

a

$$g(x) = 2x(1-x)$$

$$g(0) = 0 \longrightarrow g(0) = 2 \cdot 0(1-0) = 0$$

$$g\left(\frac{1}{2}\right) = \frac{1}{2} \longrightarrow g\left(\frac{1}{2}\right) = 2 \cdot \frac{1}{2}\left(1 - \frac{1}{2}\right) = \frac{1}{2} \therefore$$

b

BY THEOREM EXISTENCE & UNIQUENESS OF A FIXED POINT  
IN LECTURE 5, A3:

$$|g'(x)| < 1 \quad \text{FOR } \forall x \in [a, b]$$

$|g'(p_0 \approx 0)| > 1$  SO FIXED POINT ITERATION  
WILL NOT CONVERGE TO ROOT  $x = 0$

c

FIXED POINT ITERATION WILL CONVERGE TO ROOT  $x = \frac{1}{2}$   
BECAUSE OF A<sub>1</sub> & A<sub>3</sub> OF THE ABOVE MENTIONED 2  
THEOREM

WE EXPECT LINEAR ORDER OF CONVERGENCE