```
C:\Windows\system32\cmd.exe

Enter function f(x): x**8 + 2*x -5
Enter initial guess x0: 0

n       x
--------------
1       0.000000
2       2.500000
3       2.187628
4       1.914785
5       1.677615
6       1.474767
7       1.310028
8       1.195525
9       1.143253
10      1.134116
11      1.133875

The approximate root is x = 1.13387.
Press any key to continue . . .
```

```python
# _*_ coding: utf-8 _*_

import math


def f(expr, x):
    return eval(expr, {"x": x, "math": math, **math.__dict__})


# Numerical derivative f'(x)

def df(expr, x, h=1e-6):
    return (f(expr, x + h) - f(expr, x - h)) / (2 * h)


# Newton-Raphson Method

def newton(expr, x0, tol=1e-5, max_iter=20):
    x = x0

    print("\nn\tx")
    print("--------------")

    for n in range(1, max_iter + 1):
        print(f"{n}\t{x:.6f}")

        fx = f(expr, x)
        dfx = df(expr, x)

        if abs(dfx) < 1e-12:
            print("\nDerivative too small. Stopping.")
            break

        x_new = x - fx / dfx

        if abs(x_new - x) < tol:
            x = x_new
            break

        x = x_new

    print(f"\nThe approximate root is x = {x:.5f}.")


# MAIN

expr = input("Enter function f(x): ")
x0 = float(input("Enter initial guess x0: "))

newton(expr, x0)
```