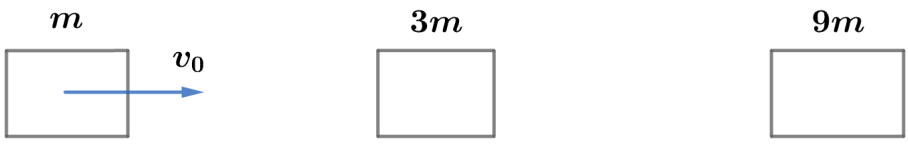
2015 F=ma Exam: Problem 8

Kevin S. Huang



Recall that in an elastic collision between mass m moving at velocity v_0 and mass M at rest, the velocity v_2 of M after the collision is given by

$$v_2 = \frac{2m}{m+M} v_0$$

In our case, we have after m collides with $3m$,

$$v_{3m} = \frac{2(m)}{m+3m} v_0 = \frac{v_0}{2}$$

After $3m$ collides with $9m$, we have

$$v_{9m} = \frac{2(3m)}{3m+9m}\left(\frac{v_0}{2}\right) = \frac{v_0}{4}$$

Thus, the answer is $\boxed{\text{B}}$.