

<b>Name:</b>	<b>Signature:</b>
<b>Department:</b>	<b>Number:</b>

Q1. (25 points)

A police car is traveling in a straight line with constant speed  $v_p$ . A truck traveling in the same direction with the speed  $3v_p/2$  passes the poice car. The truck driver realizes that he is speeding, and immediately begins to slow down at a constant acceleration of  $-a_x$  until he comes to a stop. This is his lucky day, however, and the police car (still moving with the same constant speed) passes the truck driver without giving him a ticket.

(a) Express the two cars' second meeting time in terms of the given variables.

(b) Find the velocity at the instant they meet again and show that it does not depend on the acceleration of the truck.

(c) Sketch the x-t graph for the two vehicles.

(d) Find the maximum velocity the truck can have, so that the police car will reach him before it stops.

