

$$n \ln 2 \geq \ln 10^4$$

$$n \geq \frac{\ln 10^4}{\ln 2}$$

Fixed point iteration:  $p_{n+1} = g(p_n)$

Ex. #4/64 The following 4 methods are proposed to compute  $\sqrt[5]{7}$ 's. Rank them in order based on their apparent speed of convergence

$$(a) p_n = \left(1 + \frac{7 - p_{n-1}^3}{p_{n-1}^2}\right)^{\frac{1}{2}}$$

$$(b) p_n = p_{n-1} - \frac{p_{n-1}^5 - 7}{p_{n-1}^2}$$

$$(c) p_n = p_{n-1} - \frac{p_{n-1}^5 - 7}{5 p_{n-1}^4}$$

$$(d) p_n = p_{n-1} - \frac{p_{n-1}^5 - 7}{12}$$

We consider the value of  $g'(\sqrt[5]{7})$ .