Objective: Determine the **multiple** real roots of the equation: $f(x) = x^5 - 5x^2 - 35x^3 + 125x^2 + 194x - 280 = 0$ using Newton's Method.

Problem Description:

1. Write a program using Newton's Method to locate the approximate roots of the function$f(x) = x^5 - 5x^2 - 35x^3 + 125x^2 + 194x - 280 = 0$.
2. Write a function MaxRoot() that will return maximum possible root for the polynomial and consider this as your initial guess.
3. Use Horner's rule to perform all iterations of the Newton's Method until the relative estimated error ϵ_a falls below a level of $\epsilon_s = 0.001$
4. Use synthetic division to deflate the polynomial at lower degree. Write a function polynomialDeflation() that will return the coefficients of deflated polynomial.
   Algorithm for Synthetic Division:
   $b_{i-1} = a_i + x_r b_i \quad ; for\ i = n, n-1, \ldots .0$
   $b_n = 0$

   Where a is the coefficient at degree n and b is the coefficient at degree $n - 1$
5. Use appropriate functions from math header file.
6. Print the degree of the polynomial, roots found at each degree, after which iteration and relative error on that iteration.
7. Evaluate your approximate root using Horner's method if it return zero than print your root is closed to exact root.
8. At the end print total number of roots you have found.

Sample Input/output:

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Enter values of coefficients:
Coefficient x[5] = 1

Coefficient x[4] = -5

Coefficient x[3] = -35

Coefficient x[2] = 125

Coefficient x[1] = 194

Coefficient x[0] = -280
Largest Possible root is 5.000000
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 At order 5 the Root is 4.000000 after 3 iteration and relative error 0.000004
The Root is close to real Root

 At order 4 the Root is 1.000000 after 8 iteration and relative error 0.000063
The Root is not real Root

 At order 3 the Root is -2.000000 after 10 iteration and relative error 0.000000
The Root is close to real Root

 At order 2 the Root is -5.000000 after 14 iteration and relative error 0.000366
The Root is not real Root

 At order 1 the Root is 7.000000 after 16 iteration and relative error 0.000000
The Root is close to real Root
There are 5 Roots for the given polynomial
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