HW 2

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$$x_{n+1} = \frac{12}{1+x_n} \quad ; \quad \alpha = 3$$

DOES $g(x) = \frac{12}{1+x_n}$ MAP $[2.5, 3.5]$ ON $[2.5, 3.5]$?

$$g(2.5) = \frac{12}{1+2.5} = 3.4 \checkmark$$

$$g(3.5) = \frac{12}{1+3.5} = 2.7 \checkmark$$

YES

FOR $\forall x \in [2.5, 3.5]$ IS $|g'(x)| < 1$

$$|g'(x)| = |12(1+x_n)^{-2}|$$

FOR SOME $x \in [2.5, 3.5]$ $\{x_n\}$ WILL
CONVERGE BUT NOT NECESSARILY TO $\alpha = 3$

$\rightarrow$ TEST @ 2.5 & 3.5

$$|g'(2.5)| = |12(1+2.5)^{-2}| = 0.98 < 1$$

$$|g'(3.5)| = |12(1+3.5)^{-2}| = 0.59 < 1$$

FOR $\forall x \in [2.5, 3.5]$
$\{x_n\} \rightarrow \alpha = 3$