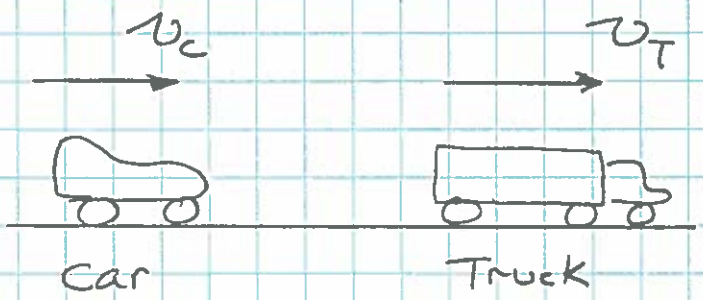
a.)



$m_c = 1000\ kg$

$m_T = 20{,}000\ kg$

$v_T = 25 \frac{km}{hr} \left(\frac{1000\ m}{1\ km}\right)\left(\frac{1\ hr}{3600\ s}\right)$

$= 6.94\ m/s$

$K_{car} = K_{truck}$

$\frac{1}{2} m_c v_c^2 = \frac{1}{2} m_T v_T^2$

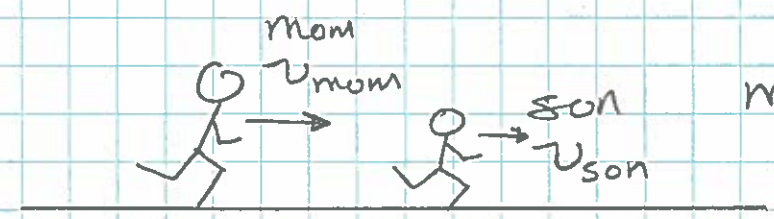
$v_c = \left(\frac{m_T}{m_c} v_T^2\right)^{1/2} = \left(\frac{m_T}{m_c}\right)^{1/2} v_T$

$= 4.47\ v_T$

$= \underline{31.0\ m/s}$

$= \underline{111.7\ km/h}$

b.)



$m_{mom} = 4\, m_{son}$

$K_{mom} = K_{son}$

$\frac{1}{2} m_{mom} v_{mom}^2 = \frac{1}{2} m_{son} v_{son}^2$

$\frac{v_{son}}{v_{mom}} = \sqrt{\frac{m_{mom}}{m_{son}}} = \sqrt{4} = \underline{2}$