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Two automobiles are involved in a game of chicken. The two cars start from rest at opposite ends of a long, one-lane road. The Audi accelerates at A for T seconds and then travels at constant velocity. The Buick accelerates at $A/2$ for $2T$ seconds and then travels at constant velocity. Determine the elapsed time when the cars collide (t_{collide}) as a function of the length of the road (d), A and T . The collision takes place after both cars have reached constant velocity.

Motion Information

Object:			Object:		
Event 1:	Event 2:	Event 3:	Event 1:	Event 2:	Event 3:
$t_1 =$	$t_2 =$	$t_3 =$	$t_1 =$	$t_2 =$	$t_3 =$
$r_1 =$	$r_2 =$	$r_3 =$	$r_1 =$	$r_2 =$	$r_3 =$
$v_1 =$	$v_2 =$	$v_3 =$	$v_1 =$	$v_2 =$	$v_3 =$
$a_{12} =$	$a_{21} =$		$a_{12} =$	$a_{21} =$	

Mathematical Analysis

Questions

If $A = 0 \text{ m/s}^2$, what should t_{collide} equal? Does your function agree with this observation?

If $d = \infty$, what should t_{collide} equal? Does your function agree with this observation?

What is the minimum length of road needed to guarantee the two cars collide at top speed?

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