8. This problem also involves the direct application of the principle of conservation of momentum in a manner similar to that used in the previous problem with the difference that in this case both players were moving before the collision. The players were initially moving in opposite directions, so we choose the original direction in which one of them was moving as positive and the other as negative. For this solution we will arbitrarily identify the direction in which the 100 kg player initially was moving as the positive direction. This means his initial velocity is specified as + 3.0 m / s and the initial velocity of the 85 kg player is - 5.0 m / s.

$$p_{before} = p_{after}$$

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2) v_{after}$$

$$(100 \text{ kg})(3.0 \text{ m / s}) + (85 \text{ kg})(-5.0 \text{ m / s}) = (100 \text{ kg} + 85 \text{ kg}) v_{after}$$

$$(300 - 425)\text{kg m / s} = (185 \text{ kg}) v_{after}$$

$$v_{after} = -125 / 185 \text{ m / s} = -0.68 \text{ m / s}$$

Note that the final velocity of the two players is in the negative direction, which is the direction in which the smaller player was initially moving. Despite his larger mass, the slower speed of the larger player results in a smaller value for his momentum. Thus you should watch out for collisions with fast moving little guys! The same result would be obtained by choosing the direction of the other player as positive.