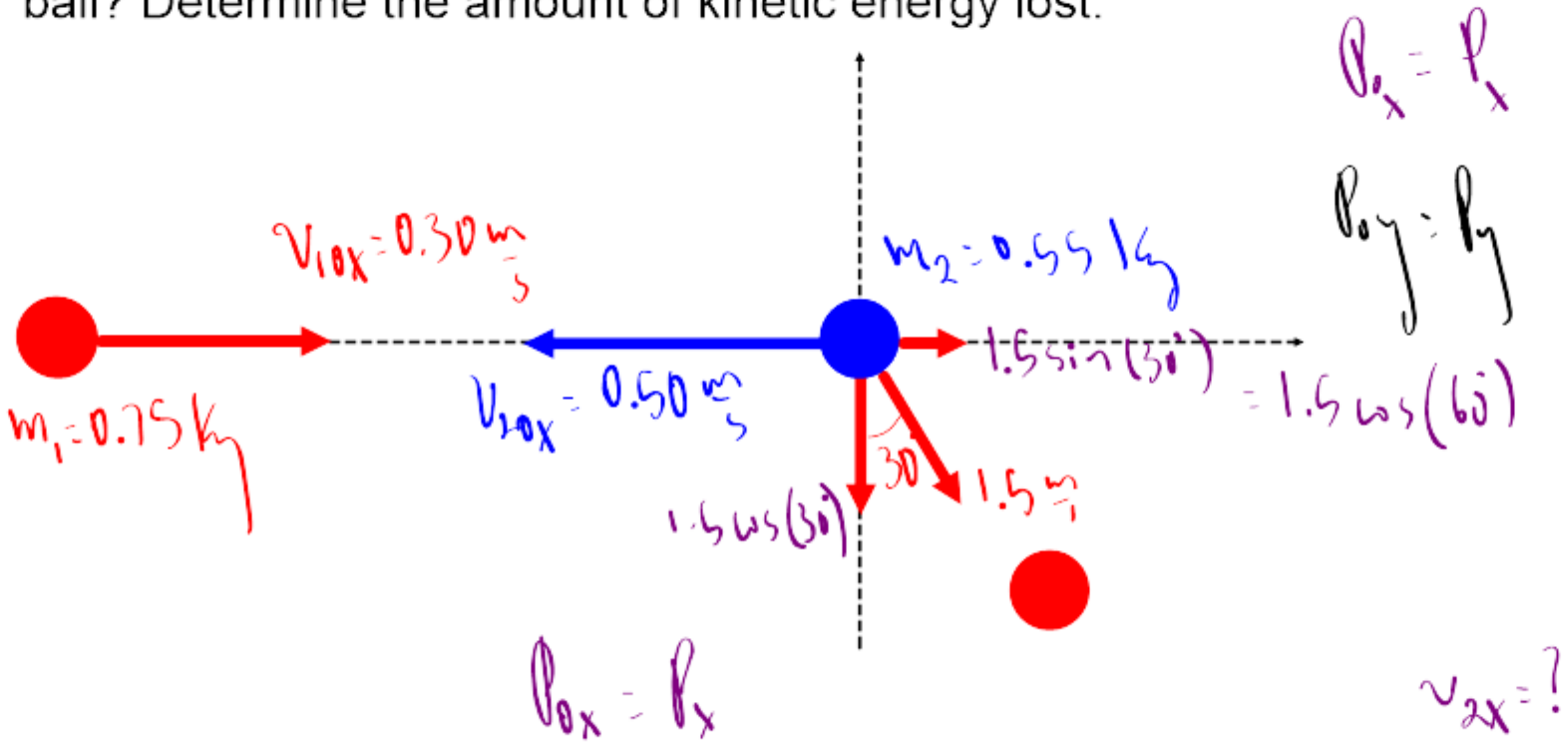


4. A 0.750 kg red ball traveling at 0.30 m/s East hits a 0.550 kg blue ball traveling at 0.50 m/s West. After the collision, the red ball moves away at 0.15 m/s  $30^\circ$  E of S. What is the final velocity of the blue ball? Determine the amount of kinetic energy lost.



