Assignment-5(P-342)

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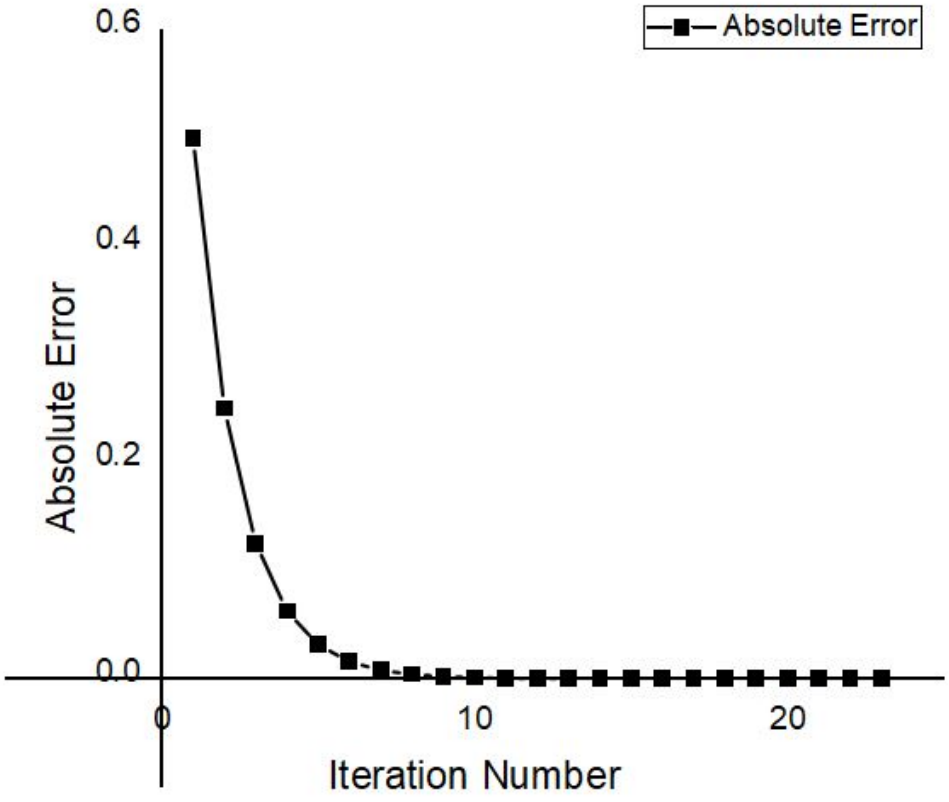
Question-1(a)

$$\log(x) - \sin(x) = 0 \tag{1}$$

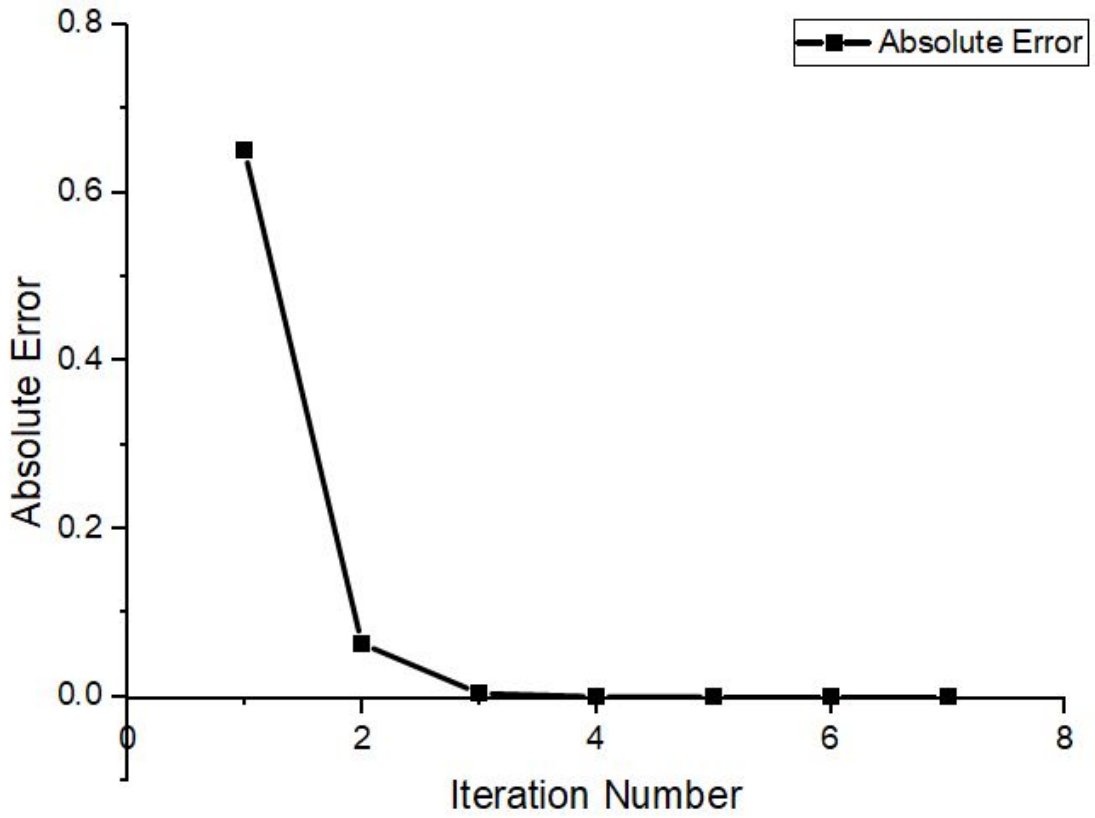
Graphs:Absolute Error vs Iteration Number

