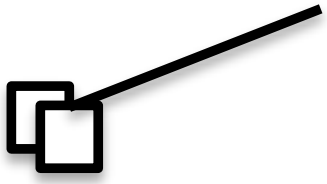
PS#9 Due in Class Monday, Nov. 13. Please pay good attention to describe the lens you are using and explain your method.

**** four stars indicate that you should consider the direction of acceleration to inform your choice of axis. Do you remember how to pick a good axis? Are you making a good FBD?

1. 7.1, Exercise 3

2. You are watching the fuzzy dice from the rearview mirror. As you take off on level ground, it makes an angle as shown at right.

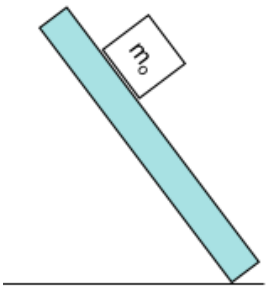


   a) **** state how you will inform your choice of axis.
   b) Estimate the acceleration of the car.
   c) What must be the coefficient of friction of your tires for this to happen?
   d) Is this realistic?
   e) If the mass of the dice is 100 g, what is the tension in the string?

3. Consider the fuzzy dice above. Now the car is stationary and you are sitting it in. You grab the dice and pull them to one side exactly as in the diagram above. Then you let go of them.
   a) **** Choose a good axis. Is the direction of acceleration the same as above? State how this direction will inform your choice of axis.
   b) Again find the acceleration of the dice with direction.
   c) Again, if the mass of the dice is 100 g, please find the tension in the string. Is it the same as the string above? Why might this make sense?

4. Consider the fuzzy dice in above. Now you are holding them from the end of the 50 cm string, and spinning the dice around. The path of the dice is a circle in the horizontal plane. Estimate the speed of the dice.

5. Consider the mass on the inclined plane shown at right.



   a) ****, make a good choice of axis.
   b) Estimate the acceleration if the surface is frictionless.
   c) What coefficient of friction is necessary for the block to slide at a constant speed?

6. Assume instead that the image above is for a car on a freeway off ramp as illustrated in 7.3 exercise 2. If the off ramp has a radius of 50 m, what is the ideal speed for a car not to skid if the road is very slippery?

7. 7.4 Exercise 1

8. Please start (and possibly finish) your final project. Please let me know if there's anything I can do to support the project.

9. Please see a picture of me pushing a system of masses up a vertical wall with a coefficient of friction of 0.4. If I push the stick as shown with a force of 80 N, please find the approximate acceleration of the system of masses, and the tension in the string holding the 1 kg mass.