# 2009 F=ma Exam: Problem 20

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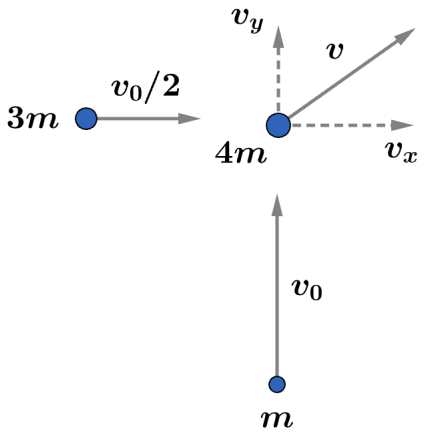


Conserving momentum in the x-direction,

$$p_x = 3m\left(\frac{v_0}{2}\right) = 4mv_x$$
$$v_x = \frac{3}{8}v_0$$

Conserving momentum in the y-direction,

$$p_y = mv_0 = 4mv_y$$
$$v_y = \frac{v_0}{4}$$

By the Pythagorean theorem,

$$v = \sqrt{v_x^2 + v_y^2} = v_0\sqrt{\left(\frac{3}{8}\right)^2 + \left(\frac{1}{4}\right)^2} = \frac{\sqrt{15}}{8}v_0$$

so the answer is $\boxed{\text{C}}$.