PHYS 210 - General Physics I

- More with projectiles
- Circular motion: an introduction
- Forces

From lab …

- Use of $\vec{F}_{net} = m\vec{a}$ when mass is accelerating.
- A new way to deal with uncertainties:

$$\mu_k = \frac{m_1}{m_2} - \frac{(m_1 + m_2)a}{m_2 g} = \frac{m_1}{m_2} - \frac{m_1 a}{m_2 g} - \frac{m_2 a}{m_2 g} = m_1 m_2^{-1}\left(1 - \frac{a}{g}\right) - \frac{a}{g}$$

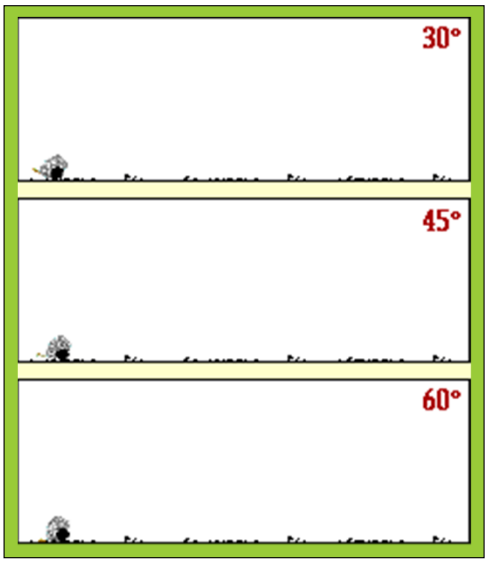
$$\delta\mu_k = \left|\frac{\partial \mu_k}{\partial m_1}\right| \delta m_1 + \left|\frac{\partial \mu_k}{\partial m_2}\right| \delta m_2 + \left|\frac{\partial \mu_k}{\partial a}\right| \delta a$$

$$\Rightarrow \quad \delta\mu_k = \frac{1}{m_2}\left(1 - \frac{a}{g}\right)\delta m_1 + \frac{m_1}{m_2^2}\left(1 - \frac{a}{g}\right)\delta m_2 + \frac{1}{g}\left(\frac{m_1}{m_2} + 1\right)\delta a$$

Motion in 2-D: Projectile Motion

- The horizontal range, R, is given by
  - $R = (v_o^2/g) \sin(2\theta_o)$
  - What angle gives the maximum value of R?

$$\theta = \frac{\pi}{4}$$



EX: P 4.41

- A projectile is fired with an initial speed of 30 m/s and an angle of 60° above the horizontal. The object hits the ground 7.5 s later.
- A. How much higher or lower is the launch point relative to the point where the projectile hits the ground?
- B. What is the velocity of the projectile when it hits the ground?

Do this:

- *Draw a sketch!*
- *Draw a coordinate system*
- *Make a two-column list (one for horizontal and one for vertical) of all relevant variables, making it clear what is known and unknown.*

Have a great Wednesday!