Momentum Vector Problems

Note: *In each of these problems, angles given are relative to the velocity of the ball initially moving. After the collision, one ball is traveling to the left of this line, the other to the right.*

1. A 0.15 kg pool ball traveling at 4 m/s collides with an identical pool ball initially at rest. The first ball goes off at an angle of 30º and the second goes off at an angle of 60º. How fast is each ball traveling after the collision?

2. A 0.15 kg pool ball traveling at 5 m/s collides with an identical pool ball initially at rest. After the collision, the first ball is traveling at 3 m/s and the second is traveling at 4 m/s. What angles could they be traveling at?

3. A 0.25 kg pool ball collides with an identical pool ball initially at rest. After the collision, the first ball goes off at 3 m/s and an angle of 35º. The second ball goes off at an angle of 65º . How fast was the first ball going before the collision and how fast is the second ball going after the collision?

4. A 0.15 kg pool ball traveling at 4 m/s collides with an 0.25 kg pool ball initially at rest. After the collision, the 0.15 kg ball goes off at an angle of 60º and the 0.25 kg ball goes at an angle of 30º. How fast is each ball traveling after the collision?

5. A 0.30 kg pool ball traveling at 5 m/s collides with an 0.15 kg pool ball initially at rest. After the collision, the first ball is traveling at 3 m/s and the second is traveling at 4 m/s. What angles could they be traveling at?

Answers: *1) 2.00 m/s & 3.46 m/s 2) 37º & 53º 3) v_i=3.66 m/s & v_2=2.10 m/s*
4) v_1=2.00 m/s & v_2=2.08 m/s 5) 0º & 0º !