Graph 1



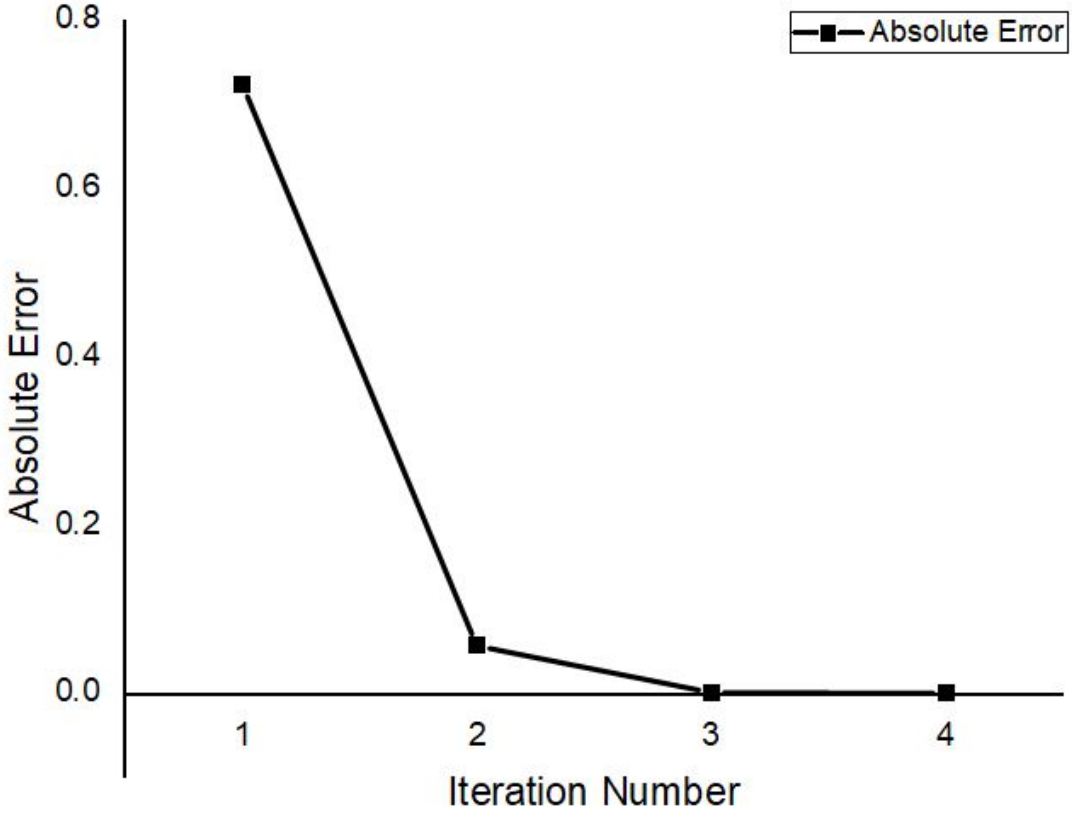
Graph 1: **Bisection method for question 1(a)**

