2-1 Solution Curves without a Solution

Find the critical points and phase lines of the given autonomous 1st order DEs. Classify each critical point as either asymptotically stable, unstable, or semi-stable. By hand, sketch typical solution curves in the region in the xy-plane determined by the graphs of the equilibrium solutions.

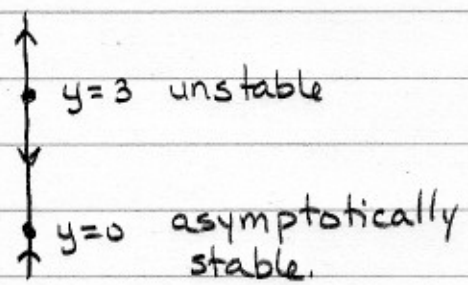
1. $\frac{dy}{dx} = y^2 - 3y$

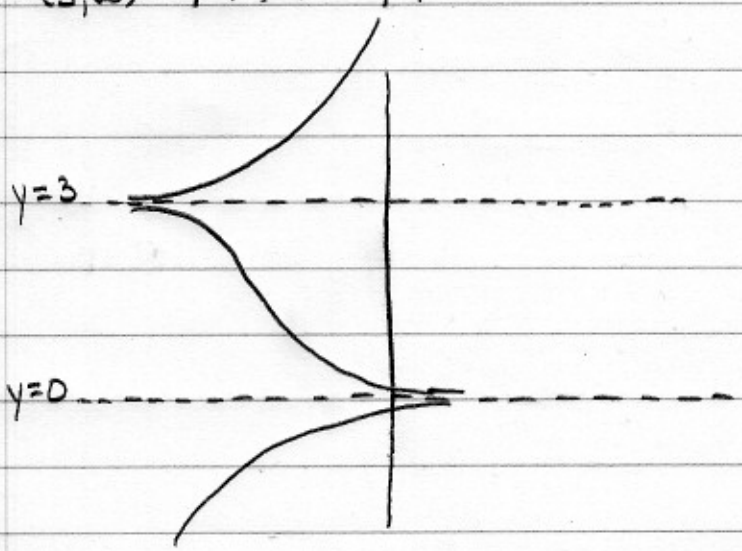
$y^2 - 3y = 0$

$y(y-3) = 0$

$y = 0 \quad y = 3.$

Interval	TV	Sign	↑/↓
$(-\infty, 0)$	-1	$+$	↑
$(0, 3)$	1	$-$	↓
$(3, \infty)$	4	$+$	↑





2. $\frac{dy}{dx} = y(2-y)(4-y)$

$y(2-y)(4-y) = 0$

$y = 0, 2, 4.$

Interval	TV	Sign	↑/↓
$(-\infty, 0)$	-1	−	↓
$(0, 2)$	1	+	↑
$(2, 4)$	3	−	↓
$(4, \infty)$	5	+	↑