

### Formulas

$$p=mv$$

$$\Delta p=m\Delta v=F_{\text{net}}\Delta t$$

$$\Sigma p_i=\Sigma p_f$$

### To Remember

Coordinate System needed

Draw it out if you need it

Remember you have to do x and y comp

List out all the values on the side write them all out - label angles too

i.e.  $m_A=5.0\text{kg}$  |  $v_{Aix}=4.0\text{m/s}$  |  $v_{Afx}=2.0\text{m/s} \cos 30^\circ$  |  $v_{Afy}=2.0\text{m/s} \sin 30^\circ$  |  $m_B=7.0\text{kg}$  |  $m_B=0\text{m/s}$  |  $v_{Bf}=?$

When dealing with inelastic/stick together objects, remember they are one thing - **combined**

### Key Concepts

A **state** is a possible configuration that a system can exist in accordance with the laws of physics.

**Phase space** contains all the configuration.

**Deterministic** is when you know where you came from (the past) and where you are going next (the future) if you know where you are at the present.

**Momentum** -  $p$  - unit -  $\text{kg} \cdot \text{m/s}$

**Impulse** -  $\Delta p$  = change in momentum

### Collisions

Elastic Collisions  $p$  and  $E_k$  are **conserved** - perfectly bounce off of each other

$$\Sigma p_i=\Sigma p_f \text{ and } \Sigma E_{ki} = \Sigma E_{kf}$$

unrealistic irl - nothing is lost thru sound/heat/etc.

Inelastic Collisions  $p$  is **conserved**,  $E_k$  isn't - stick together

$$\Sigma p_i=\Sigma p_f \text{ and } \Sigma E_{ki} \neq \Sigma E_{kf}$$

Explosion explodes into multiple pieces

$$\Sigma p_i=\Sigma p_f \text{ and } \Sigma E_{ki} \neq \Sigma E_{kf}$$



By [goldennfluff](#) (goldennfluff)

Published 30th May, 2025.

Last updated 30th May, 2025.

Page 1 of 1.

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