

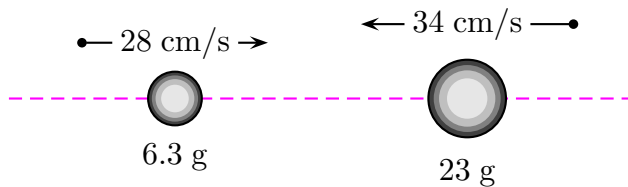
This print-out should have 7 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Head On Collision 01

001 (part 1 of 2) 10.0 points

Assume: Moving to the right is positive.

A(n) 6.3 g object moving to the right at 28 cm/s makes an elastic head-on collision with a 23 g object moving in the opposite direction at 34 cm/s.



Find the velocity of the first object immediately after the collision.

Correct answer: -69.3379 cm/s.

002 (part 2 of 2) 10.0 points

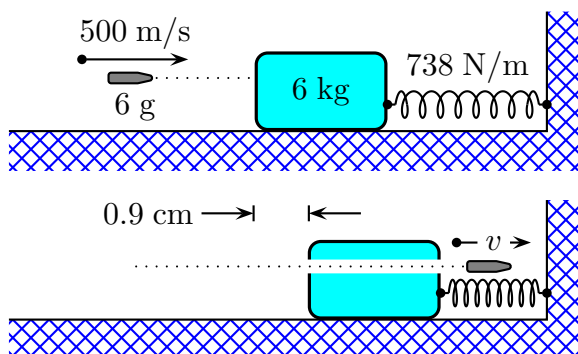
Find the velocity of the second object after the collision.

Correct answer: -7.33788 cm/s.

Bullet Passes Through

003 (part 1 of 2) 10.0 points

A bullet of mass 6 g moving with an initial speed 500 m/s is fired into and passes through a block of mass 6 kg, as shown in the figure. The block, initially at rest on a frictionless, horizontal surface, is connected to a spring of force constant 738 N/m.



If the block moves a distance 0.9 cm to the right after the bullet passed through it, find

the speed v at which the bullet emerges from the block.

Correct answer: 400.185 m/s.

004 (part 2 of 2) 10.0 points

Find the magnitude of the energy lost in the collision.

Correct answer: 269.526 J.

Clinging After Collision 02

005 10.0 points

Two ice skaters approach each other at right angles. Skater A has a mass of 67.3 kg and travels in the $+x$ direction at 2.84 m/s. Skater B has a mass of 32.6 kg and is moving in the $+y$ direction at 1.72 m/s. They collide and cling together.

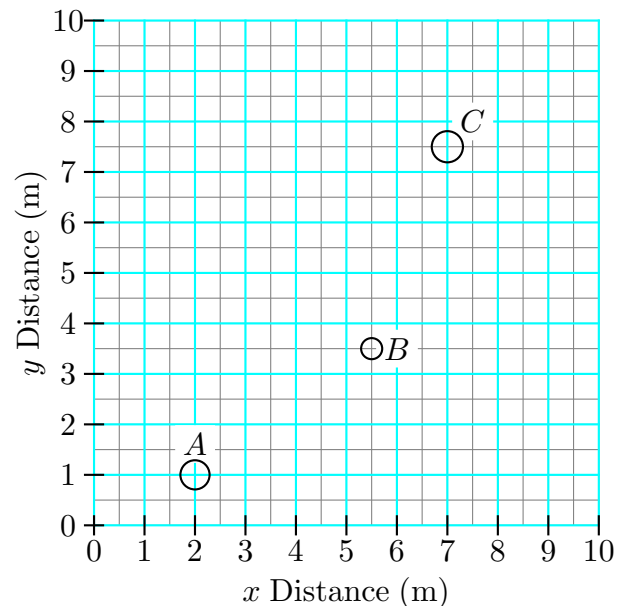
Find the final speed of the couple.

Correct answer: 1.99387 m/s.

Three Masses 01

006 (part 1 of 2) 10.0 points

Three spherical masses are located in a plane at the positions shown in the figure below. A has mass 29.8 kg, B has mass 12.2 kg, and C has mass 35.9 kg.



Calculate the x -coordinate of the center of mass.

Correct answer: 4.85237 m.

007 (part 2 of 2) 10.0 points

Calculate the y -coordinate of the center of mass.

Correct answer: 4.38703 m.