Sent: Sunday, September 21, 2003 1:23 PM
Question:
On Chapter 6 Problem 24, I think it might be helpful to look at the system as a whole and find the acceleration of the two boxes (because they are equal). I am not sure how to find the entire friction force of the system, though. Would I add the given friction forces of the two different boxes. Or would I only consider the greater of the two friction froces (i.e. the Wheaties box's friction force), because that is the one slowing the system down most?

Response:
You are on the right track; you just need to think it through.
You already know the friction force on each of the boxes. Considering the system to consist of BOTH boxes, then the NET friction force on the SYSTEM is the sum of the two individual friction forces. (Both frictions are slowing the system.) Once you have the (common) acceleration of the two boxes, you can consider ONE of the boxes as the system, identify the forces on it, and solve for the force on it from the other box.

Sent: Saturday, September 20, 2003 7:07 PM
Question:
I was going through problem set 2 and noticed that in question 56 of chapter 5 the question reads that a descending elevator decelerates at 2.4 m/s^2 and when explaining the problem at lecture on Thursday, you made the acceleration vector pointing down. But seeing as it is decelerating as it is going down, wouldn't the acceleration vector be pointing up? Also the second part of the question states that the elevator is moving upward with an acceleration of 2.4 m/s^2, how does that differ from the elevator moving down with a deceleration of the same value?

Response:
See the question and answer already posted on this problem below. I discussed a similar -- though not the same problem -- at lecture. Mine had Einstein on a scale; this has a lamp held by a cord from the top. The point in either case is to choose a positive direction -- both in my case and this problem, the choice of up as positive is sensible. So lets go with that.
Your statement "But seeing as it is decelerating as it is going down, wouldn't the acceleration vector be pointing up?" is quite correct. For accelerations the same in the first and second parts of the problem, the forces would also be the same. But of course, the other physical circumstances -- which direction it is moving and whether the speed is increasing or decreasing --- are very different. I think that is the point.

Sent: Saturday, September 20, 2003 3:50 PM
Question
Re: Problem 6-8, p. 112:
The way I see this is two diagrams, one centered on her feet and one on her back, since she can control the amount of force she uses on either, independently. But the wording in (b) makes it sound like there's only one push. Where would that be from - her back or her feet? I'm not sure how to divide the force of gravity between the two areas, either. Clues?

Reply:
The entire body of the climber is the system. You must include ALL the forces acting on her -- including the forces both on her back and on her feet. (For example, if you miss one of the horizontal forces, she would accelerate!) Gravity (weight) clearly acts someplace within her body (we see later exactly where, when we talk about center of mass); for the purposes of this problem, you do not need to specify precisely where on her it acts, only that it acts on her body (the system).

Sent: Saturday, September 20, 2003 9:50 AM

Question Re: Problem 5-50 (c), p. 97
Don't we need to know the mass of the co-worker, to figure out the gravity force on him?

Reply:
You are only asked for the force exerted by the co-worker (on the chair through the rope). For this, you do NOT need to know his mass (or the force exerted by gravity on him or the force exerted by him by the floor or ...)

Sent: Saturday, September 20, 2003 12:12 AM

Question:
Can you use the "constant acceleration" equations if the acceleration is zero?

Reply:
A constant acceleration can be any constant value. Zero is as good a constant value as any other ... so YES, constant acceleration includes the case of zero acceleration.

Q*uestion*
Re: Problem 5-24 (pg. 95)
I'm unclear on how acceleration at an angle affects the gravity force and N. I tilted the axes so that N is straight up. The book doesn't say which direction the acceleration is in, so I'm assuming that it's horizontal, in line with the rope. Does that mean it affects the horizontal coordinate of the gravity force?

Reply:
Your language choices make for confusion. Perhaps it would be clearer if you left "up" and "down" to mean what those words usually mean. So instead of saying, "I tilted the axes so that N is straight up." , a clearer statement would be "I chose my axes so x was in the direction of the ramp and y was in the perpendicular direction with N along the +y axis."
For the remainder, it is then clear that with this choice the acceleration (and the motion) is along the +x direction. (All motion must be along the ramp.) Also, gravity will have components along both x and y axes.

Question:
Re: Problem 5-56 (pg. 97)
What exactly is meant by "a descending elevator that decelerates"? In normal English that means to slow down as it goes down, but in physics wouldn't that mean a positive, upward acceleration? Or does it mean a true descending elevator that decelerates in a physics sense, i.e., an elevator going faster and faster as it goes down?

Reply:

Both normal English and the physics sense are correct and consistent (as stated in your first sentence). The last sentence is incorrect and contradicts the previous sentence. Decelerate means slow down ... or the magnitude of the speed gets smaller. Since the velocity is down and its magnitude gets slower, then dv/dt is up. So the acceleration is up. In part (b), the speed is going up and it is getting bigger so dv/dt is ...