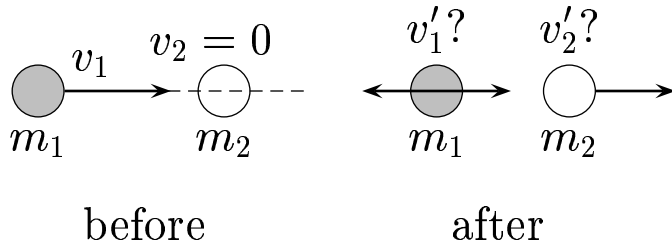


Given: A ball is approaching  $m_2 = 2 m_1$  with a speed  $v_1$ .



After an elastic collision, find the final velocities:  $v_1'$  and  $v_2'$ .

- A)  $v_1' = \frac{-v_0}{3}$       and       $v_2' = \frac{2v_0}{3}$ .
- B)  $v_1' = \frac{v_0}{3}$       and       $v_2' = \frac{v_0}{3}$ .
- C)  $v_1' = -v_0$       and       $v_2' = \frac{v_0}{2}$ .
- D)  $v_1' = \frac{-v_0}{4}$       and       $v_2' = \frac{v_0}{2}$ .

The center-of-mass system,

$$\text{With } v'_i = 2 v_{cm} - v_i, v_{cm} = \frac{m v_1}{3 m} = \frac{v_1}{3},$$

$$v'_1 = \frac{2 v_0}{3} - v_0 = \frac{-v_0}{3},$$

Incorrect answers: The reader should check that:

- B corresponds to perfectly inelastic collision.
- C violates conservation of energy.
- D violates conservation of momentum.

Answer **A**.

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