```
% Title : Limit and Continuity for f(x,y)
% Aim : To test the limit and continuity of a
%       function f(x,y) at (x0,y0).

clc
clear all
syms x y

f = input('Enter the function f(x,y): ');
x0 = input('Enter the value of x0: ');
y0 = input('Enter the value of y0: ');

L1 = limit(subs(f,y,y0),x,x0);
L2 = limit(subs(f,x,x0),y,y0);

% Path approach y=g(x)
m = input('Enter the value of m as a natural number: ');
y1 = y0+(x-x0)^m
L3 = limit(subs(f,y,y1),x,x0);

% Path approach x=g(y)
n = input('Enter the value of n as a natural number: ');
x1 = x0+(y-y0)^n
L4 = limit(subs(f,x,x1),y,y0);

if ((L1==L2) && (L2==L3) && (L3==L4))
    fprintf('Limit may exist at (x0,y0) and if it esists then it is %d. \n',
L1)
    f_x0_y0 = input('Enter the value of f at (x0,y0): ');
    if (L1==f_x0_y0)
        disp('Function may be continuous  at (x0,y0)')
    else
        disp('Function is not continuous at (x0,y0)')
    end
else
    disp('Limit does not exist at (x0,y0) and hence the function is also not
continuous at (x0,y0)')
end
```

Q1. $\frac{x-y}{x+y}$

```
Enter the value of x0:
0
Enter the value of y0:
0
Enter the value of m as a natural number:
2
Enter the value of n as a natural number:
3

Limit does not exist at (x0,y0) and hence the function is also not continuous at
(x0,y0)
```

Q2. $\frac{y^3}{x^2+y^2}$

```
Enter the function f(x,y):
y^3/(x^2+y^2)
Enter the value of x0:
0
Enter the value of y0:
0
Enter the value of m as a natural number:
2
Enter the value of n as a natural number:
3

Limit may exist at (x0,y0) and if it esists then it is 0.
```

Q3. $\frac{x^2y}{x^2+y^2}$

```
Enter the function f(x,y):
x^2*y/(x^2+y^2)
Enter the value of x0:
-1
Enter the value of y0:
3
Enter the value of m as a natural number:
2
Enter the value of n as a natural number:
3


Limit may exist at (x0,y0) and if it esists then it is 0.
```

Q4. $\frac{x(y-1)}{y(x-1)}$

```
Enter the function f(x,y):
(x*(y-1))/(y*(x-1))
Enter the value of x0:
2
Enter the value of y0:
3
Enter the value of m as a natural number:
2
Enter the value of n as a natural number:
3


Limit may exist at (x0,y0) and if it esists then it is 1.
```

Q5. $\frac{x^4-y^2}{x^4+y^2}$

```
Enter the function f(x,y):
(x^4-y^2)/(x^4+y^2)
Enter the value of x0:
0
Enter the value of y0:
0
Enter the value of m as a natural number:
2

Enter the value of n as a natural number:
3

Limit does not exist at (x0,y0) and hence the function is also not continuous at
(x0,y0)
```

Q6. $\frac{xy}{|xy|}$

```
Enter the function f(x,y):
x*y/(abs(x*y))
Enter the value of x0:
1
Enter the value of y0:
2
Enter the value of m as a natural number:
2


Enter the value of n as a natural number:
3


Limit may exist at (x0,y0) and if it esists then it is 1.
```