

## Problem 1

Problems 1 through 6 involve equations of the form  $dy/dt = f(y)$ . In each problem sketch the graph of  $f(y)$  versus  $y$ , determine the critical (equilibrium) points, and classify each one as asymptotically stable or unstable. Draw the phase line, and sketch several graphs of solutions in the  $ty$ -plane.

$$dy/dt = ay + by^2, \quad a > 0, \quad b > 0, \quad y_0 \geq 0$$