Graph 2



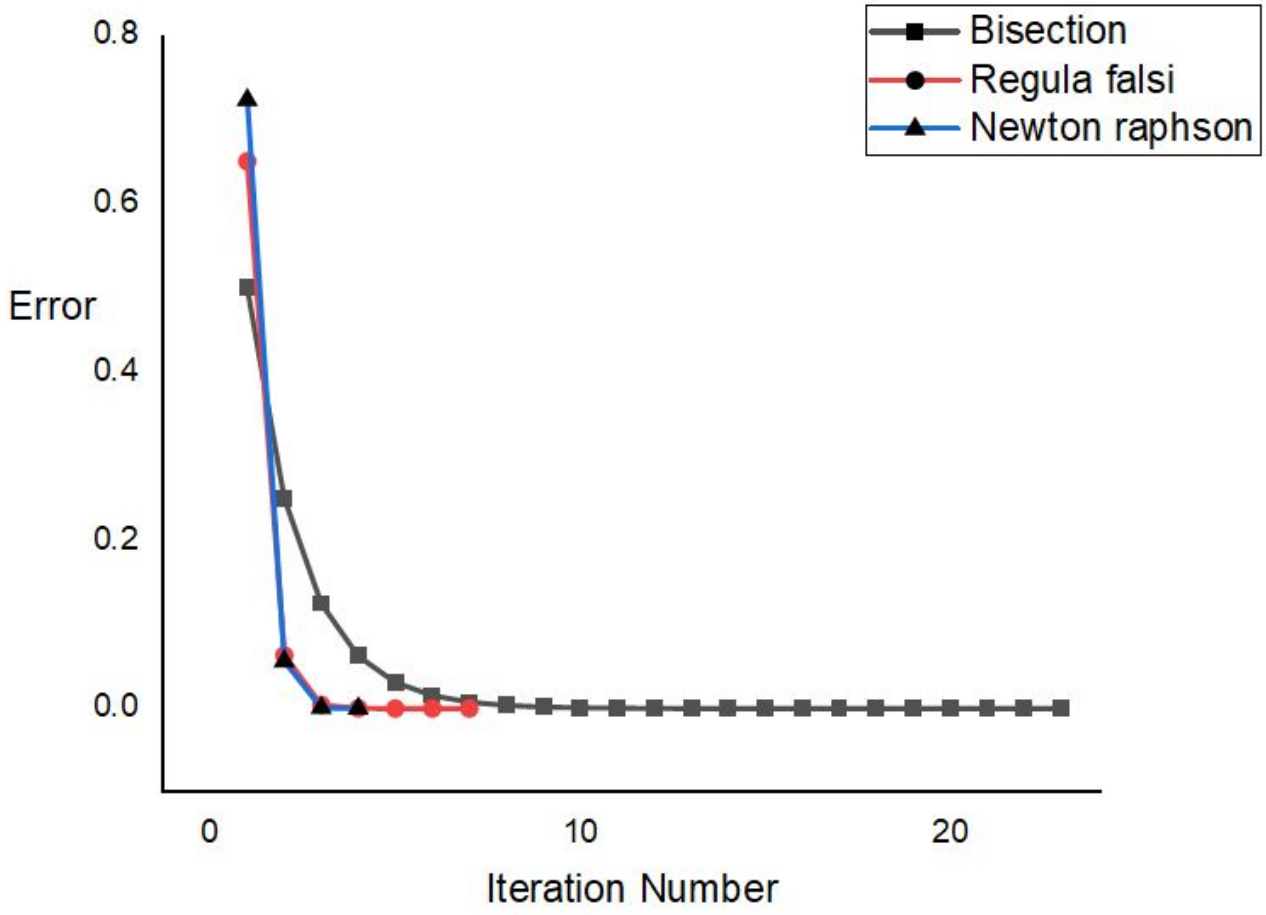
Graph 2: **Regula-Falsi method for question 1(a)**

Graph 3



Graph 3: **Newton Raphson method for question 1(a)**

Graph 4



Graph 4: **All three combined method for question 1(a)**

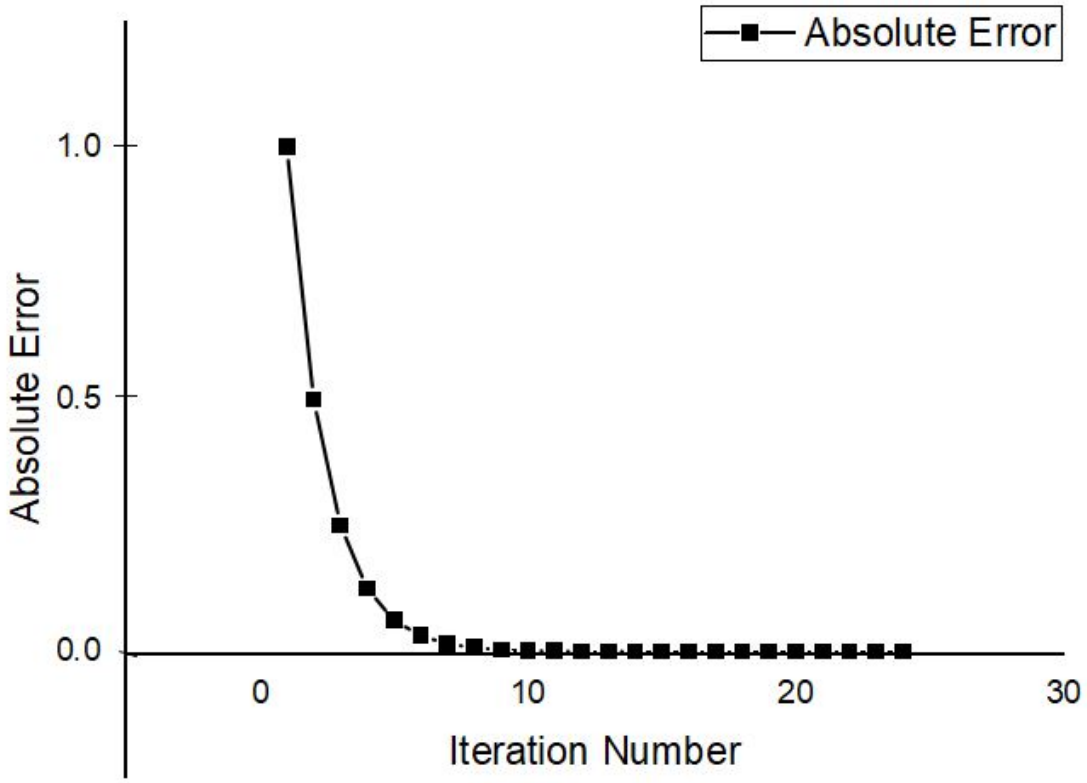
Note

From the combined graph we can conclude that the Newton-Raphson method converges much faster than Bisection method.Newton-Raphson method and Regula Falsi method is faster method to have the root but there are some limitations but Bisection method has no such kind of limitations.

