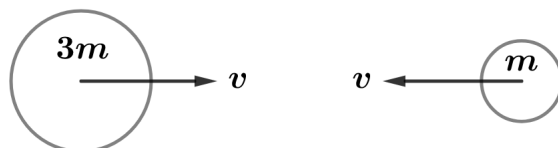


2019A F=ma Exam: Problem 2

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In the elastic collision, energy is conserved so the kinetic energy is

$$K_e = \frac{1}{2}(3m)v^2 + \frac{1}{2}mv^2 = 2mv^2$$

In the perfectly inelastic collision (masses stick together), the final velocity v' by conservation of momentum is

$$3mv - mv = (3m + m)v'$$

$$v' = \frac{v}{2}$$

so the kinetic energy after the collision is

$$K_s = \frac{1}{2}(3m + m)v'^2 = \frac{mv^2}{2}$$

Then

$$\frac{K_e}{K_s} = 4$$