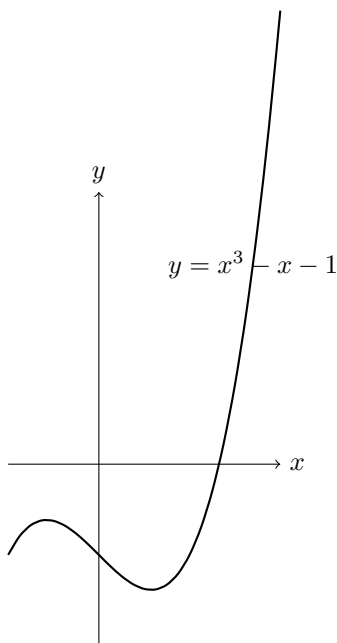


Question 4

Use Newton's Method to approximate a root of the equation:

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

Start with an initial guess of $x_1 = 1$, and compute the next three iterations: x_2 , x_3 , and x_4 , rounding answers to four decimal places.



Question 4 - Solution

Newton's iteration is

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}, \quad f(x) = x^3 - x - 1, \quad f'(x) = 3x^2 - 1.$$

Keeping full precision internally gives

$$x_2 = 1.0000000000 - \frac{-1.0000000000}{2.0000000000} \approx \boxed{1.5000}$$

$$x_3 = 1.5000000000 - \frac{0.8750000000}{5.7500000000} \approx \boxed{1.3478}$$

$$x_4 = 1.3478260870 - \frac{0.1006821731}{4.4499054820} \approx \boxed{1.3252}$$