Дано:

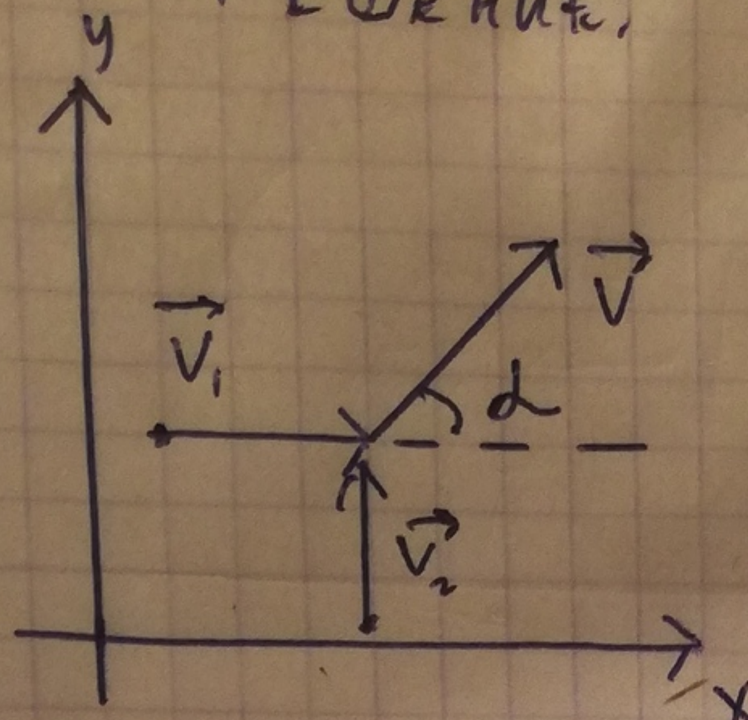
$v_1 = v_2$

$\vec{v}_1 \perp \vec{v}_2$

$v - ?$

$\frac{m_{рез}}{m_0} - ?$

Решение:



По т. Пифагора:

$v = \sqrt{v_1^2 + v_2^2} = \sqrt{0{,}5c^2} = 0{,}7c$

$E = \frac{m_0 c^2}{\sqrt{1 - \frac{0{,}25}{1}}} = 0{,}866\, m_0$

$\Rightarrow E = 2{,}3\, m_0 c^2$ до удара $= 1{,}15\, m_0 c^2$

$E = \frac{m_p c^2}{\sqrt{1 - 0{,}49}} = 1{,}96\, m_p c^2$ после удара

По ЗСЭ:

$1{,}96\, m_p c^2 = 2{,}3\, m_0 c^2 \Rightarrow \frac{m_p}{m_0} = 1{,}17$

$m_p = \frac{2{,}3\, m_0}{1{,}96} = 1{,}17\, m_0$

Ответ: $v = 0{,}7c$

$\frac{m_p}{m_0} = 1{,}17$