Quiz 4 (In-class section, 10 points) Name:

Using the Newton-Raphson method, find the root of f(x)

f(x)=0.5\*x3-4\*x2+4\*x+2 =0.001 (error limit)

(please provide 5 significant figures in computed values, e.g. x.xxxx)

|  |  |  |  |
| --- | --- | --- | --- |
| **iteration** | **x** | **f(x)** | **f'(x)** |
| 1 | 3.0000 | -8.5000 | -6.5000 |
| 2 | 1.6923 | -0.26309 | -5.2426 |
| 3 | 1.6421 | -0.00374 | -5.0921 |
| 4 | 1.6414 | -8.3E-07 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **iteration** | **x** | **f(x)** | **f'(x)** |
| 1 | 0.0000 | 2.0000 | 4.0000 |
| 2 | -0.5000 | -1.0625 | 8.3750 |
| 3 | -0.37313 | -0.07543 | 7.1939 |
| 4 | -0.36265 | -0.0005 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **iteration** | **x** | **f(x)** | **f'(x)** |
| 1 | 6.4000 | -5.1680 | 14.240 |
| 2 | 6.7629 | 0.76148 | 18.502 |
| 3 | 6.7218 | 0.01037 | 17.999 |
| 4 | 6.7212 | 2.02E-06 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **iteration** | **x** | **f(x)** | **f'(x)** |
| 1 | 1.0000 | 2.5000 | -2.5000 |
| 2 | 2.0000 | -2.0000 | -6.0000 |
| 3 | 1.6667 | -0.12963 | -5.1667 |
| 4 | 1.6416 | -0.00095 |  |



|  |  |  |  |
| --- | --- | --- | --- |
| **iteration** | **x** | **f(x)** | **f'(x)** |
| 1 | 2.0000 | -2.0000 | -6.0000 |
| 2 | 1.6667 | -0.12963 | -5.1667 |
| 3 | 1.6416 | -0.00095 | -5.0905 |
| 4 | 1.6414 | -5.4E-08 |  |

Notes:

1. The value of the function at the root is the  value since at the root, f(x)=0.
2. Note that this function has several roots.
3. Note that depending where the starting point is, you may end up at a different root.
4. Note that the number of iterations to reach the error limit may result in slightly different root values (which will converge with more iterations).