

MP/S11

$m_1 = 6.0g$

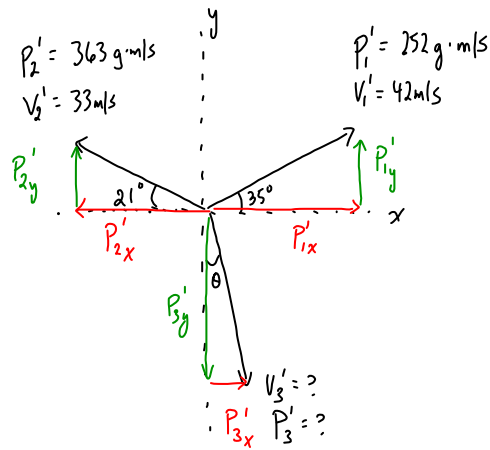
$m_2 = 11g$

$m_3 = 8.0g$

$V_1' = 42m/s$

$V_2' = 33m/s$

$V_3' = ??$



Method 1 - components (x-y chart)

Before:

$P_{x\text{ total}} = 0$

$P_{y\text{ total}} = 0$

After

	x	y
P_1	$+252 \cos 35^\circ$	$+252 \sin 35^\circ$
P_2	$-363 \cos 21^\circ$	$+363 \sin 21^\circ$
P_3	x	y
P_{total}	0	0

Along the x-axis: $252 \cos 35^\circ - 363 \cos 21^\circ + x = 0$

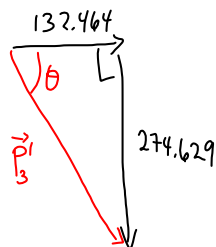
$206.426 - 338.890 + x = 0$

$x = 132.464 \text{ g}\cdot\text{m/s}$

Along the y-axis: $252 \sin 35^\circ + 363 \sin 21^\circ + y = 0$

$144.541 + 130.088 + y = 0$

$y = -274.629 \text{ g}\cdot\text{m/s}$



$c^2 = a^2 + b^2$

$c^2 = (132.464)^2 + (274.629)^2$

$c = 304.906 \text{ g}\cdot\text{m/s}$

$\tan \theta = \frac{274.629}{132.463}$

$\theta = 64.3^\circ$

$P = mv$

$v = \frac{P}{m}$

$v = \frac{304.906 \text{ g}\cdot\text{m/s}}{8.0g}$

$v = 38 \text{ m/s}$

$\vec{v}_3' = 38 \text{ m/s} [64^\circ \text{ CW from } x\text{-axis}]$

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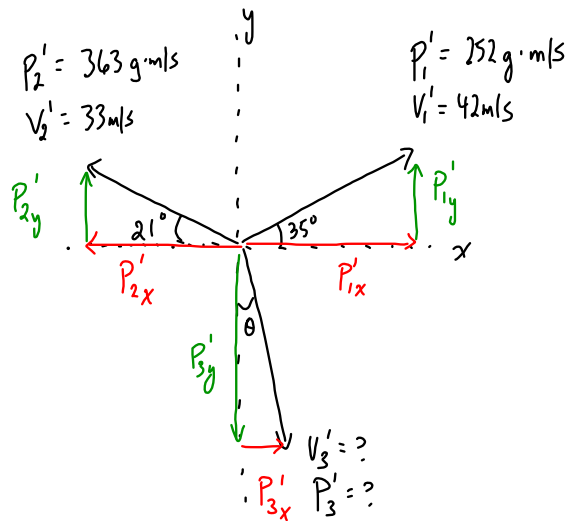
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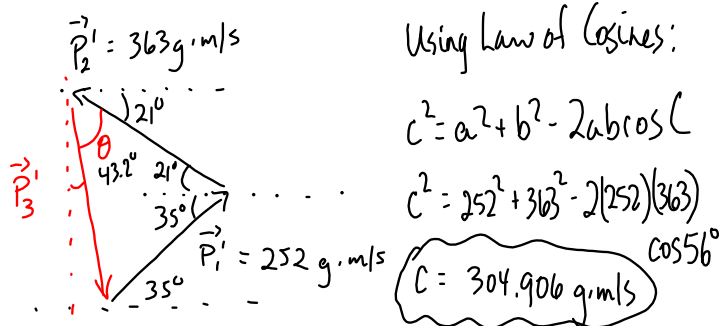
$V_3' = ??$



Method 2 - Vector Addition Diagram

$\vec{P}_{total} = \vec{P}'_{total}$

$0 = \vec{P}'_1 + \vec{P}'_2 + \vec{P}'_3$



$P = mv$

$v = \frac{P}{m}$

$v = \frac{304.906g \cdot m/s}{8.0g}$

$V = 38m/s$

Using the Law of Sines

$\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{252}{\sin \theta} = \frac{304.906}{\sin 56^\circ}$

$\sin \theta = \frac{252 \sin 56^\circ}{304.906}$

$\theta = 43.3^\circ$

$\vec{V} = 38m/s [64^\circ \text{ CW from } +x\text{-axis}]$

To Do: PP/S13