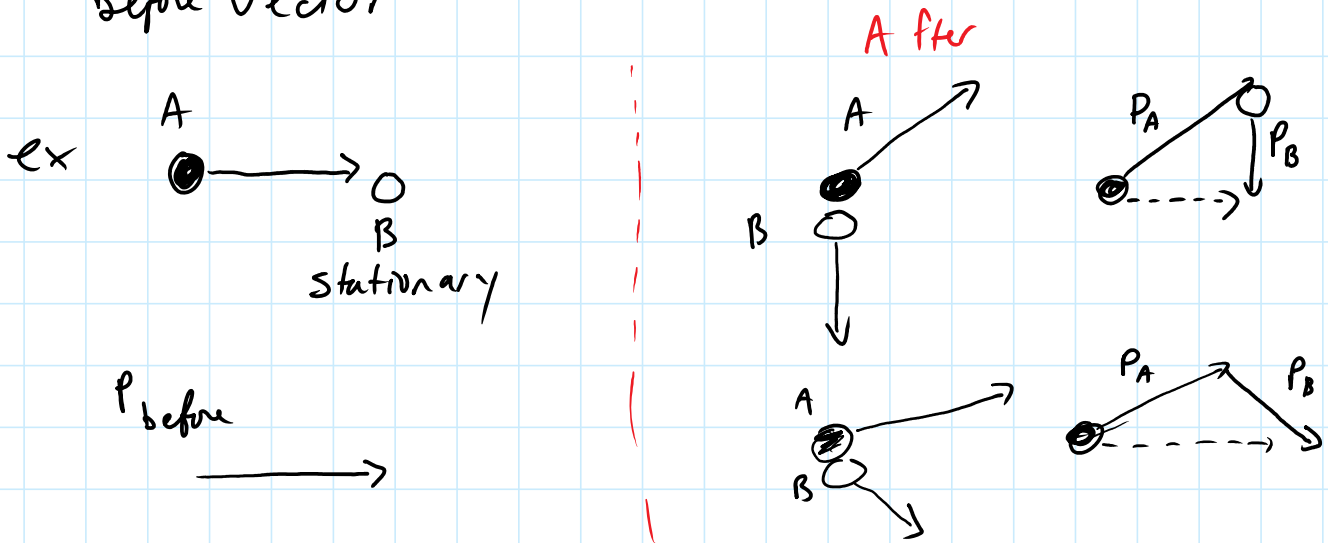


# 2D Collisions & Explosions

Tuesday, April 10, 2018 10:28 AM

use vectors  
 $P_{\text{before}} = P_{\text{after}}$

- Determine the total momentum before the collision, both mag & direction  
all objects
- The momentum after (total, both objects) must add to = the before vector



A 3.0 kg Calculus textbook is thrown at 5.0 m/s E. It spontaneously explodes with a 1.2 kg piece traveling [N] at 9.0 m/s. Find vel of other piece.

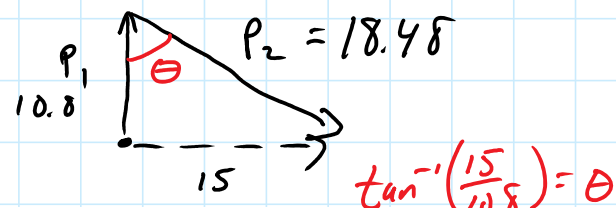
$$P_b = (3 \text{ kg})(5)$$

$$\xrightarrow{\hspace{2cm}}$$

$$= 15 \text{ kg m/s}$$

$$\uparrow P_1 = (1.2)(9)$$

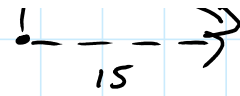
$$= 10.8 \text{ kg m/s}$$



$$0 - 18.48 = m v$$

$$P_2 = 18.48 = m v \\ = 1.8 v$$

$$v = 10.3 \text{ m/s @} \\ 54^\circ \text{ [E of S]}$$



$$\tan^{-1}\left(\frac{15}{10.8}\right) = \theta \\ \theta = 54^\circ$$

Handout + P. 80 #2, 4