# Board Meeting Beta

PHYSICS 203, PROFS. BEAN, KLAFEHN, MARTENS YAVERBAUM
JOHN JAY COLLEGE OF CRIMINAL JUSTICE, THE CUNY

1) Take at least one large white board for each group.

   ***With as much clarity, completeness, color, vivacity and verity as possible***, on group white boards, respond to the problem on the following page.

   You may certainly use more than one white board per group.

2) We will leave AT LEAST 45 minutes to 1 hour for the following:

   Gather in an approximate circle, all Boards facing in.

   Discuss the Boards with respect to and for any leading questions posed by the Instructor.

   The Instructor, however, will play a noticeably minimal role. Whenever s/he is silent and whenever you wonder what to discuss, do the following:

   a) Begin by attempting to identify and reconcile disagreements among boards,

   b) Freely but respectfully follow whatever conceptual/conversation paths emerge from the attempt to reconcile boards.

   c) Emphasize ***Depth*** over ***Breadth***:

      Once the class discovers that it is disagreement or confusion over a particular and fundamental point—

      whether or not this point was originally intended for discussion--

      STICK WITH THE CONCEPT ***PAST*** THE POINT OF FRUSTRATION & SEEMING 'CIRCLES'.

   d) Do not interrupt colleagues.

**PLEASE NOTE:** The goal of the board meeting is to have a DEBATE. We are looking for POLITE, but **PASSIONATE *dis***agreement. Don't try to make peace, try to ***get at the issues***. Don't let things go because there's disagreement. ***Pursue*** them ***because*** there's disagreement.

# Part 1: Least to Greatest

1. A book slides down a tilted (frictional) desk at a constant velocity. $\mu_s = 0.6$, $\mu_k = 0.5$.

   Put the forces acting on the book in order from weakest to strongest. Treat the two components of gravity as separate forces. There will be a total of four forces.

   Put the forces acting on the book in order from weakest to strongest again. This time, treat the force of gravity as a single force. There will be a total of three forces.

2. A laptop computer is sitting on a desk. An irresponsible, reckless physics teacher pushes on the computer to try to make it move. He pushes *at a 45 degree angle*, downward *and* eastward. The computer does *not* move. $\mu_s = 0.4$, $\mu_k = 0.3$

   Put the forces acting on the computer in order from weakest to strongest (i.e. lowest magnitude to greatest). Treat the two components of the computer teacher's push (down and right) as *separate forces*—i.e. don't worry about the total diagonal force. There will be a total of 5 forces.

# Part 2: The Excluded Middle

Determine whether each of the statements below is true or false.
Explain & justify your conclusion.

1. The instantaneous speed of an object is its distance traveled divided by the time elapsed.
2. If an object accelerates from rest at a constant rate of 20 feet/$s^2$, then it covers 60 feet in the first 3 seconds of travel.
3. If an object has a negative acceleration, this means it is accelerating opposite the direction of its velocity.
4. To compute the velocity of one object is to acknowledge the existence of a second object.
5. Velocity is the magnitude of the speed vector.
6. My velocity relative to you is the sum of my velocity relative to Earth and Earth's velocity relative to you.
7. Projectile motion is an example of free-fall motion.
8. The instantaneous speed of a projectile at its peak height is 0.
9. A bullet shot from a horizontal gun and a bullet dropped from the exact same height will land at the same time.
10. For a projectile fired with initial speed $v_0$ at angle $\theta$ (measured up from horizontal), the average vertical velocity is $v_0 \sin \theta$.
11. At the peak height of a projectile's journey, the instantaneous acceleration is 0.
12. According to Galileo's principle of relativity, Newton's 3 laws of motion should be applied *in any accelerated reference frame*.
13. Net force can be represented by a properly drawn vector.
14. The Earth pulls at a book sitting on a flat, stationary table with a force equal in magnitude and opposite in direction to the normal force exerted on the book by the table.
15. Statement (16), above, is an example of Newton's 3rd law of motion.
16. The magnitude of the static friction force is always directly proportional to the magnitude of the relevant normal force.
17. Friction on an object always points opposite the direction of that object's motion, relative to a stationary observer.
18. If there is a normal force between two objects, then there must also be a friction force.