Assignment on ME 261 (Numerical Analysis) for L-2/T-2 Students
Department of Mechanical Engg., BUET
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Q. 1: Using Bisection method of root finding, determine a root of the following equation in the interval [0, 1] up to five correct decimal places.

$$f(x) = \cos(x) - x$$

Q. 2: Using Bisection method of root finding, determine a root of the following equation in the interval [0, 1] up to four correct decimal places.

$$3x + \sin(x) - e^x = 0$$

Q. 3: Using Fixed Point Iteration of root finding, determine a root of the following equation up to four decimal places with an initial guess point $x_0 = 0.5$.

$$x^3 + x - 1 = 0$$

Q. 4: The following function has a unique root in the interval [1, 2].Using Fixed Point Iteration of root finding, determine a root of this function up to four correct decimal places.

$$f(x) = x^3 + 4x^2 - 10$$

Q. 6: Using False Position method of root finding, determine a root of the following equation up to five decimal places within the interval, [1, 3]:

$$\sin(x) - x + 2 = 0$$

Q. 7: Using Newton's method of root finding, determine a root of the following equation up to five decimal places with an initial guess point $x_0 = 1.5$.

$$x^2 = 10 + \log_e x$$

Q. 8: Using Newton's method of root finding, determine a root of the following equation up to five decimal places with an initial guess point $x_0 = 0.1$.

$$f(x) = x^2 - e^{-(3x^2)} - 3$$

Q.9: The values of sin x are given below for different values of x. Find the value of sin 42°using Newton's Interpolation technique.

x	40	45	50	55	60
y = f(x) sin x	0.6428	0.7071	0.7660	0.8192	0.8660

Q.10: Using Lagrange's interpolation formula, find the value of y corresponding to x = 10 from the following data.

x	5	6	9	11
y = f(x)	380	-2	196	508