

6. (25 pts)

a) Explain why one needs to include the mass of an object along with the object's velocity to obtain a quantity (momentum) which fully describes the motion of the object.

It would be much easier to catch a less massive object than a more massive object, both moving at the same speed. So speed does not fully describe the motion. In order to tell which would be easier to catch, the amount of mass of each is also needed.

b) When the driver of the St. Vincent van makes a sudden, hard left turn, the occupants are “thrown” against the right side of the van. Explain why they “feel” thrown to the right when there is actually **NO FORCE ACTING IN THAT DIRECTION!**

In order to turn left, there must be a force acting to the left on the passengers. However, the leather seats do not provide enough force to cause the passengers to turn. Thus, as the van turns to the left, the leather seat slides under the passengers. Of course, from the passengers' point of view it appears that they are thrown to the right rather than the van sliding out from under them to the left. When they finally impact the right side of the van, it is what applies the leftward force to cause the occupants to turn left.