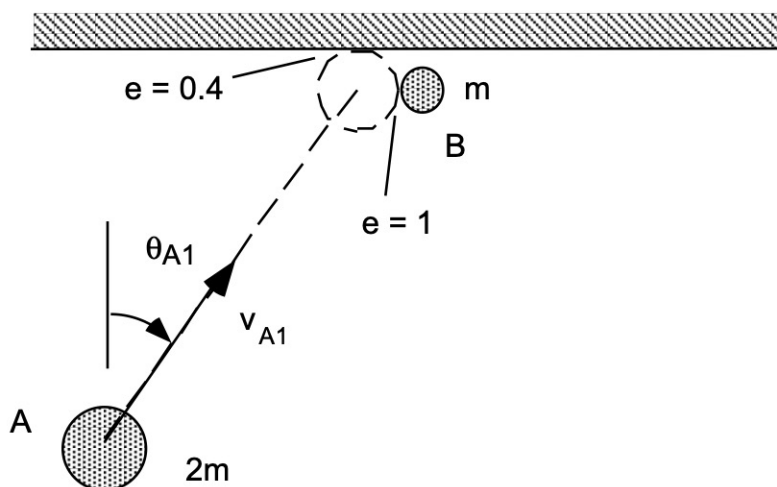


**Homework H.4.O**

**Given:** Spheres A and B (having masses of  $2m$  and  $m$ , respectively) are able to move on a smooth HORIZONTAL surface. Sphere A is given an initial velocity of  $v_{A1}$ , as shown below. Sphere A impacts sphere B at exactly the same instant that A also impacts a smooth bumper, with the line of impact of A and B being parallel to the bumper. The coefficient of restitution between A and the bumper is  $e = 0.4$ , and the coefficient of restitution between spheres A and B is  $e = 1$ .

**Find:** Determine the velocities of spheres A and B after the impacts described above.



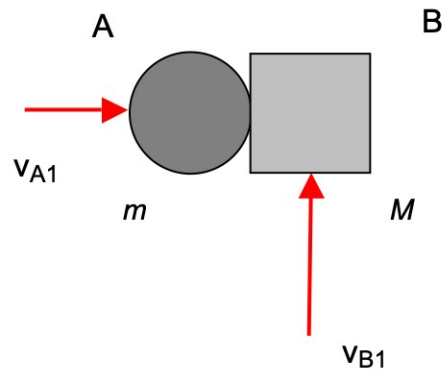
Use the following parameters in your analysis:  $v_{A1} = 15$  m/s and  $\theta_{A1} = 36.87^\circ$ .

**Homework H.4.P**

**Given:** Blocks A and B (having masses of  $m$  and  $M$ , respectively) are initially traveling in directions perpendicular to each other with speeds of  $v_{A1}$  and  $v_{B1}$ , respectively, as shown below in the figure. After impacting each other, A is traveling to the RIGHT with a speed of  $v_{A2}$ , and B travels with a speed of  $v_{B2}$  (the direction of motion for B after impact is not known). Consider all surfaces to be smooth.

**Find:** For this problem:

- Determine the mass  $M$  of block B;
- Determine the coefficient of restitution  $e$  for the impact of A and B.



Use the following parameters in your analysis:  $m = 3$  kg,  $v_{A1} = 4$  m/s,  $v_{B1} = 4$  m/s,  $v_{A2} = 2$  m/s and  $v_{B2} = 5$  m/s.

