1. A 59 kg person stands next to a 24 kg crate on a frictionless surface. After pushing the box, the person has a velocity of 0.85 m/s, to the East. What is the velocity of the crate?

2. A horizontally fired, 12 g bullet strikes and embeds itself into a 2.4 kg ballistic pendulum. The COM of the bullet + pendulum rises a vertical distance of 12 cm. What was the bullet’s initial speed?

3. Block A (mass 5m) moves along the \(-x\)-axis and approaches the origin with \(v_x = +v_0\). Block B (mass 3m) rests at the origin. (a) If they collide \textit{inelastically} (they stick together), what is their velocity after they collide? (b) If they collide \textit{elastically} (conserving kinetic energy), what are their velocities (\(v_A \neq v_B\)) after they collide?

4. Lump of clay A has mass 1.8 kg and velocity \(\vec{v} = +2.5\hat{i}\) m/s. Lump of clay B has mass 3.7 kg and velocity \(\vec{v} = (-0.75\hat{i} + 1.7\hat{j})\) m/s. The lumps collide and form a single lump of clay. What is the velocity of this lump?