Practical Questions on Parameter types in C#

Q1: Write a C# method that demonstrates the difference between passing a parameter by value and passing it by reference. Create two methods: one that modifies an integer passed by value and another that modifies an integer passed by reference. Call these methods from Main and observe the output.

Q2: Write a method that takes two integers as input and returns their sum and product using out parameters. Call this method from Main and display the results.

Q3: Create a method that accepts a params array of integers and returns their average. Write a Main method to test your function with different numbers of arguments.

Q4 : Create a method that calculates the area of a rectangle. The method should have two parameters: length and width, with width being optional (default value of 10). Write a Main method to call this function with and without specifying the width.

Q5: Write a method that accepts three parameters: int a, int b, and int c. Demonstrate how to call this method using named parameters in different orders from the Main method.

Q6: Create a method that accepts an in parameter and attempts to modify it. Observe what happens when you try to assign a new value to the in parameter within the method.

Q7: Write a method that accepts a dynamic parameter and prints its type at runtime. Pass different types of data (e.g., int, string, List<int>) to this method from the Main method and observe the output.

Q8: Imagine you are writing a method for a banking application that calculates interest based on various optional parameters like principal, rate, time, and compoundingFrequency (per year cycle). Implement this method using optional and named parameters to provide maximum flexibility. Write test cases in the Main method to verify your implementation.

NOTE: r is rate, t is time, and n compoundingFrequency

and P is Principal Amount

The method calculates the interest using the compound interest formula:

$$\mathbf{A} = \mathbf{P} \times (\mathbf{1} + \frac{\boldsymbol{r}}{\boldsymbol{n}})^{\boldsymbol{nt}}$$