

Questions and Problem Set

Momentum Round Table

Below are 3 questions that you will do in groups of three. Each person will *independently* work for two minutes and then give the question to the next person in the group for the next step, until all the problems are complete. At each step, you should check the work of the previous steps.

1) Draw the diagram and write the equations for total momentum *before* the collision (x and y).

2) Write the equation for momentum after the collision and equate it to the equation before the collision (x and y).

3) Solve the equations for the missing quantities and perform the vector addition required to complete the question.

Check the questions together as a group.

1. A 52 kg student is standing on a 26 kg cart that is free to move in any direction. Initially, the cart is moving with a velocity of 1.2 m/s [S]. The student then walks off at a velocity of 1.0 m/s [W] relative to the floor. Determine the final velocity of the cart.
2. Two automobiles collide at an intersection. One car of mass 1400 kg is travelling at 45 km/h [S]. The other car of mass 1300 kg is travelling at 39 km/h [E]. If the cars stick together, determine the velocity after the collision.
3. A nucleus, initially at rest decays radioactively, leaving a residual nucleus. In the process it emits two particles horizontally: an electron with momentum 9.0×10^{-21} kg·m/s [E] and a neutrino with momentum 4.8×10^{-21} kg·m/s [S]. If the residual nucleus has a mass of 3.6×10^{-25} kg, what is its velocity?

