

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

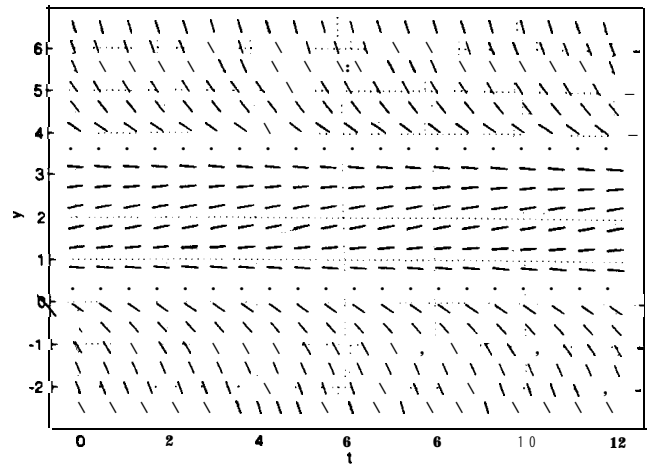
(b) Find the solution of the initial value problem  $y' = ty^2$ ,  $y(2) = 1$ . Indicate the interval in which the solution is valid.

(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  $y' = y + t$ ,  $y(0) = a$ .

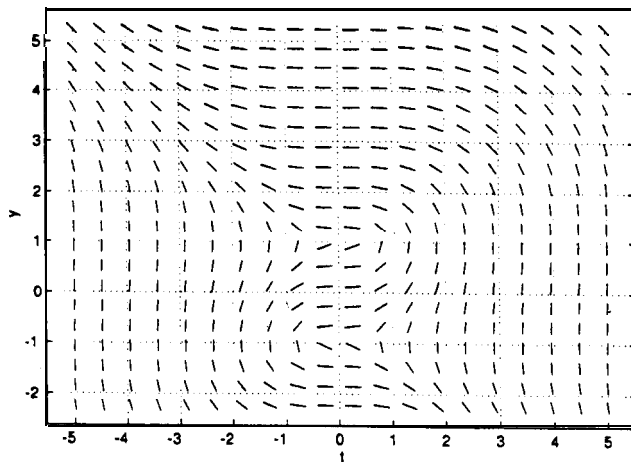
(b) For what value(s) of  $a$  will the solution approach infinity as  $t \rightarrow \infty$ ?

3. Use the given direction field of the differential equation  $y' = f(t, y)$  to sketch the solutions that satisfy the initial conditions  $y(0) = 0$ ,  $y(0) = 1$ ,  $y(0) = 2$ ,  $y(0) = 3$ ,  $y(0) = 4$ .



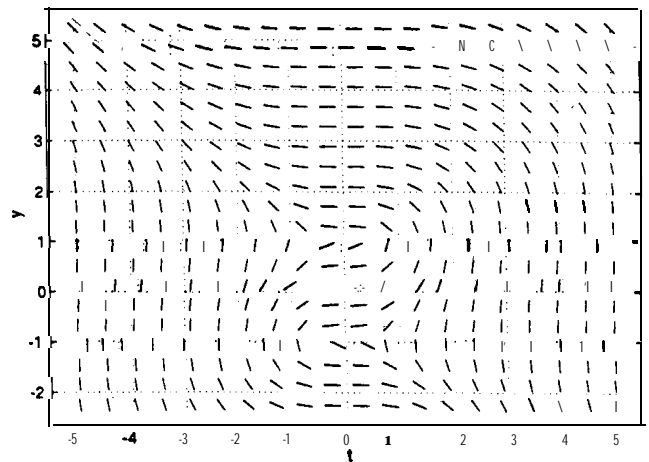
4. Use the given direction field of the differential equation  $y' = f(t, y)$  to sketch the solution that satisfies the given initial condition. Indicate approximately the interval in which each solution is valid.

(a)  $y(0) = 0$



$$< t <$$

(b)  $y(0) = 3$



$$< t <$$

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