Theorem 2.1 gives a method for determining the number of necessary iterations.

Given a tolerance ε we find n such that

$$\frac{b-a}{2^n} \leq \varepsilon \rightarrow 2^n \geq \frac{b-a}{\varepsilon}$$

$$n \ln 2 \geq \ln \frac{b-a}{\varepsilon}$$

$$n \geq \frac{\ln \frac{b-a}{\varepsilon}}{\ln 2}$$

#.13 Example: Use Theorem 2.1 to find a bound for the number of iterations needed to achieve an approximitation with accuracy 10^{-4} to the solution of

$$x^3 - x - 1 = 0$$

lying in the interval $[1, 2]$

$$\frac{2-1}{2^n} \leq 10^{-4} \rightarrow 2^n \geq 10^4$$

$$\ln 2^n \geq \ln 10^4$$

$$n \geq \frac{\ln 10^4}{\ln 2} \approx 13.2877$$

$$n \geq 14$$