2.1016
m = 2.0977
root = 2.0977

m = 2.0957
root = 2.0957
m = 2.0947
root = 2.0947

2. Find the root of $f(x)=x^3-2x-5$ corrected two places of decimals in Newton -Raphson method.

Code : $f=@(x)x^3-2*x-5;$
 $DF=@(x)3*x^2-2;$
 $x0=1;tol=0.001;diff=1;$
 $while\ diff \geq tol;$
 $x1=x0-f(x0)/DF(x0);$
 $diff = abs(x1 - x0);$
 $x0=x1;$
 end
 $root=x0$

Ans: root = 2.0946