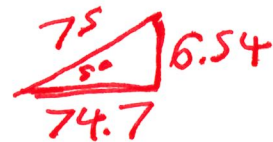
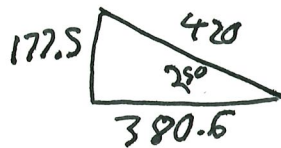
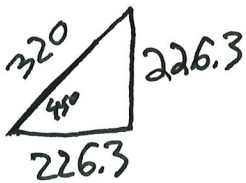


A 2.0 kg ball moving at 160 m/s 45° above right. It collides with a 3.0 kg ball moving at 140 m/s 25° above the left. After the collision, the 3.0 kg ball is moving at 25 m/s, 5.0° above the right. What is the final velocity of the 2.0 kg ball?

Momentum

- 2 kg before = $320 \frac{\text{kg}\cdot\text{m}}{\text{sec}}$, 45° above right
- 3 kg before = $420 \frac{\text{kg}\cdot\text{m}}{\text{sec}}$, 25° above left
- 3 kg after = $75 \frac{\text{kg}\cdot\text{m}}{\text{sec}}$, 5° above right



Momentum in x direction (say right is positive)

Before

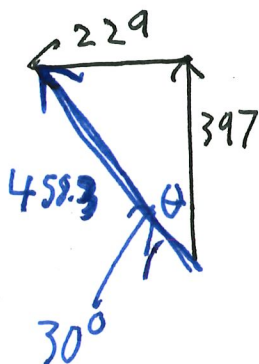
$$226.3 - 380.6 = 74.7 + p_x$$

$$\rightarrow 229 = p_x \rightarrow \text{229 } \frac{\text{kg}\cdot\text{m}}{\text{sec}} \text{ left}$$

Momentum in y direction (say up is positive)

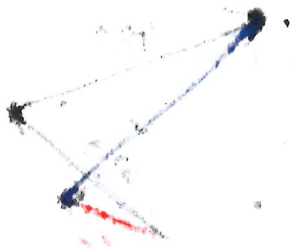
$$226.3 + 177.5 = 6.54 + p_y$$

$$397 = p_y \rightarrow \text{397 } \frac{\text{kg}\cdot\text{m}}{\text{sec}} \text{ Up}$$



$$v = \frac{458.3 \frac{\text{kg}\cdot\text{m}}{\text{sec}}}{2.0 \text{ kg}} = 229 \text{ m/s}$$

230 m/s, 6.0×10^1 degrees above left



The area of the triangle is $\frac{1}{2} \times \text{base} \times \text{height}$
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