Reminders 10-25-10:

-Exam 2 Average 60% (see email that was sent to you; it has an extra credit assignment) Next Exam will require use of conservation of energy and free-body analysis.

-Circular Motion Conceptual Questions Due Wednesday (see Blackboard).

-Chapter 7 Quiz Wednesday

-Rewrite of Momentum Lab Due Next Monday (turn in old and new versions)

Fix calculations for $\Delta p_1=m(v_{1f}-v_{1i})$ $\Delta p_2=m(v_{2f}-v_{2i})$ for inelastic collisions.

Fix units in calculations.

Fix All Sig. Figs. errors!!!!

Fix all plagiarized sections of reports

Fix answer to question 1. Calculate KE before and after collision. One calculation for elastic collision and one from inelastic collision.

If you want to fix the sig. fig. error from mass measurements, you'll need to do the experiment again, unless someone in your group has the correct data.

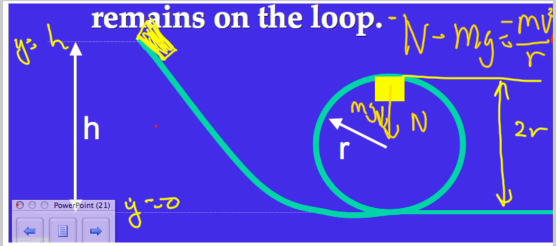
Grade will be recorded when corrections are made.

Objectives:

-Examples

-Kepler's Laws

-Apparent Weight



Normal force min at top of loop. Norce max at bottom of loop.

As long as $N > 0$ at top of loop. Object makes around loop.

$$-N - mg = \frac{-mv^2}{r} \quad \text{let } N \to 0$$

$$-mg = -\frac{mv^2}{r}$$

$$v = \sqrt{rg}$$

Need to use Cons. of Energy to find release point.

$$\Delta PE + \Delta KE = 0$$

$$mg(2r - h) + \frac{1}{2} m v_T^2 = 0$$

Know v_T because min. condition is $v = \sqrt{rg}$

$$v_T = \sqrt{rg}$$

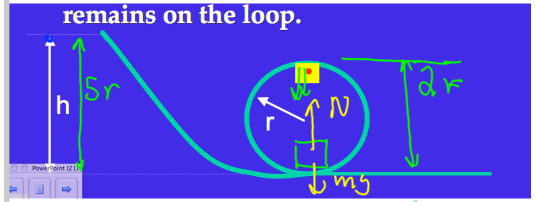
$$\cancel{m} g(2r - h) + \frac{1}{2} \cancel{m} (\sqrt{rg})^2 = 0$$

$$2rg - hg + \frac{1}{2} rg = 0$$

$$\frac{5}{2} r\cancel{g} - h\cancel{g} = 0$$

$$h = \frac{5}{2} r$$

Let's let $h = 5R$



To find force at bottom we need speed at bottom.

Use cons. of Energy

$$\Delta PE + \Delta KE = 0$$

$$-5\cancel{m}gR + \frac{1}{2}\cancel{m}v_b^2 = 0$$

$$-5gR + \frac{1}{2}v_b^2 = 0$$

$$v_b = \sqrt{10gR}$$

$$N_b - mg = \frac{mv_b^2}{r}$$

$$N_b = mg + \frac{mv_b^2}{r}$$

$$= mg + \frac{m\left(\sqrt{10gr}\right)^2}{r}$$

$$= \boxed{11mg}$$

Find N_{Top}

find v_{Top}

$$\Delta PE + \Delta KE = 0$$

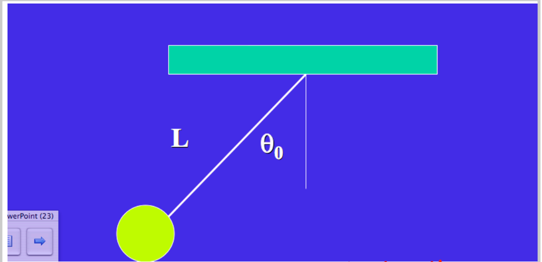
$$-\cancel{m}g3r + \frac{1}{2}\cancel{m}v_{Top}^2 = 0$$

$$-3gr + \frac{1}{2}v_{Top}^2 = 0$$

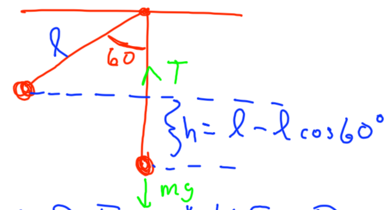
$$v_{Top} = \sqrt{6gr}$$

$$-N_{top} - mg = -\frac{mv_T^2}{r}; \quad N_{Top} = \frac{mv^2}{r} - mg$$

$$N_{Top} = \frac{m\left(\sqrt{6gr}\right)^2}{r} - mg = 5mg$$



To find Tension at bottom, we need Speed at bottom.



$$\Delta PE + \Delta KE = 0$$

$$-mgh + \frac{1}{2} m v_b^2 = 0$$

$$-\cancel{m}g[l - l\cos 60°] + \frac{1}{2}\cancel{m} v_b^2 = 0$$

$$-gl(1 - \cos 60°) + \frac{1}{2} v_b^2 = 0$$

$$gl(1 - \cos 60°) = \frac{1}{2} v_b^2$$

$$v_b = \sqrt{2gl(1 - \cos 60°)}$$

Now sum forces

$$T - mg = \frac{mv^2}{r}$$

$$T = mg + \frac{mv^2}{r}$$

r = length of string

$$= mg + \frac{m\left(\sqrt{2gl(1-\cos 60)}\right)^2}{l}$$

$$= mg + 2mg(1 - \cos 60)$$

$$T = 3mg - 2mg\cos 60$$