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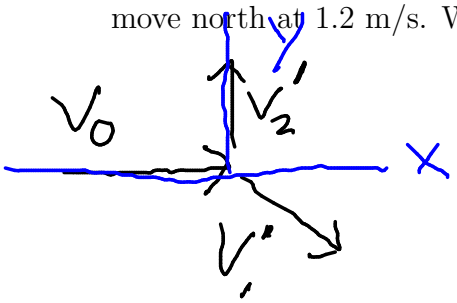
Quiz 4 – PH241 **Name**_____ ☐ **Pledged**

Conservation of Energy: $E_{before} = E_{after}$
Conservation of momentum: $\vec{P}_{before} = \vec{P}_{after}$
$\vec{P} = m\vec{v}$ $KE = \frac{1}{2}mv^2$ $PE_g = mgh$ $E = KE + PE$
$g = 9.81 m/s^2$

A 3.5 kg particle moving east at 4.5 m/s sudenly explodes into 2 pieces. The 2.0 kg piece move north at 1.2 m/s. What is the velocity of the 1.5 kg piece (speed and direction).



momentum conservation only.

x: $(3.5kg)(4.5m/s) = 1.5kg\,(V_{x_1}')$ (1)

y: $0 = (1.5kg)(V_{y_1}') + 2kg\,(1.2m/s)$ (2)

(1) $V_{x_1}' = 10.5 m/s$

(2) $V_{y_1}' = -1.6 m/s$

$V_1' = \sqrt{(10.5m/s)^2 + (1.6m/s)^2} = 10.6 m/s$

$\theta = \tan^{-1}\left(\frac{-1.6}{10.5}\right) = 9^0$