If possible **without solving**, determine where the solution exists for the following initial value problems:

If not possible **without solving**, state where in the ty-plane, the hypothesis of theorem 2.4.2 is satisfied. In other words, use theorm 2.4.2 to determine where for some interval about t_0, a solution to IVP, $y' = f(t, y)$, $y(t_0) = y_0$ exists and is unique.

Example 1: $y' = y^{\frac{1}{3}}$, $y(t_0) = y_0$

Example 2: $ty' - y = 1$, $y(t_0) = y_0$

Example 3: $y' = ln|\frac{t}{y}|, \quad y(3) = 6$

Example 4: $(t^2 - 1)y' - \frac{t^3 y}{t-4} = ln|t|, \quad y(3) = 6$