Math 17B
Kouba
Classifying Equilibria

Ex: Find and classify (stable or unstable) the equilibria for

$$\frac{dN}{dt} = N^2 - 3N - 4$$

using the

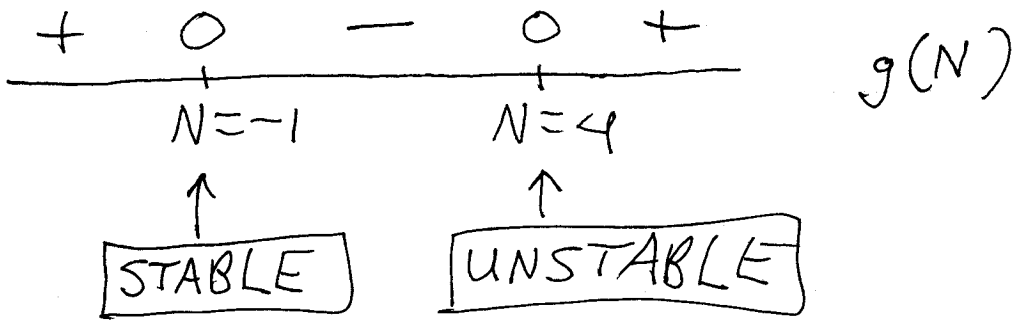
a.) graphical approach (sign chart)

b.) analytical approach (eigenvalue method)

$g(N) = N^2 - 3N - 4 = (N-4)(N+1) = 0$

$\rightarrow$ $\boxed{N=4}$, $\boxed{N=-1}$ are equilibria

a.)



b.) $g'(N) = 2N - 3$:

i.) $g'(-1) = 2(-1) - 3 = -5 < 0$ so $N=-1$ $\boxed{\text{STABLE}}$

ii.) $g'(4) = 2(4) - 3 = 5 > 0$ so $N=4$ $\boxed{\text{UNSTABLE}}$