

# Quiz 1 MTH416.616

Tuesday, January 28, 2025 2:42 PM

$$x' = \boxed{x^2 + 2x + a = 0} \quad \text{set}$$

$$x = \frac{-2 \pm \sqrt{4 - 4a}}{2} = -1 \pm \sqrt{1-a}$$

3 possibilities exist:

①  $1-a < 0$

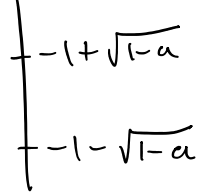
↳ no equilibria because they would be complex

②  $1-a = 0 \leftrightarrow a = 1$

↳ one equilibrium:  $x = 1$   $\rightsquigarrow$  

③  $1-a > 0 \leftrightarrow a < 1$

↳ two equilibria:  $x = -1 + \sqrt{1-a}, -1 - \sqrt{1-a}$


$$\begin{array}{c} -1 + \sqrt{1-a} \\ -1 - \sqrt{1-a} \end{array}$$

$a = 1$  is a bifurcation point