Since the question states that East is positive, and the fisherman is moving west, then when the fisherman jumps into the rowboat, they will both be moving west. Therefore the velocity should be NEGATIVE.—

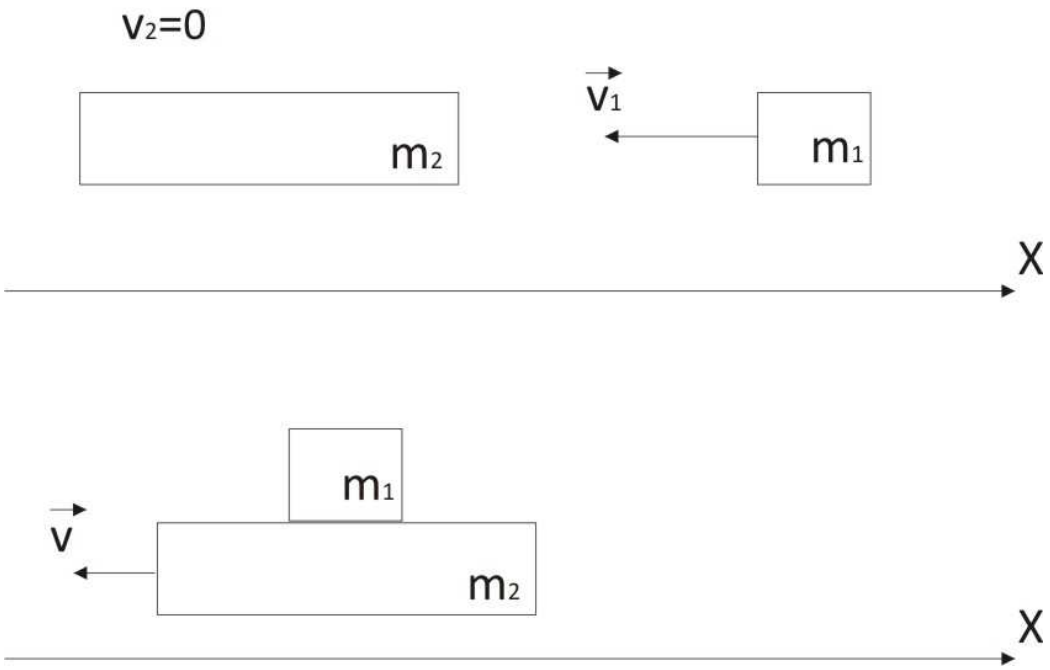
Note: Take East as the positive direction.

A(n) 80 kg fisherman jumps from a dock into a 129 kg rowboat at rest on the West side of the dock. If the velocity of the fisherman is 4.7 m/s to the West as he leaves the dock, what is the final velocity of the fisherman and the boat? Answer in units of m/s.

Solution.

$$m_1 = 80kg, m_2 = 129kg, \upsilon_1 = 4.7\frac{m}{s};$$

$$\upsilon - ?$$



The law of conservation of momentum in vector form:

$$m_1\overrightarrow{\upsilon_1} = (m_1 + m_2)\vec{\upsilon}.$$

Projection on X:

$$-m_1\upsilon_1 = -(m_1 + m_2)\upsilon;$$

$$m_1\upsilon_1 = (m_1 + m_2)\upsilon;$$

$$\upsilon = \frac{m_1\upsilon_1}{(m_1 + m_2)}.$$

$$\upsilon = \frac{80 \cdot 4.7}{(80 + 129)} = 1.8\left(\frac{m}{s}\right).$$

Answer: $\upsilon = 1.8\frac{m}{s}$.