Math 142-2, Group work 9

Problem 1

A long road has an initial uniform traffic density $\rho(x,0) = \frac{\rho_{\max}}{3}$. At $t = 0$, a traffic accident occurs at $x = 0$, which effectively limits the flow rate past $x = 0$ to $q(0,t) = \frac{3}{16} u_{\max} \rho_{\max}$. Determine the traffic density for $t > 0$. Assume $\hat{u}(\rho) = u_{\max}\left(1 - \frac{\rho}{\rho_{\max}}\right)$.