Question-1(b)

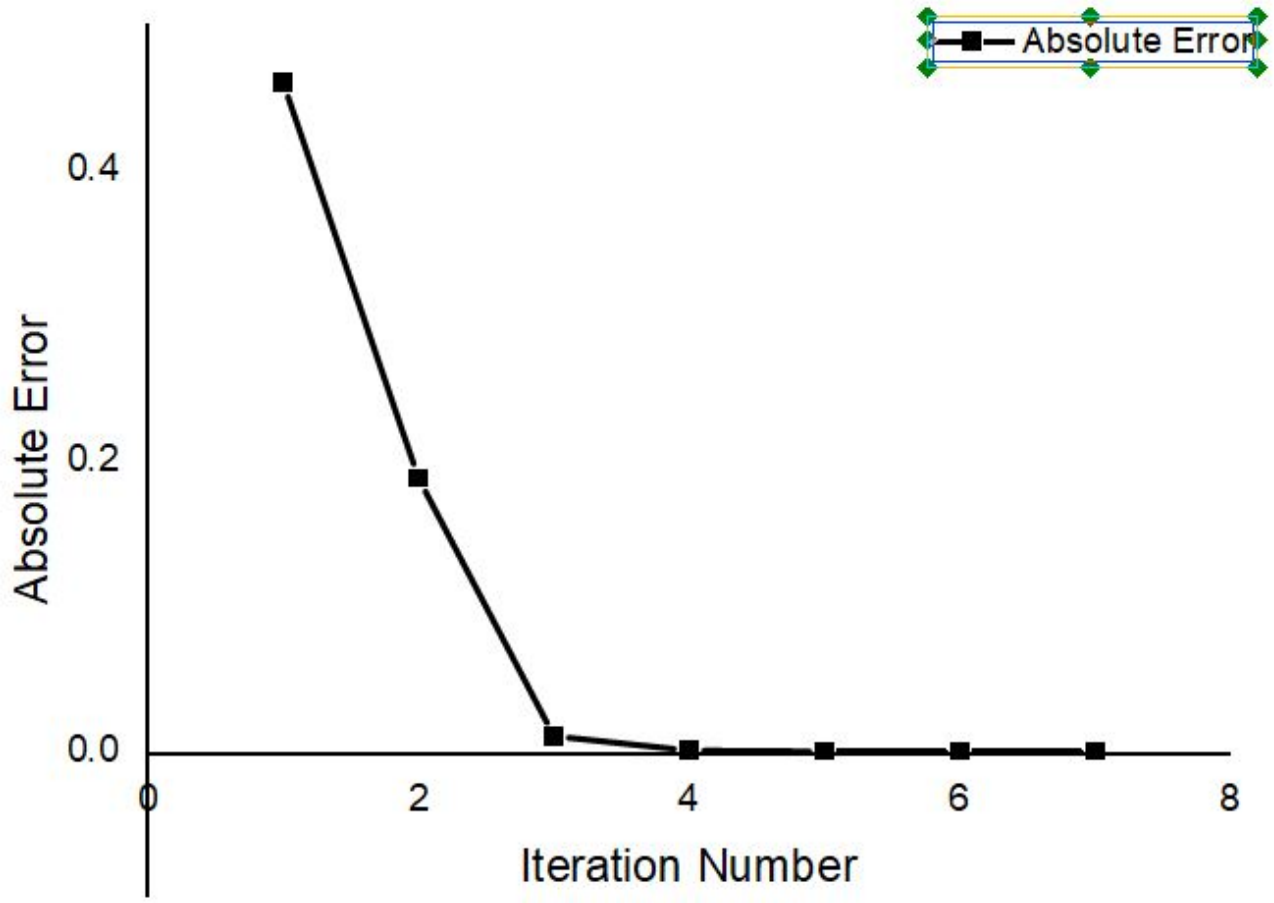
$$-x - \cos(x) = 0 \tag{2}$$

Graph 5



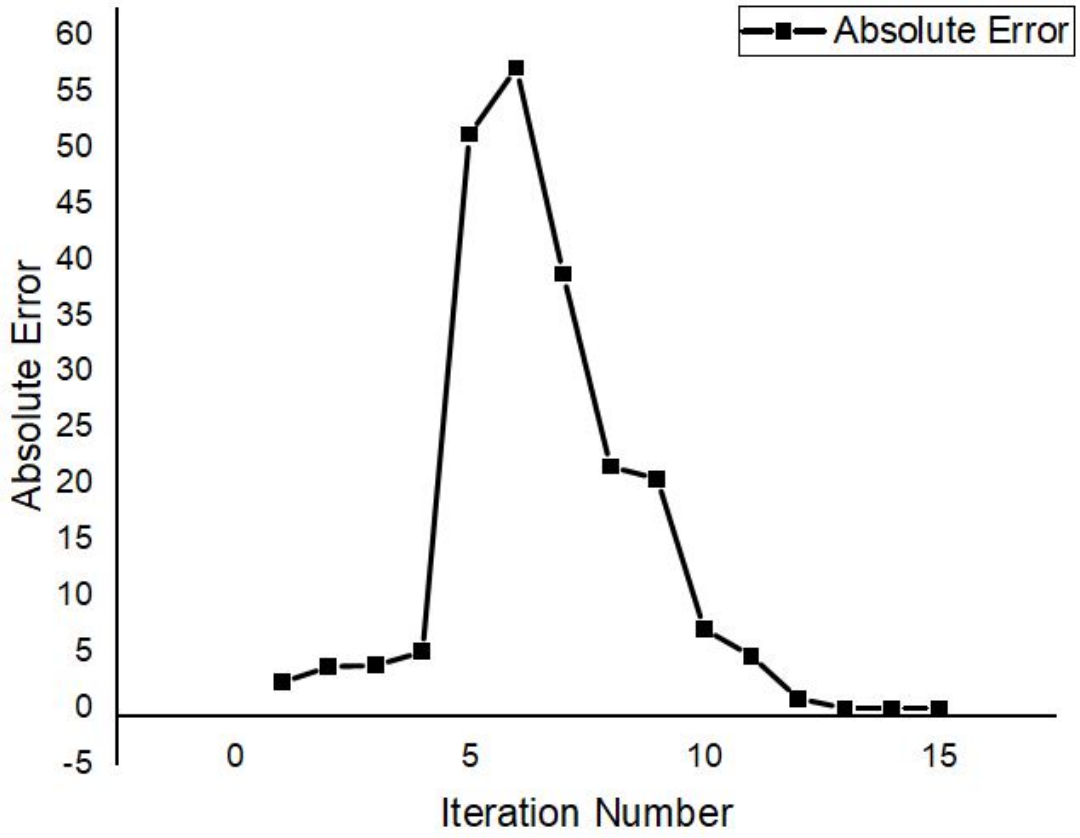
