4. Using the important equations above complete the below table without the simulation and then **check your work in the simulation**. Set the masses and velocities as described in the table. **Bold and Highlight Your Answers. 16 pts**

| $m_1$ | $m_2$ | $v_1$ | $v_2$ | $p_{total}$ | $v_1'$ | $v_2'$ |
|---|---|---|---|---|---|---|
| 1.20 kg | 1.20 kg | +1.50 m/s | -1.80 m/s | | -1.80 m/s | |
| 2.40 kg | 4.80 kg | +1.30 m/s | 0.0 m/s | | -.433 m/s | |
| 2.50 kg | 3.90 kg | | .850 m/s | 11.5 kgm/s | | 2.74 m/s |
| 1.00 kg | 5.10 kg | 4.600 m/s | 0.90 m/s | | -1.59 m/s | |

KE stands for Kinetic Energy $KE = \frac{1}{2}mv^2$ and is measured in joules. Note that kinetic energy is not a vector quantity.

5. Describe the effect of an **elastic** collision on the total kinetic energy of the two-object system.



## Answer

| $m_1$ | $m_2$ | $v_1$ | $v_2$ | $p_{total}$ | $v'_1$ | $v'_2$ |
|---|---|---|---|---|---|---|
| 1.20kg | 1.20kg | 1.50m/s | -1.80m/s | **-0.36 kg m/s** | -1.8m/s | **1.5 m/s** |
| 2.40kg | 4.80kg | 1.30m/s | 0 | **3.12 kg m/s** | -0.433 | **0.8665 m/s** |
| 2.50kg | 3.90kg | **3.274 m/s** | 0.850m/s | 11.5kg m/s | **0.3256 m/s** | 2.74 |
| 1.00kg | 5.10kg | 4.60m/s | 0.90m/s | **9.19 kg m/s** | -1.59 | **2.11 m/s** |

## Explanation

A. $P_{total} = m_1v_1 + m_2v_2$
$= (1.2*1.5)+(1.2*-1.8)$
$= 1.8 - 2.16$
$=$ **-0.36 kg m/s**

B. $P_{total} = m_1v'_1 + m_2v'_2$
$-0.36= (1.2*-1.8)+(1.2*v'_2)$
$-0.36 = -2.16 + 1.2\ v'_2$
$v'_2= 1.8/1.2$
**$v'_2 = 1.5$ m/s**