Alec Webb  
MATH446

**Project 3: Newton's Method Results**

**Equations Used:**

**1.)**

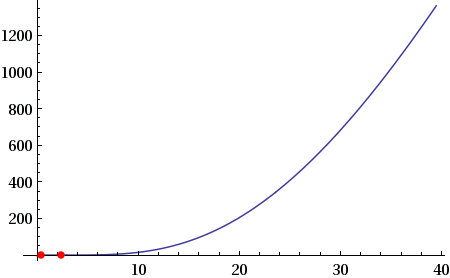
|  |  |  |
| --- | --- | --- |
| **Initial Guess** | **Root** | **Convergence Type** |
| 0.3 | 0.444444444444450 | Quadratic\* |
| 2.2 | 2.466440855251409 | Linear\*\* |

**Problem with interval including x = 0.7:**  
 The problem with the values around this x is due to the line that is tangent is pointing into the negative numbers due to the inclusion of square roots in our original equation. Or pointing to a new starting point which cannot be resolved.

**2.)**

**Quadratic Convergence:**

|  |  |
| --- | --- |
| **Newton Iteration** | **Theoretical Value** |
| -3.830878826669657 | M = 0.912315780795651 |

  
**Encountered a discrepancy:** f'(0.4444444444444444) is not equal to zero, so should be quadratic. However the ratio output from the MATLAB session is around -3.8. Is this due to the nature of the curve at 0.4444... (repeating) while being relatively flat?  
  
\*The errors roughly double with each step

**3.)**

**Linear Convergence:**

|  |  |
| --- | --- |
| **Newton Iteration** | **Deduced Multiplicity** |
| 0.746189018693704 | m=4 (approx 3/4) |

**Rationale:** f'() = 0; Indicative of linear convergence.  
  
\*\*The errors do not double with each step