

Problem 2. (10 points)

Suppose that u is a real valued function of two variables and that u is differentiable.

(a) Solve the initial value problem

$$\begin{cases} u_t + 3u_x = 0 \\ u(0, x) = x^2. \end{cases}$$

(b) Find all solutions to the differential equation

$$u_t + 3u_x + u = 4t.$$