

Section 9.6 Motion of a System of Particles

- 41.** A 2.00-kg particle has a velocity $(2.00\hat{i} - 3.00\hat{j})$ m/s, and a 3.00-kg particle has a velocity $(1.00\hat{i} + 6.00\hat{j})$ m/s. Find (a) the velocity of the center of mass and (b) the total momentum of the system.

- 44.** A ball of mass 0.200 kg has a velocity of $1.50\hat{i}$ m/s; a ball of mass 0.300 kg has a velocity of $-0.400\hat{i}$ m/s. They meet in a head-on elastic collision. (a) Find their velocities after the collision. (b) Find the velocity of their center of mass before and after the collision.

43. Romeo (77.0 kg) entertains Juliet (55.0 kg) by playing his guitar from the rear of their boat at rest in still water, 2.70 m away from Juliet, who is in the front of the boat. After the serenade, Juliet carefully moves to the rear of the boat (away from shore) to plant a kiss on Romeo's cheek. How far does the 80.0-kg boat move toward the shore it is facing?