Consider the differential equation

$$y' = y(y-1)(y-3)$$

1. Find the equilibrium (constant) solutions.

2. Draw the phase line and sketch representative solutions.

3. If $y(0) = 2$, find

$$\lim_{t \to \infty} y(t) \quad \text{and} \quad \lim_{t \to -\infty} y(t)$$
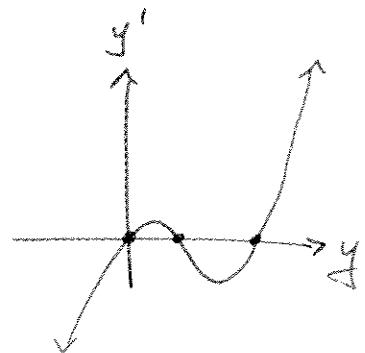
1. $y' = 0$ when $\left.\begin{array}{c} y = 0 \\ y = 1 \\ \text{or} \quad y = 3 \end{array}\right\}$ Equilibrium solutions

2.
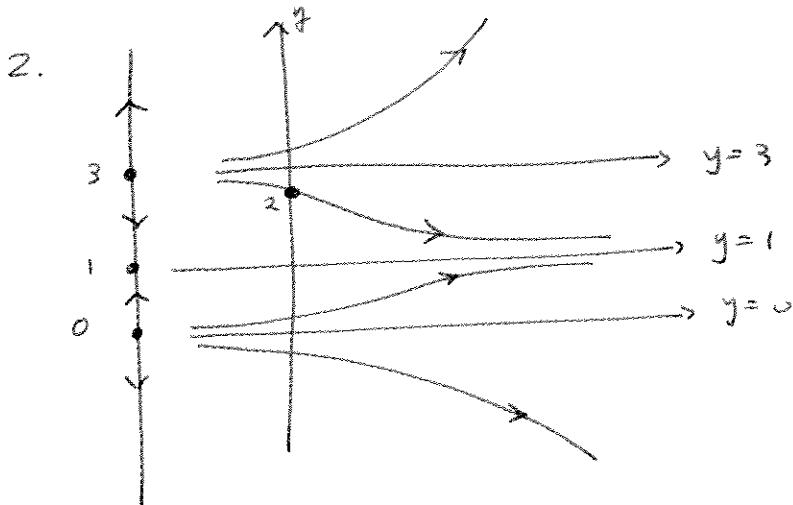
3. If $y(0) = 2$ (as on the curve above, where $(0,2)$ is indicated by a dot) then

$$\lim_{t \to \infty} y(t) = 1$$

and

$$\lim_{t \to -\infty} y(t) = 3$$