Question 18977

Lets use the law of conservation of linear momentum. Let the ox-axis go to the right. So, the projection of vector form $\vec{p}_1 + \vec{p}_2 = \vec{p}$ (where $\vec{p}_1$ is the linear momentum of the car with initial velocity 15m/s, and $\vec{p}_2$ is the linear momentum of the car with initial velocity 5m/s) onto ox-axis is: $m_1 v_0^1 - m_2 v_0^2 = (m_1 + m_2) v$, which gives

$$v = \frac{m_1 v_0^1 - m_2 v_0^2}{m_1 + m_2} = 7 \, m/s \quad .$$