1. (a) Find the general solution of the differential equation $y' = ty^2$.

(b) Find the solution of the initial value problem $y' = ty^2$, $y(2) = 1$. Indicate the interval in which the solution is valid.

(c) Find the solution of the initial value problem $y' = ty^2$, $y(2) = 0$. Indicate the interval in which the solution is valid.

2. (a) Find the solution of the initial value problem $y' = y + t$, $y(0) = a$.

(b) For what value(s) of $a$ will the solution approach infinity as $t \to \infty$?
3. Use the given direction field of the differential equation \( y' = f(t, y) \) to sketch the solutions that satisfy the initial conditions \( y(0) = 0, \ y(0) = 1, \ y(0) = 2, \ y(0) = 3, \ y(0) = 4. \)

4. Use the given direction field of the differential equation \( y' = f(t, y) \) to sketch the solution that satisfies the given initial condition. Indicate approximately the interval in which each solution is valid.

(a) \( y(0) = 0 \)  
(b) \( y(0) = 3 \)

5. Find the slope of the solution of the differential equation \( y' = y^2 - t^2 \) at the point \( (2, 3) \).