Assignment 3 Function and Operator Overloading

Purpose of this assignment is to demonstrate Function and operator overloading, as well as type conversion.

- 1. Write a C++ program to realize a matrix class. The program should be able to do the following.
 - Instantiate an object of a matrix class with a given number of rows and columns.
 - Display the members of a given matrix in rectangular matrix form.
 - Input matrix elements into appropriate format.
 - Assign one object of matrix with another object.
 - Following mathematical operations should be allowed between a pair of complex variables
 - Addition
 - Subtraction
 - Multiplication (by a scalar and another matrix)
 - Given a matrix, the program should be able to calculate
 - its transpose.
- 2. This assignment deals with representing and manipulating polynomials using simple arrays. A polynomial, such as $a_n x^n + a_{n-1} x^{n-1} + \ldots + a_0$, will be implemented as an **array** of coefficients, with coefficient a_i being stored in location i of the **array**. The coefficients are floating point values (potentially negative). The array will be dynamically allocated to allow us to increase the size of the array during execution if necessary.

You are to implement the following set of functions:

- Default constructor that dynamically allocates an array of elements (set to 50) and constructs a polynomial value of 0.
- A specialized (or alternate) constructor that takes an argument which indicates the size of the desired dynamic array and constructs a zero polynomial
- A copy constructor
- A destructor
- setCoeff(), to set a specific coefficient in the polynomial
- retrieveCoeff() to get a specific coefficient from the polynomial
- incrementCoeff(), to add a value to a specific coefficient in the polynomial
- degree(), which determines the degree of the polynomial
- numOfTerms(), which determines the number of terms in the polynomial
- evaluate(), which evaluates the polynomial for a given value of X
- Derivative of a polynomial

Also overload appropriate operators to do the following:

- Addition of two polynomials
- Subtraction of two polynomials
- Determines the equality of two polynomials
- Multiplies a polynomial by a constant value