1 Introduction to Python

1. Explain and develop a computer program to find roots of the equation,

$$bx + c = 0$$

2. Explain and develop a computer program to find roots of the equation,

$$ax^2 + bx + c = 0$$

3. Develop computer programs to compute the following sums with loops and then with mathematical formula for $n = 10, 20, 50$.

   (a) $1 + 2 + \cdots + n = \dfrac{n(n+1)}{2}$

   (b) $1^2 + 2^2 + \cdots + n^2 = \dfrac{n(n+1)(2n+1)}{6}$

   (c) $1^3 + 2^3 + \cdots + n^3 = \dfrac{n^2(n+1)^2}{2^2}$

   (d) $1^4 + 2^4 + \cdots + n^4 = \dfrac{n(n+1)(2n+1)(3c^2+3n-1)}{30}$

4. Develop a computer program to determine the exponential function which can be written in infinite series form

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots$$

   then compute the value of e^x for $x = 0.1, 0.5, 1$ with polynomial approximation of degree 5.

2 Solutions of Equations in One Variable