$$m_1 v_{10x} + m_2 v_{20x} = m_1 v_{1x} + m_2 v_{2x}$$

$$0.75 \times 0.3 + 0.55(-0.5) = 0.75 \times 0.15 \sin(30^\circ) + 0.55 \cdot v_{2x}$$

$$-0.05 = 0.05625 + 0.55 \cdot v_{2x}$$

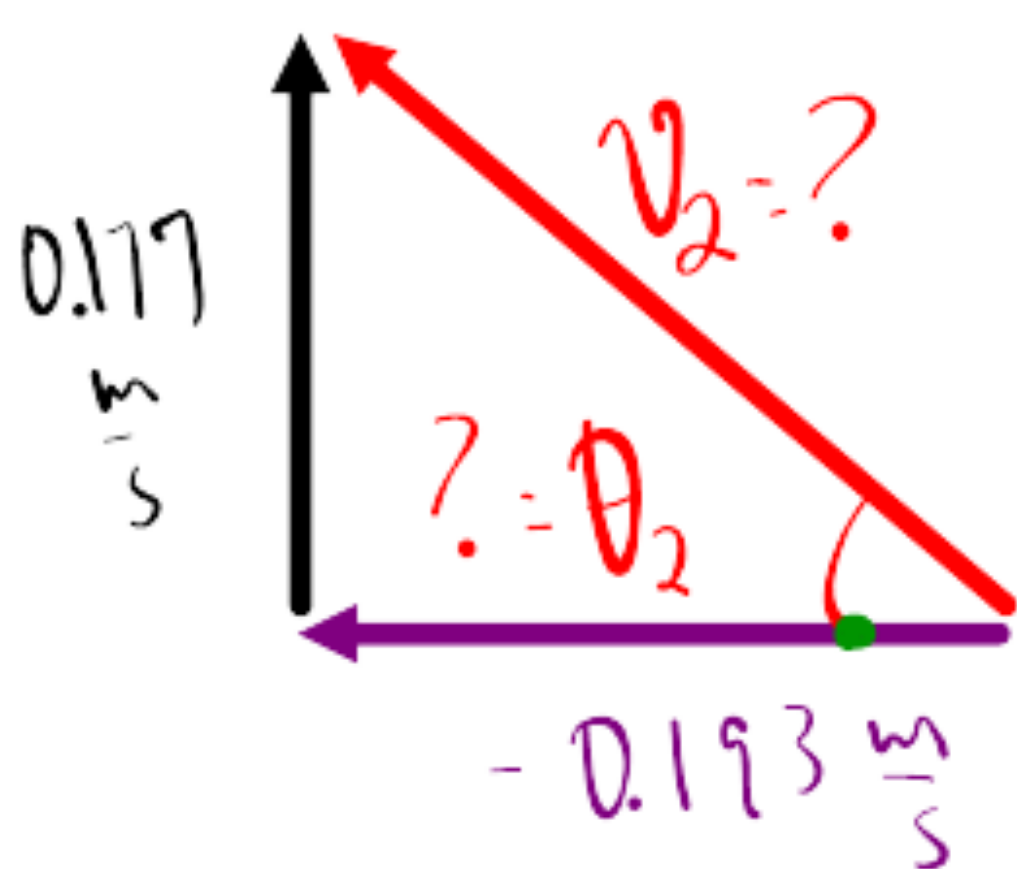
$$\frac{-0.10625}{0.55} = v_{2x} = -0.193 \text{ m/s}$$

