2007 F=ma Exam: Problem 13

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Before:
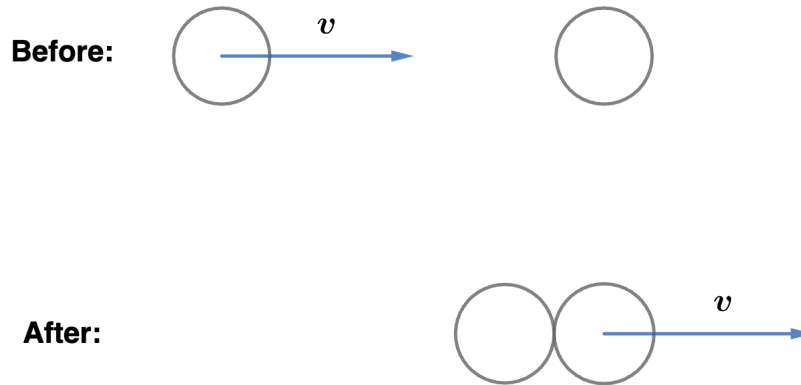
After:

Recall the elastic collision equations for mass m colliding with mass M:

$$v_1 = \frac{m - M}{m + M}v$$

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

If $m = M$, then

$$v_1 = 0$$

$$v_2 = v$$

so the first particle goes to rest while the second particle picks up the initial velocity of the first. Thus, their momenta swap after the collision so the answer is $\boxed{D}$.