

2018A F=ma Exam: Problem 3

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We must have conservation of momentum which we can apply to the horizontal and vertical directions.

$$P_{x0} = mv$$

$$P_{y0} = 0$$

Thus, we see

A) $P_{xf} = mv = P_{x0}$ is true.

B) $E_f = \frac{1}{2}mv^2 = E_0$ is not true in an inelastic collision.

C) $P_{yf} = 0 = P_{y0}$ is true.

D) $|v_{CMf}| = \frac{v}{2}$ is true since $|v_{CMf}| = |v_{CM0}| = |v_{CMx}| = \frac{mv+0}{2m} = \frac{v}{2}$.

E) $P_f = \sqrt{P_{xf}^2 + P_{yf}^2} = P_{xf} = mv \neq 0$ is true.

Therefore, the answer is B.