Zero

$$p_{0y} = p_y$$

$$m_1 v_{10y} + m_2 v_{20y} = m_1 v_{1y} + m_2 v_{2y}$$

$$0 = 0.75(-0.15) \cos(30^\circ) + 0.55 v_{2y}$$



$$\frac{+0.0974}{0.55} = v_{2y} = 0.177 \text{ m/s}$$

$$v_2^2 = v_{2x}^2 + v_{2y}^2$$

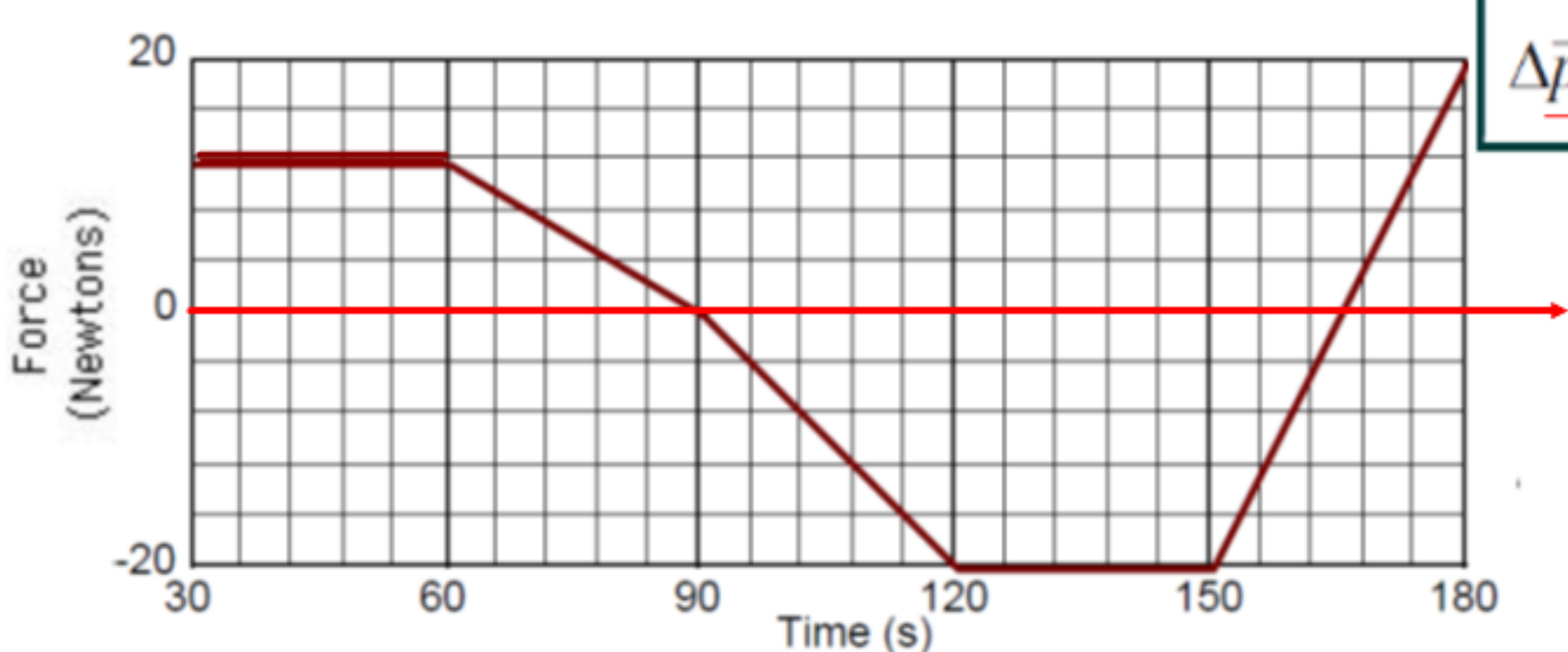
$$v_2 = \sqrt{0.193^2 + 0.177^2} = 0.261 \text{ m/s}$$

$$\theta = \tan^{-1} \frac{v_y}{v_x}$$

$$\theta = \tan^{-1} \left( \frac{0.177}{-0.193} \right) = -42.5^\circ \text{ N of W}$$

**NEXT CLASS we will answer the following problem**

4. A 30 kg cart travelling at 25 m/s.....



$$\vec{p} = m\vec{v}$$

$$\Delta \vec{p} = \vec{F} \Delta t$$

- What is the impulse from 30 to 60 seconds?
- What is the impulse from 60 to 90 seconds?
- What is the impulse from 60 to 120 seconds?
- Using the information from the text above combine with the graph, calculate the final velocity at the 90 second mark.
- Calculate the velocity at the 120 second mark.