

1. A 95 kg fullback, running at 8.2 m/s, collides in midair with a 128 kg defensive tackle moving in the opposite direction. Both players end up with zero speed. How fast was the tackle moving originally?
2. Ball A (5.0 g) moves at a velocity of 20.0 cm/s to the right. It collides with ball B (10.0 g) moving along the same line with a velocity of 10.0 cm/s to the right. After the collision, ball A is still moving but with a velocity of 8.0 cm/s in the same direction. What is the velocity of ball B after the collision?
3. Before a collision, a 25 kg object is moving at 12 m/s to the right. After a collision with stationary box, the 25 kg object moves at 8 m/s to the right. What is the resulting momentum of the box?
4. A 2575 kg van runs into the back of a 835 kg compact car at rest. They move off together at 8.5 m/s. Assuming no friction with the ground, find the initial speed of the van.
5. A 15 g bullet is shot into a 5085 g wooden block standing on a frictionless surface. The block, with the bullet in it, acquires a velocity of 1.0 m/s. Calculate the velocity of the bullet before striking the block.
6. A hockey puck, mass 0.115 kg, moving at 35.0 m/s, strikes an octopus thrown on the ice by a fan. The octopus has a mass of 0.265 kg. The puck and octopus slide off together. Find their velocity.
7. A 50 kg woman, riding on a 10 kg cart is moving east at 5.0 m/s. The woman jumps off the cart and hits the ground at 7.0 m/s eastward, relative to the ground. Calculate the velocity of the cart after she jumps off.
8. A car with mass 1245 kg, moving at 29 m/s strikes a 2175 kg car at rest. If the two cars stick together, with what speed do they move?
9. A 92 kg fullback, running at 5.0 m/s, attempts to dive across the goal line for a touchdown. Just as he reaches the goal line, he is met head-on in midair by two 75 kg linebackers, one moving at 2.0 m/s and the other at 4.0 m/s. If they all become entangled as one mass, with what velocity do they travel? Does the fullback score?
10. A 5.00 g bullet is fired with a velocity of 100 m/s toward a 10.00 kg stationary solid block resting on a frictionless surface.
 - a) What is the change in momentum of the bullet if it is embedded in the block?
 - b) What is the change in momentum of the bullet if it ricochets in the opposite direction with a speed of 99 m/s?