Class 14
Announcements

• Exam Friday:
  – Material from HW3,4,5 (note, more material than in exam 1, don’t get complacent!)
  – As usual, bring calculator, #2 pencils and photo-ID

• Tutorials:
  – Tu/Th 5:30-6:30 in BPS1308 or CEM138 depending on size (size does matter)
Concepts overview

1. Momentum

2. Conservation of momentum

3. Impulse
Momentum

- \( p = mv \)
- \( F = ma \)
- \( = m \Delta v / \Delta t \)
- \( = \Delta p / \Delta t \)

- Force is the “rate of change of momentum”
Impulse

- Work, $W = F_x \Delta x$

- Impulse = $F \Delta t = \Delta p$

- Remember the concept of impulse, but it is less important than Momentum or energy
Conservation of momentum

- Closed system: no external forces are acting =>
- In any collision, the total momentum of the entire system is conserved
- Always true
You are a passenger in a car and not wearing your seat belt. Without increasing or decreasing its speed, the car makes a sharp left turn, and you find yourself colliding with the right-hand door. Which is the correct analysis of the situation?

1. Before and after the collision, there is a rightward force pushing you into the door.
2. Starting at the time of collision, the door exerts a leftward force on you.
3. both of the above
4. neither of the above
An astronaut floating weightlessly in orbit shakes a large iron anvil rapidly back and forth. She reports back to Earth that

1. the shaking costs her no effort because the anvil has no inertial mass in space.
2. the shaking costs her some effort but considerably less than on Earth.
3. although weightless, the inertial mass of the anvil is the same as on Earth.