2) Fixed-point iteration

Let p be a fixed-point of g i.e.

$$g(p) = p.$$

We want to built a sequence $\{p_n\}_{n=1}^{\infty}$ that converges to p.

a) Choose initial approximation p_0

b) Set

$$p_n = g(p_{n-1}) \qquad n \geq 1$$

Note: If $p_n \to p$ and $g(x)$-continuous then

$$p_n = g(p_{n-1})$$

$$\downarrow$$

$$p = g(p)$$

Thus, p is a fixed point. This technique is called <u>fixed-point iteration.</u>

Ex #6|64 Use a fixed-point iteration method to determine a solution for

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

on $[1, 2]$. Use $p_0 = 1$.