

g. Starting with  $x_1 = 2$ , find the third [2075] approximation  $x_3$  to the root of the eq<sup>n</sup>  
 $x^3 - 2x - 5 = 0$ .

Solution:

$$\text{here, } f(x) = x^3 - 2x - 5 = 0.$$

$$f'(x) = 3x^2 - 2.$$

We have,  $x_1 = 2$  be the initial guessing root.

1st iteration:

$$x_0 = 2$$

$$f(x_0) = -1$$

$$f'(x_0) = 10$$

Now,

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

$$= 2 - \frac{(-1)}{10}$$

$$= 2.1$$

Similarly computing  $x_2, x_3$ , and tabulating in the table below;

$n$	$x_n$	$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$
0	2	2.1
1	2.1	2.0945
2	2.0945	2.0946
3	2.0946	2.0946

$\therefore$  The third approximation  $x_3 = 2.0946$  ,,