

1. A 500 kg cannon fires a 5 kg ball forward at 80 m/s. What was the final velocity of the cannon?
2. Tandoy is sitting in a boat and throws a rock north at 30 m/s. Tandoy and the boat (total mass 130 kg) move south at 2 m/s. What is the mass of the rock?
3. Tai (40 kg) and Randy (60 kg) are competing in the Ice Dancing Championship. They begin their routine with Tai pushing off on Randy. If Randy travels at 0.85 m/s, what is Tai velocity?
4. A 50 gram bullet is fired from a 1.2 kg gun with a speed of 150 m/s.
 - a. What is the recoil velocity of the gun?
 - b. Which experiences a greater force, the gun or the bullet?
 - c. Which experiences a greater change in velocity?
 - d. Which experiences a greater acceleration?

Recoil Problems

- e. Which experiences a greater impulse?
5. Pinal (60 kg) and Jaiden (45 kg) are on a row boat (25 kg) in the middle of a lake. For some unknown reason, Pinal jumps off the front of the boat with a speed of 2 m/s and Jaiden jumps off the back with a speed of 3 m/s. What is the resultant speed of the boat?
6. All of these problems involved two objects initially at rest and then both objects moving after pushing apart. How can momentum be conserved if there was no motion at first, then both objects somehow gain motion?

Answers:

- 1) 0.8 m/s, backwards 2) 8.67 kg 3) 1.28 m/s, opposite direction
4. a) 6.25 m/s b) same c) bullet d) bullet e) same
5) 0.6 m/s 6) one momentum is + and the other is -, so the total momentum is still 0