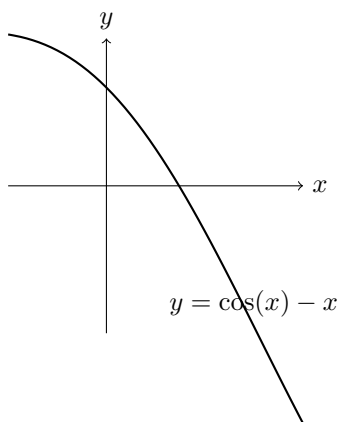


Question 5

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

$$\cos(x) - x = 0$$

Start with an initial guess of $x_1 = 0.5$, and compute the next three iterations: x_2 , x_3 , and x_4 , rounding to four decimal places.



Question 5 - Solution

Newton's iteration is

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

Keeping full precision internally gives

$$x_2 = 0.5000000000 - \frac{0.3775825619}{-1.4794255386} \approx \boxed{0.7552}$$

$$x_3 = 0.7552224171 - \frac{-0.0271033119}{-1.6854506318} \approx \boxed{0.7391}$$

$$x_4 = 0.7391416661 - \frac{-0.0000946154}{-1.6736538108} \approx \boxed{0.7391}$$