### Example: Newton-Raphson Method for Finding Roots

Let's find the root of a function f(x)f(x)f(x) using the Newton-Raphson method:

#### Example Function

Consider the function: f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5

### Explanation

**Loading** rootSolve **Package**: We load the rootSolve package, which provides functions for finding roots of equations.

**Function Definition**:

* 1. The function f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5 is defined using the f function in R.

**Finding Roots**:

* 1. The uniroot.all function from the rootSolve package is used to find all roots of the function f in the interval [1,3][1, 3][1,3]. This function is useful as it can handle finding multiple roots within a given interval.

**Application**:

* 1. We apply the uniroot.all function to find the root(s) of f(x)f(x)f(x) within the interval [1,3][1, 3][1,3].
  2. The result is stored in root and printed to the console.
  3. We also check the value of f at the root(s) to verify the correctness of the roots found.

### Interpretation

**Root(s)**: The uniroot.all function finds all roots of the function f(x)=x3−2x−5f(x) = x^3 - 2x - 5f(x)=x3−2x−5 within the interval [1,3][1, 3][1,3]. In this case, it finds one root x≈2.094552x \approx 2.094552x≈2.094552.

**Value of** fff **at the Root(s)**: Checking fff at the root(s) confirms that the function values are very close to zero, verifying the correctness of the root(s) found.