

Tuesday, October 22/13  
Physics 122/121

Midterm - Tentatively: Wed., Nov. 22

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Potential Grad Meeting -> IS Today: Main Theatre TAKE A PEN

1. **Boat Simulation #1-10 -> 4 Days Late**
2. Rewrite -> Quiz: Collisions and Relative Velocity: Thursday -> Noon
3. Unit 1 Test -> Friday, Oct. 25/13      **—————>**
4. Circular Motion - Continue
5. Worksheet: Circular Motion
6. Unbanked Curves
7. L1 - Banked Curves
8. L1 - Vertical Circular Motion



Test: Unit 1 - Dynamics Extension

- Six Problems: 1. Force Problems (2) *hill + kinetic push/pull*  
 2. Torque Problem (L1 and L2)  
 3. 1D Collision (Elastic/Inelastic)  
 4. 2D Collision  
 5. Relative Velocity (L1 and L2)

Formulas will NOT be provided.

Force Problems	Torque	Collision
$\vec{F}_{net} = m\vec{a}$ $F_f = \mu N$ $W = mg$ $\vec{v}_f = \vec{v}_i + \vec{a}t$ $\vec{v}_f^2 = \vec{v}_i^2 + 2\vec{a}d$ $\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$	$\vec{\tau} = rF\sin\theta$ CW $\ominus$ CCW $\oplus$	$\vec{p} = m\vec{v}$ $\frac{m_1\vec{v}_1 + m_2\vec{v}_2 = m_1\vec{v}_1' + m_2\vec{v}_2'}{1D}$ elastic $\Delta E_K = 0$ inelastic $\Delta E_K = -\Delta E$ $E_K = \frac{1}{2}mv^2$ $\Delta E_K = E_{K1}' + E_{K2}' - E_{K1} - E_{K2}$ $\Delta E_K = (E_{K1}' + E_{K2}') - (E_{K1} + E_{K2})$
		2D: $m_1v_{1x} + m_2v_{2x} = m_1v_{1x}' + m_2v_{2x}'$ $m_1v_{1y} + m_2v_{2y} = m_1v_{1y}' + m_2v_{2y}'$ $\left[ \begin{matrix} v_{2x}' \\ v_{2y}' \end{matrix} \rightarrow \vec{v}_2' \right]$ <i>sign + direction</i>

Relative Velocity

Boat:  $\vec{V}_{BS} = \vec{V}_{BW} + \vec{V}_{WS}$   
 $\vec{R} = \text{Component} + \text{Component}$

Plane:  $\vec{V}_{pg} = \vec{V}_{pa} + \vec{V}_{ag}$   
airspeed      wind

Law of Pythagoras  $R = \sqrt{A^2 + B^2}$

SoH CAH ToA  
 $\vec{v} = \frac{J}{t} \parallel v = \frac{d}{t}$   
 $\left. \begin{matrix} \vec{v} \rightarrow \text{km/h} \\ \vec{d} \rightarrow \text{m} \end{matrix} \right\} \text{Units!}$