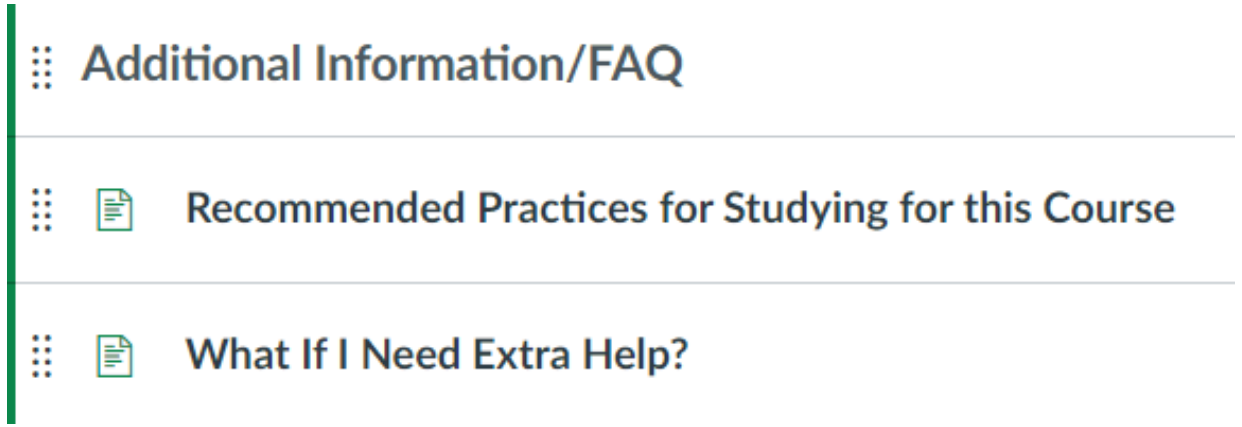
How was class on Friday with Dr. Perry?

I heard he did some demos – which ones and what did you think?

Notes

- As you prepare for Midterm II:
  - Post questions to EdDiscussion! Fastest way to get an answer. (Turn on notifications to see other's questions/answers)
  - Reminder: Office hours of LA's and TA!

- Exam Corrections: You **must** follow **the 4-step method** or you'll need to do it over again.



Notes

- Midterm II will include 11 questions = 10 new questions and 1 Zombie Question
- It will be a mix of conceptual/quantitative as before!

Prelecture Review: Problem Solving w/ Momentum

Statics, Friction, and Linear Elasticity

$$\vec{x}_{com} = \frac{1}{m}\int \rho \vec{x} dx \qquad \sigma_{stress} = F/A$$

$$\sum \vec{F} = 0 \qquad \sum \vec{\tau} = 0$$

$$\tau = \vec{r} \times \vec{F} \qquad F_W = mg \qquad F_B = \rho g V$$

$$F_{static} \leq \mu_s N \qquad F = -k\Delta X$$

$$Y = \frac{F/A}{\Delta L/L} \qquad B = \frac{\Delta P}{\Delta V/V} \qquad S = \frac{F/A}{\Delta x/l}$$

What would we like added or changed?
What did we learn/not learn?
What are our comments and questions?

Prelecture Review: Problem Solving w/ Momentum

Newton's Laws, Linear and Angular Dynamics

$$1.\ \dot{v}_{free} = 0 \qquad 2.\ F = \frac{d}{dt}(mv) \qquad 3.\ F_{act} = -F_{react}$$

$$F_{kinetic} = \mu_k N$$

$$I = \sum m_i R_i^2 = \int \rho R^2 dV \qquad \tau = \frac{d}{dt}(I\omega)$$

$$I_{||} = mx^2 + I_{com} \qquad I_{disk} = \frac{1}{2}mR^2$$

$$I_{rod} = \frac{1}{12}mL^2 \quad I_{Ball} = \frac{2}{5}mR^2 \quad I_{sphere} = \frac{2}{3}mR^2$$

What would we like added or changed?

What did we learn/not learn?

What are our comments and questions?

Prelecture Review: Problem Solving w/ Momentum

Terrestrial and Celestial Mechanics

Work and Energy

$$W = \vec{F} \cdot \vec{r} \qquad KE = \frac{1}{2}mv^2 \qquad \Delta KE = W_{on} = -W_{by}$$

$$E_{mech} = KE + U \qquad \Delta U = W_{on} = -W_{by}$$

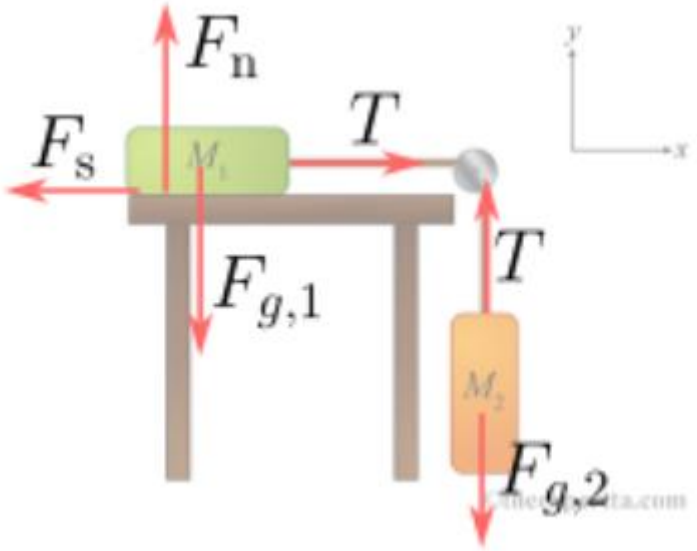
$$\Sigma E = constant \qquad U = \frac{1}{2}kx^2 \qquad U = mgh$$

$$KE_{rot} = \frac{1}{2}I\omega \quad \Delta KE_{rot} = \tau\Delta\theta \qquad P = \frac{dE}{dt}$$

What would we like added or changed?
What did we learn/not learn?
What are our comments and questions?

Comments and Questions

- I do not understand what the equation $\vec{x}com = 1m \int \rho\vec{x}\, dx$ is indicating. I have absolutely no idea what this equation means $I = \sum miRi2 = \int \rho R2dV$.
- Is the power equation.. P=E/t or P=dE/dt? The formula sheet says one thing and the internet says another. Or are they the same thing?
- I'm hoping that you can go over more momentum questions, that topic confuses me alot.
- I'm still confused about free-body diagrams and don't understand whether the axes are supposed to be positive/negative.



My Comments and Questions

Here's how I think of the topics for this midterm:

- Statics and Elasticity
  - Center of Mass
  - Translational Static Equilibrium (forces)
  - Rotational Static Equilibrium (torques)
  - Linear Elasticity (Hooke's Law)
- Dynamics (Newton's Laws)
  - First, Second, and Third Law
  - Applications to systems as in Statics
- Work and Energy
  - Work done by an applied force
  - Kinetic Energy
  - Work-Energy Theorem
  - Mechanical Energy/Conservation of Mechanical Energy
  - Friction and dissipative forces