

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 $(2, 3)$.