Graph 5: **Bisection method for question 1(b)**

Graph 6



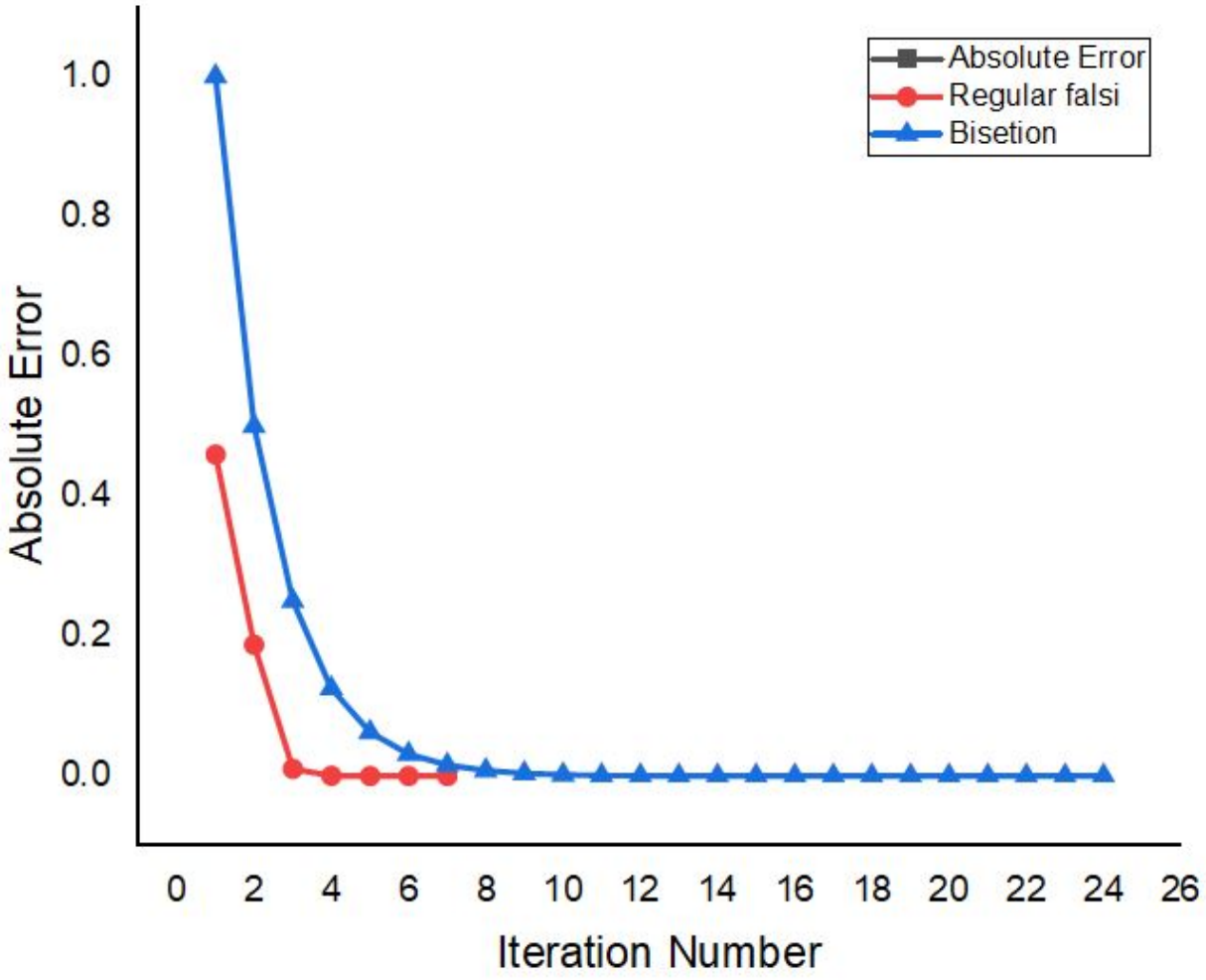
Graph 6: **Regula-Falsi method for question 1(b)**

