# Manual Solutions

## Bisection Method

**Bisection Method**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **f(X)** | **=** |  | **=** | **0** |
| f(X) = = 0 interval [1,2] | | | | | = | T3-3T-2 | = | **0** |
| f(X) | = |  | = | **0** |
| f (1) | = | 13- 1 - 2 |  |  |
|  | = | -2 |  | **F (1) < 0** |
|  | | | | |
| f (2) | = | 23 -2 -2 |  |  |
|  | = | 4 |  | **F (2) > 0** |
| Since f(1)<0. f(2) > 0; a root exists between 1 and 2 | | | | |
| **C** | = |  |  |  |
|  | = | 1.5 |  |  |
| f (1.5**)** | = | 1.53 -1.5 -2 |  |  |
|  | = | -0.125 |  |  |
| therefore, updated Interval [1.5,2] | | | | |

**Table 1:Iteration Table.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Iterations** | **a** | **F(a)** | **b** | **F(b)** | **c** | **F(c)** | **update** |
| 1 | 1.00000000 | -2.00000000 | 2.00000000 | 4.00000000 | 1.50000000 | -0.12500000 | a=c |
| 2 | 1.50000000 | -0.12500000 | 2.00000000 | 4.00000000 | 1.75000000 | 1.60937500 | b=c |
| 3 | 1.50000000 | -0.12500000 | 1.75000000 | 1.60937500 | 1.62500000 | 0.66601562 | b=c |
| 4 | 1.50000000 | -0.12500000 | 1.62500000 | 0.66601562 | 1.56250000 | 0.25219727 | b=c |
| 5 | 1.50000000 | -0.12500000 | 1.56250000 | 0.25219727 | 1.53125000 | 0.05911255 | b=c |

So **1.53125000** considered as a **root** according to Bisection Method after 5 iterations