4. Find the general solution of the first-order PDE $u_t + cu_x = 0$, where c is a constant, by introducing the change of variables $\xi = x - ct$, $\eta = t$, and then use that general solution to solve the problem.

$$u_t + cu_x = 0, \qquad (-\infty < x < \infty,\ \ 0 < t < \infty)$$
$$u(x, 0) = f(x).$$

(The problem is from Vibrating String; d'Alembert's Solution in Wave Equation.)