Answer on question #61700, Physics / Other

Question A car of mass 1400 kg moving south at 11 ms1 collides into another car of mass 1800 kg moving east at 30 ms1. The cars are stuck together after the collision. Determine the velocity of the cars immediately after the collision.

Solution We have to add momentums of both car, remembering that they are vectors. The angle between them is 90°, hence, their sum is

$$\vec{p} = \vec{p}_1 + \vec{p}_2 = \sqrt{m_1^2 v_1^2 + m_2^2 v_2^2} = \sqrt{1400^2 \cdot 11^2 + 1800^2 \cdot 30^2} \approx 56153\, kg \cdot m/s$$

So, their velocity when they are stuck together is

$$v = \frac{p}{m_1 + m_2} = \frac{56153}{1400 + 1800} \approx 17.55\, m/s$$