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Numerical Computing Lab Session 1:

**Task 1(If more than one root kindly mention all values)**

|  |  |
| --- | --- |
| Function | Root (by visualization) |
|  | 0.6 |
|  | 0.2 , 1.3 |
|  | -2.2 , -1.1 |

**Task 2 (Bisection Method)**

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 11 | (0,1) | 0.62402 |
| 0.00001 | 18 | (0,1) | 0.62418 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 15 | (-10,10) | 0.62438 |
| 0.00001 | 21 | (-10,10) | 0.62418 |

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 10 | (0,0.5) | 0.29785 |
| 0.00001 | 17 | (0,0.5) | 0.29752 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 11 | (0.5,2.5) | 1.25683 |
| 0.00001 | 18 | (0.5,2.5) | 1.25662 |

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 9 | (-2.25,-2) | -2.19042 |
| 0.00001 | 16 | (-2.25,-2) | -2.19130 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Interval | Root |
| 0.001 | 11 | (-1.3,0) | -0.79790 |
| 0.00001 | 16 | (-1.3,0) | -0.79816 |

Write your Observations:

**Task 3 (Newton Raphson Method)**

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 4 | 0 | 0.62418 |
| 0.00001 | 4 | 0 | 0.62418 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 12 | 4 | 0.62418 |
| 0.00001 | 12 | 4 | 0.62418 |

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 4 | 0 | 0.29753 |
| 0.00001 | 4 | 0 | 0.29753 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 4 | 1 | 1.25662 |
| 0.00001 | 5 | 1 | 1.25662 |

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 3 | -1 | -0.79815 |
| 0.00001 | 4 | -1 | -0.79815 |

Repeat the process by selecting another interval

|  |  |  |  |
| --- | --- | --- | --- |
| Tol | No. of Iterations | Starting Point | Root |
| 0.001 | 4 | -2 | -2.19130 |
| 0.00001 | 4 | -2 | -2.19130 |

Write your Observations:

**Task 4:**

|  |  |
| --- | --- |
| Function | Root (by fsolve) |
|  | 0.62418 |
|  | 0.29753 |
|  | -2.19130 |