Due week of 10/11

Tutorial HW4:
Reconciling common sense and
Newton's laws

Name: _____

Section: _____

I. Interpretations

A. On the force vs. acceleration graph at right:

1. What do the three different lines represent?

2. How is the slope of a line related to the object that produced that line?

3. What is the interpretation of the slope of each line?

4. What does it mean for all the lines to go through the origin? What would it mean if someone had drawn a line that started on a non-zero value on the horizontal axis?
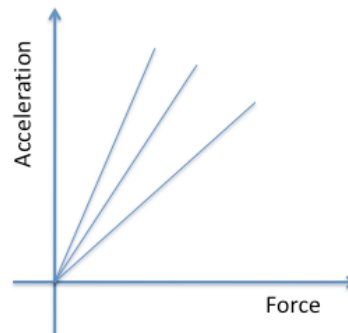
II. Pushed book

Using your hand to exert a horizontal force, you push a physics textbook across the floor at a steady pace. The frictional force exerted by the floor on the book opposes its motion. Is the "push" force exerted by your hand greater than, less than, or equal to that frictional force?

A. What's an incorrect, but reasonable, answer that someone like your (perhaps hypothetical) roommate, a humanities major, might give? Explain what that person might be thinking and why it would be reasonable even though incorrect.

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B. Now you answer the question, and explain your reasoning.

C. Is there a way to reconcile the reasonable-but-incorrect idea underlying your roommate's reasoning with your own reasoning in this case? Or would you just have to tell the roommate to accept your reasoning because experiments support it? (*Hint:* How could your roommate refine his or her intuition to be consistent with your reasoning?)

D. In almost every tutorial and homework that you've done (including the question above!), we've had you spend a lot of time thinking about mistaken reasoning—your own mistakes and even other people's mistakes. What do you see as the point, if any, of focusing on mistakes? (We've asked this before, but not on an assignment you handed in., and we want to see what you think.) Please be honest; write what *you* think, not what your professor thinks. You'll get full credit for completing this part-D sincerely, no matter what you say.