Graph 7



Graph 7: **Newton Raphson method for question 1(b)**

Graph 8



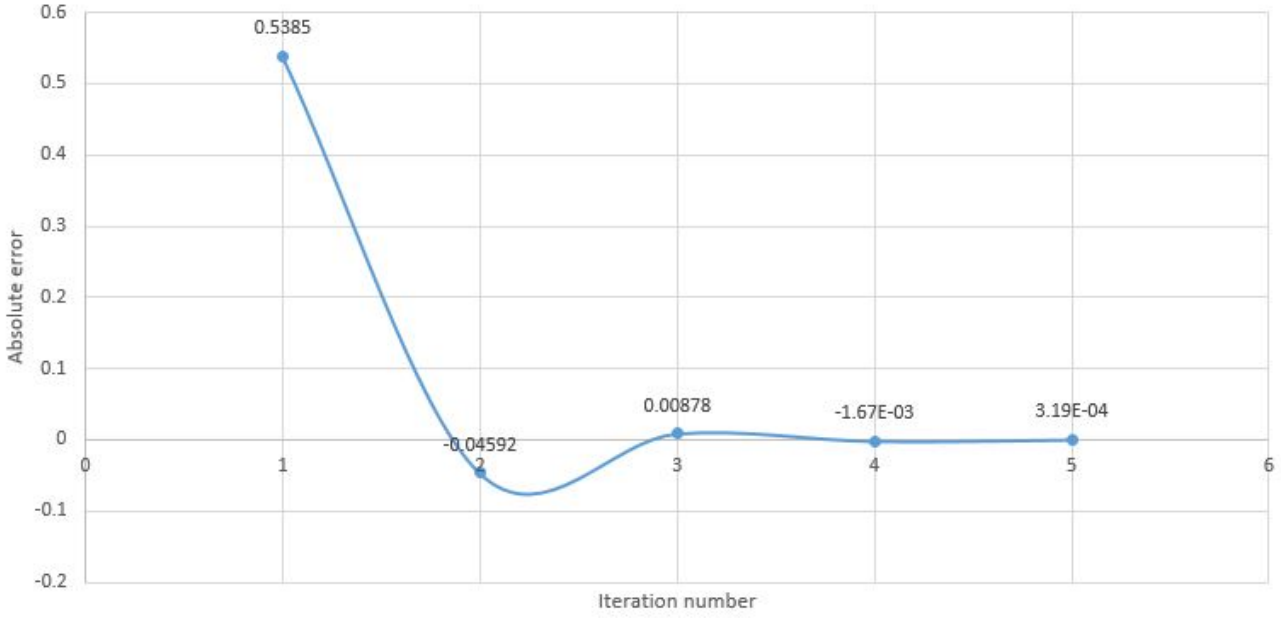
Graph 8: **All two combined method for question 1(b)**

