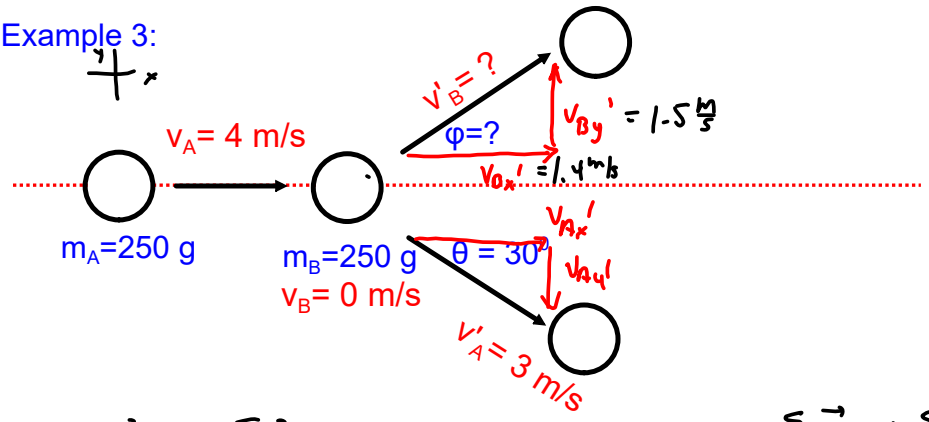
Homework: questions?

Example 3:



$\Sigma \vec{p}_x = \Sigma \vec{p}_x'$

$m_A = m_B$

$m_A v_A = m_A v_{Ax}' + m_B v_{Bx}'$

$4 = 3\cos 30^\circ + v_{Bx}'$

$4 = 2.6 + v_{Bx}'$

$v_{Bx}' = 1.4$ m/s

$\Sigma \vec{p}_y = \Sigma \vec{p}_y'$ opp dir.

$0 = m_B v_{By}' - m_A v_{Ay}'$

$v_{By}' = 3\sin 30^\circ$

$= 1.5$ m/s

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

$= 1.4^2 + 1.5^2$

$= 1.96 + 2.25 = 4.41$

$v_B' = c = 2.1$ m/s

$\tan\theta = \frac{1.5}{1.4}$

$\theta = 47^\circ$

$\vec{v}_B' = 2.1$ m/s 47° above right

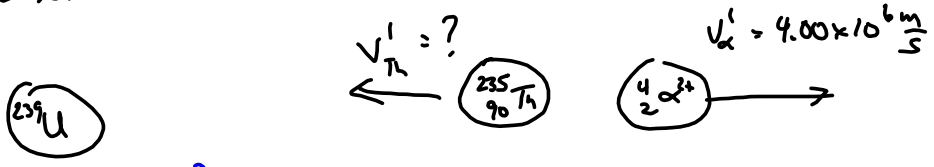
Explosions

Explosions are characterized by an initial momentum of zero.

Example: A uranium-239 atom kicks out an alpha particle (an He-4 nucleus) at a velocity of 4.00 x 10^6 m/s. What is the recoil velocity of the ~~??~~-235 product?

$^{239}_{92}U$ Before

Th



^{239}U

$\odot = \Sigma \vec{p} = \Sigma \vec{p}'$

$\odot = m_\alpha v_\alpha' - m_{Th} v_{Th}'$

u = atomic mass unit

$\odot = (4u)(+4.00 \times 10^6 \frac{m}{s}) - (235u) v_{Th}'$

$v_{Th}' = \frac{16 \times 10^6}{235}$

$\vec{v}_{Th}' = 6.8 \times 10^4$ m/s backwards

Homework:

A plate is dropped on the floor and shatters into three pieces. The first piece (m=50 g) slides to the right across the floor at 1.5 m/s. The second piece (m=150 g) slides at 120^0 to the first piece at 1.0 m/s. The third piece has a mass of 300 g - what is it's velocity?

and Question 1 from sheet.