

HW 2

$\frac{2}{b}$

$$x_{n+1} = \frac{2}{3}x_n + \frac{1}{x_n^2}$$

$$g(x_n) \approx g(\alpha) + g'(\alpha)(x_n - \alpha) + \frac{g''(\alpha)}{2!}(x_n - \alpha)^2$$

$$= g(\alpha) + \frac{g''(\alpha)}{2!}(x_n - \alpha)^2$$

$$= \frac{2}{3}(3^{1/3}) + \frac{1}{(3^{1/3})^2} + \underbrace{\left(\frac{6/(3^{1/3})^4}{2!} \right)}_{\beta} (x_n^2 - 2 \cdot 3^{1/3}x_n + 3^{2/3})$$

$$g'(x_n) \approx \beta \cdot (2x_n - 2 \cdot 3^{1/3} + 3^{1/3})$$

$$|g'(\alpha)| \approx \beta (2 \cdot 3^{1/3} - 2 \cdot 3^{1/3} + 3^{1/3})$$

$$= 12/3^{4/3} \cdot 3^{1/3}$$

$$= \boxed{5.8 \approx k}$$