Question-1(b)

$$P(x) = x^4 - 3x^3 - 7x^2 + 27x - 18 \tag{3}$$

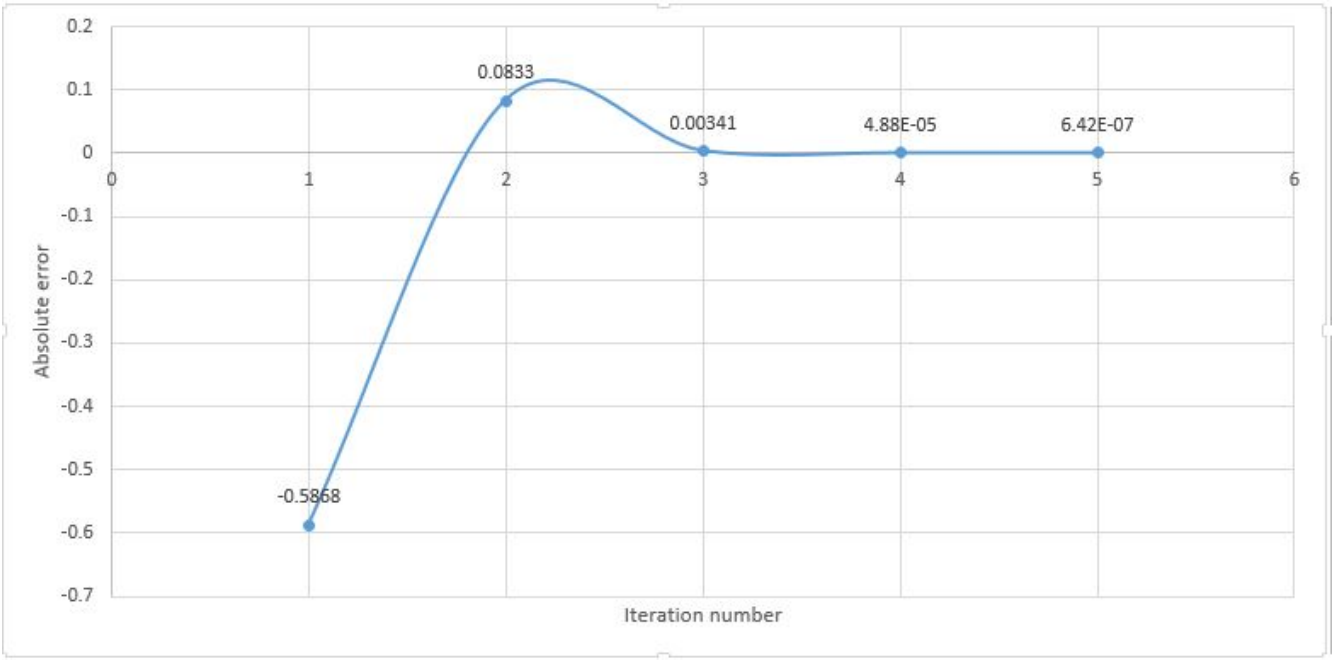
Graph 9

Graph 9:**for first root 1.9999 in Laguerre's and Synthetic division method**



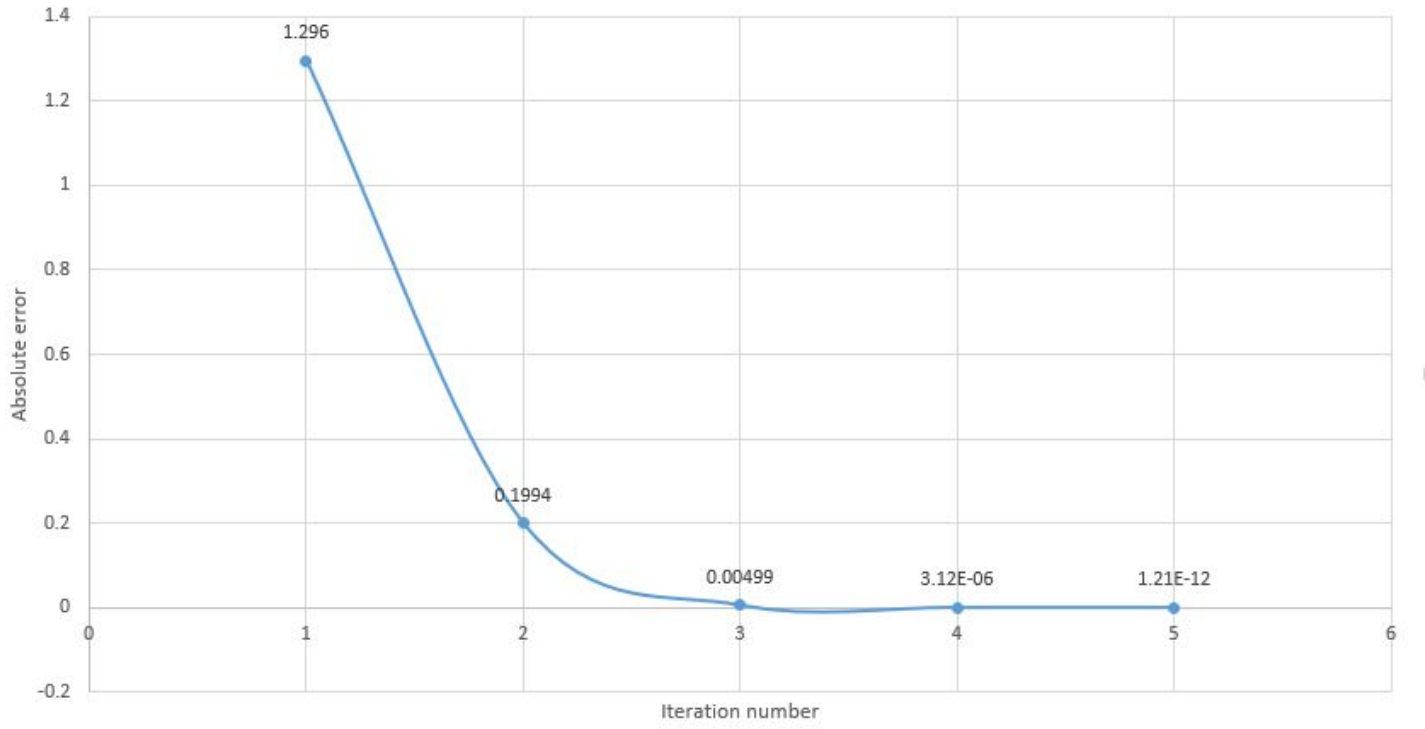
Graph 10

Graph 10:**for second root 3.000 in Laguerre's and Synthetic division method**



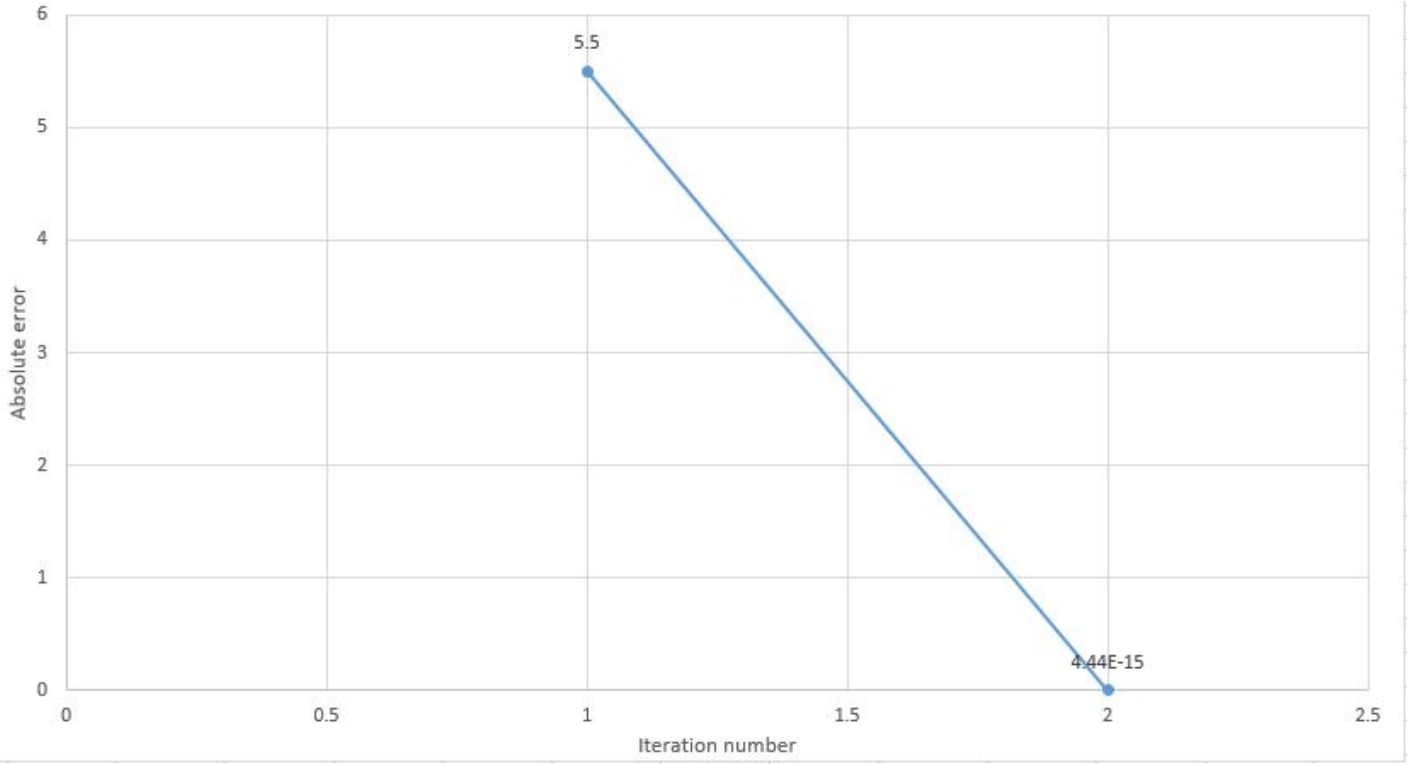
Graph 11

Graph 11: **for third root 1.0000 in Laguerre's and Synthetic division method**



Graph 12

Graph 12: **for 4th root -2.9999 in Laguerre's and Synthetic division method**



Notes

- All the graphs are Absolute Error vs Iteration number graph.
- From all this graph we can have the knowledge about how all the methods are converging and which method is more efficient to have the root.