

Examples

A mass m has speed v . It then collides with a stationary object of mass $2m$. If both objects stick together in a perfectly inelastic collision, what is the final speed of the newly formed object?

A railroad car of mass m is moving at speed v when it collides with a second railroad car of mass M which is at rest. The two cars lock together instantaneously and move along the track. What is the kinetic energy of the cars immediately after the collision?

A block of mass M is initially at rest on a frictionless floor. The block, attached to a massless spring with spring constant k , is initially at its equilibrium position. An arrow with mass m and velocity v is shot into the block. The arrow sticks in the block. What is the maximum compression of the spring?

$$\frac{mv}{\sqrt{(m+M)k}}$$