

## HW 2

2  
6.4  $x_{n+1} = \frac{2}{3}x_n + \frac{1}{x_n^2} = g(x) \quad \alpha = 3^{1/3} = 1.4$

IF  $x \in [1.0, 2.0]$  IS  $g(x) \in [1.0, 2.0]$ ?

SEE 2b.PY

$x_n$	$x_{n+1} \approx$
1.0	1.67
2.0	1.58

} ALL  $x \in [1.0, 2.0]$   
GIVE  $g(x) \in [1.0, 2.0]$

IS  $|g'(x)| \leq k < 1$  FOR  $\forall x \in [1.0, 2.0]$ ?

$$g'(x) = \frac{2}{3} - \frac{2}{x^3}$$

$x_n$	$ g'(x_n) $
1.0	1.3
2.0	0.42

} OK, TRY  $[1.3, 2.0]$

$x_n$	$ g'(x_n) $
1.3	0.24

$\alpha$  IS UNIQUE  
FIXED POINT

FOR  $\forall x \in [1.3, 2.0]$

$\{x_n\}$  CONVERGES TO  $\alpha$