Introduction

"Things should be made as simple as possible, but not any simpler."

-- Einstein

Reminders 1/2

- Written Problem Set due this Friday by 5 PM in the Drop Boxes
- Representative Assembly:
  - Discuss organisation and communication in PHY138
  - Each tutorial group chooses a Representative
  - The Assembly meet Friday, 3 – 4 PM in MP 222
  - Refreshments will be served

Reminders 2/2

- Any questions regarding the laboratory should be directed to Dr. Deyirmenjian in MP124
- Classes begin promptly at 11:10 and end promptly at 12:00 noon
  - If you can not stay until 12:00 noon do not come to class at all

Announcements

- Pre-Class Quiz Chapts 10 – 11 released
  - Due Monday October 17 by 10 AM
- My office hour this afternoon is cancelled
- Test: Tuesday November 1, 6 – 7:30 PM
  - If you have a *demonstrable* conflict, see Dr Savaria in MP129E immediately.

Last Time

- Finished Chapter 7
  - §7.6 – Nonuniform Circular Motion
- Chapter 8
  - A series of related examples
  - Newton's 3rd Law
  - Tensions and ropes

"Misteak" in the last class

- For the massive string, I mis-wrote the force the string exerts on block B
- The pdf of the PowerPoint has been corrected
- The pdf of the Journal has been corrected in purple.

Problem-Solving Strategy: **ASSESS**

- Before:
  $T = F_{S \text{ on } B} = (m_A + m_B)F / m_{tot}$
- Correct:
  $T = F_{S \text{ on } B} = (m_A + m_S)F / m_{tot}$
- The right answer must depend on m_S
- The massless string:
  $T = F_{S \text{ on } B} = m_A F / m_{tot}$

Today

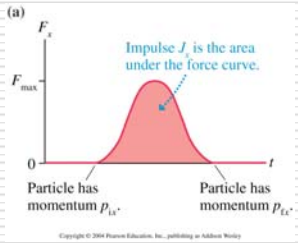
- Derivatives of trig functions
- Chapter 9 – Impulse and Momentum
  - Impulse
  - Damage to people in collisions
  - Physics of a tennis serve
  - Conservation of momentum
  - Inelastic collisions
  - Angular momentum

MAT135 – next week - §3.4

$$\frac{d \sin(\theta)}{d\theta} = \cos(\theta)$$

$$\frac{d \cos(\theta)}{d\theta} = -\sin(\theta)$$

Figure 9.4 (a)



Impulse J_x = area under the curve = $F_{avg}\,\Delta t$

Newton's 2nd Law:

$J_x = \Delta p_x = p_{fx} - p_{ix}$

4 Rotations of a Tennis Serve

- Racket about the wrist
- Forearm and wrist about the elbow
- Arm and elbow about the shoulder
- Body and shoulder about the tip of the left foot

Linear Motion	Rotational Motion
a = constant	$\alpha \equiv \frac{a_t}{r}$ = constant
$s_f = s_i + v_i t + \frac{1}{2} a t^2$	$\theta_f = \theta_i + \omega_i t + \frac{1}{2} \alpha t^2$
$v_f = v_i + a t$	$\omega_f = \omega_i + \alpha t$
m	mr^2