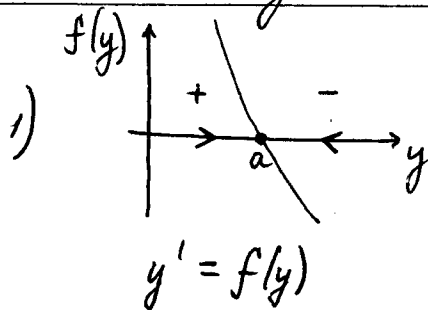


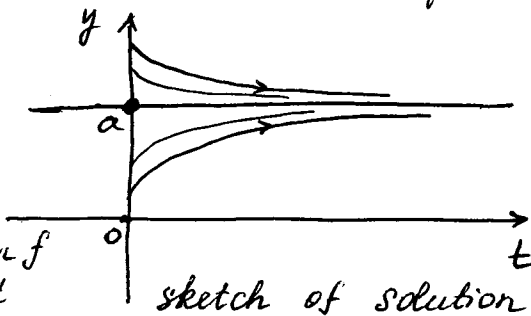
MATH 250.003
Classification of critical points.

$y' = f(y)$ - autonomous equation, $y(0) = y_0$
 $y = a$ is a critical point, if $f(a) = 0$

Example: $y' = (y-1)(y+2)$
 $y = -2$ - asymp. stable



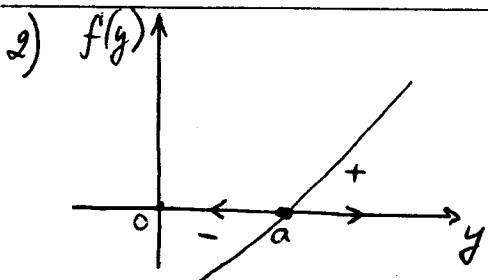
asymptotically
 - stable critical point



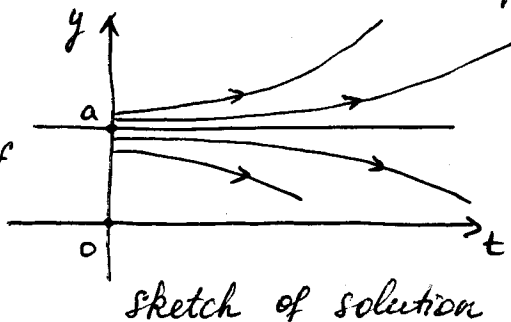
$y(t) \rightarrow a$
 $t \rightarrow \infty$

sketch of rhs function f
 near critical point

Example: $y' = (y-1)(y+2)$
 $y = 1$ - unstable

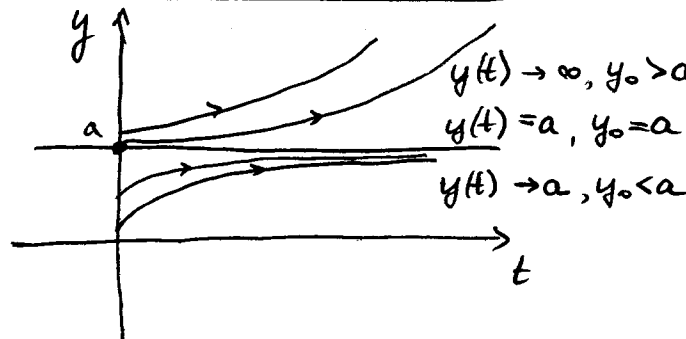
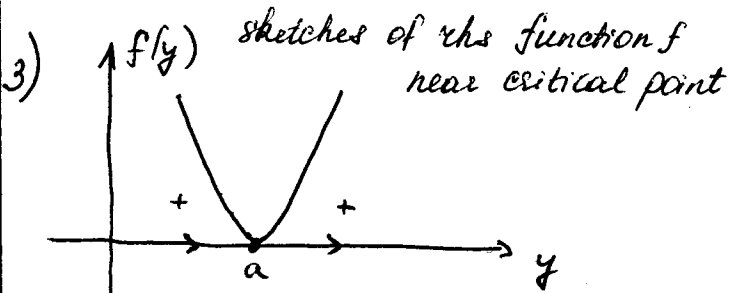


- unstable critical point



$y(t) \rightarrow \infty$, if $y_0 > a$
 $y(t) = a$, if $y_0 = a$
 $y(t) \rightarrow -\infty$, if $y_0 < a$

Example: $y' = (y-1)^2(y+2)$
 $y = 1$ - semistable
 $y = -2$ - unstable



Example: $y' = -(y-1)^2(y+2)$
 $y = 1$ - semistable
 $y = -2$ - asymp. stable

