1. Object *A* with mass *m* is traveling with velocity *v* in the *x*-direction. Object *B* also has mass *m* and is traveling with velocity *v* in the *y*-direction. The objects collide elastically and object *A* rebounds with velocity *v* in the *y*-direction. What is the *y*-component of the velocity of *B* after the collision?

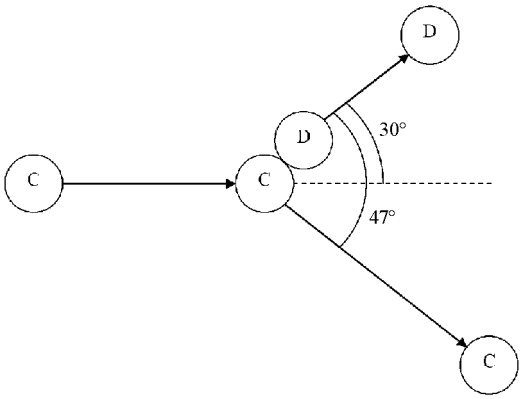
   1) 0
   2) $\frac{1}{2}v$
   3) v
   4) `$2v$
   5) $2v$

2. Two objects of mass *m* and 2 *m* are moving horizontally parallel to the *x*-axis. The mass 2 *m* overtakes and collides elastically with mass *m*. If the *y*-component of the velocity of the mass *m* is 4 m/s upward immediately after their collision, what is the *y*-component of the velocity of the mass 2 *m* immediately after the collision?

   1) 8 m/s downward
   2) 4 m/s downward
   3) 2 m/s downward
   4) 4 m/s upward
   5) 8 m/s upward

3. Two balls, one of mass *m*, the other of mass 2 *m*, move parallel to the *x*-axis and collide elastically. If the *y*-component of the velocity of the mass 2 *m* immediately after the collision is *v*, then the magnitude of the *y*-component of the velocity of the mass *m* immediately after the collision is

   1) $\frac{v}{3}$
   2) $\frac{v}{2}$
   3) v
   4) $2v$
   5) $3v$

4. 

   A cat of mass m_c is sliding across a frictionless surface in the positive *x*-direction with a velocity of magnitude v_o when it collides with a dog of mass m_d at rest. The dog now travels at an angle 30^o with respect to the cat's initial path at a velocity of magnitude v_1. The cat travels at an angle of negative 47^o with respect to the dog's path of motion with a velocity of magnitude v_2. Which of the following is true?

   1) $m_d v_1 sin30^o = m_c v_2 sin17^o$
   2) $m_d v_1 sin30^o = m_c v_2 sin47^o$
   3) $m_d v_1 cos30^o = m_c v_2 cos17^o$
   4) $m_d v_1 cos30^o = m_c v_2 cos47^o$
   5) $m_d v_1 sin30^o + m_c v_2 sin17^o = m_c v_o$

5. A 1.0 kg mass traveling 3.0 m/s north and a 2.0 kg mass traveling 2.0 m/s east collide and stick together. After the collision, their speed is most nearly

   1) 1.0 m/s.
   2) 1.7 m/s.
   3) 2.5 m/s.
   4) 3.2 m/s.
   5) 5.0 m/s.

Base your answers to questions **6** and **7** on the following situation.

An object with a mass of 6.0 kilograms and a velocity of 4.0 meters per second in the *x*-direction collides with an object of mass 3.0 kilograms and a velocity of 8.0 meters per second in the *y*-direction and they stick together.

6. After the collision, the angle the objects' trajectory makes with the *x*-axis is most nearly

   1) 0º

   2) 30º

   3) 45º

   4) 60º

   5) 90º

7. After the collision the velocity of the objects is most nearly

   1) 2.3 m/s

   2) 3.7 m/s

   3) 4.5 m/s

   4) 6.9 m/s

   5) 7.0 m/s

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8. An object at rest splits into 3 particles, each with mass *m*, traveling with velocity *v*. The angle between the velocity vectors of any two of these particles is

   1) 30º

   2) 60º

   3) 90º

   4) 120º

   5) 150º

Answer Key
One Dimensional Collisions MC Questions [Mar 28, 2011]

1. 1
2. 3
3. 4
4. 1
5. 2
6. 3
7. 2
8. 4

Name _____ Class _____ Date _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____