Question#19425

You are standing on a sheet of ice that covers the football stadium parking lot in Buffalo; there is negligible friction between your feet and the ice. A friend throws you a .400kg football that is traveling horizontally at 12m/s. Your mass is 65kg. If you catch the ball, with what speed do you and the ball move afterwards?

Solution:

Let:

$$m_1 = 0.4 \, kg$$

$$m_2 = 65 \, kg$$

$$v_1 = 12 \, m/s$$

$$v_2-?$$

According to the Newton's laws the total linear momentum cannot change:

$$m_1 v_1 = (m_1 + m_2)v_2$$

$$v_2 = \frac{m_1 v_1}{m_1 + m_2}$$

$$v_2 = \frac{0.4 * 12}{0.4 + 65} = 0.073 \, m/s$$

Answer: 0.073 m/s.