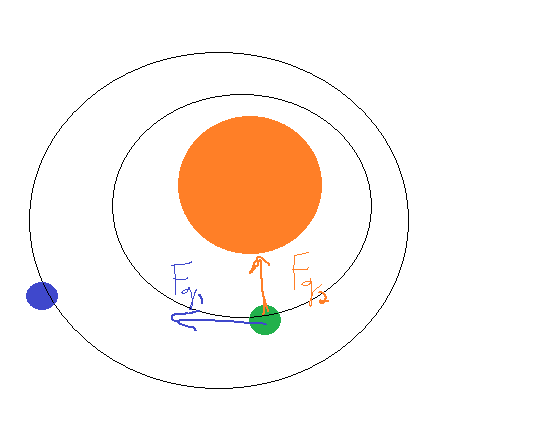
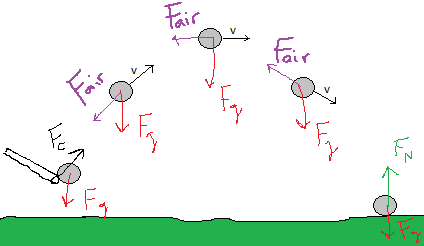
**Homework 4 Solutions due 2/12**

**Problem 1.** Draw the forces acting on the green planet. I hope you realize the gravity of this situation.



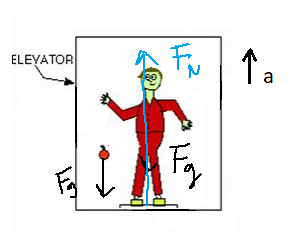
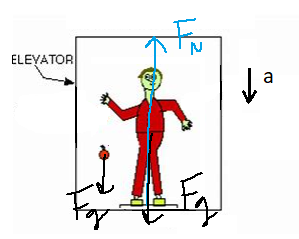
**Problem 2.** In each instance of the motion of a baseball, draw the forces acting on it. You can assume that it’s not moving neither in the first instant, nor in the last instant. That amorphous shape behind the ball, on the left, is a bat, thank you very much.



**Problem 3.** I hate elevators. But if I find myself in one, then I would do this:

(a) Suppose the elevator is accelerating upwards. Draw the forces acting on you, and the forces acting on the apple you dropped.

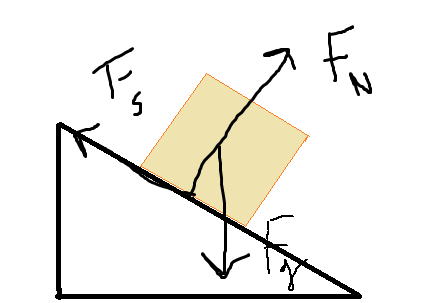
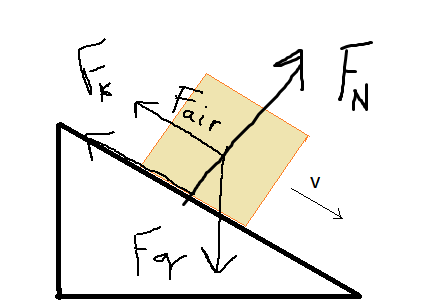
(b) Now suppose the elevator is accelerating downward, but not so fast that you’re in free fall. Draw the forces acting on you, and those on the apple you dropped, again.

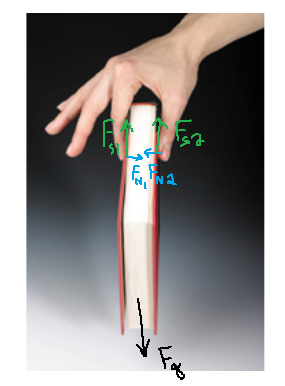
**Problem 4.** Draw the forces acting on this block if ….

(a) it’s just sitting there

(b) it’s sliding down the ramp,

**Problem 5.** Draw the forces acting on the book that’s not slipping out of your fingers thanks to your super-human pinching abilities.

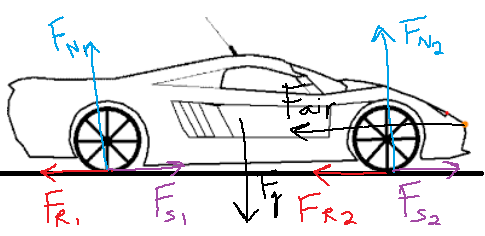
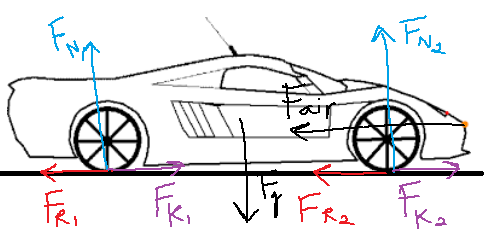


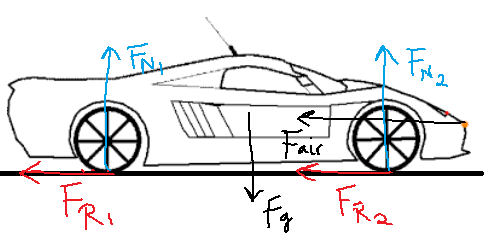
**Problem 6.** Draw the forces acting on the car if ….

(a) it’s driving to the right.

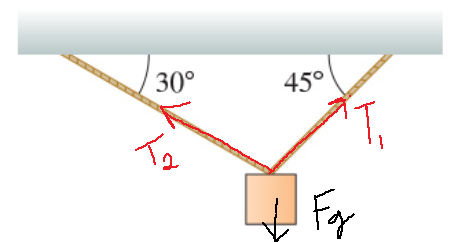
(b) you’ve pressed on the accelerator too hard, and the tires are slipping.

(c) it’s in neutral and rolling to the right.



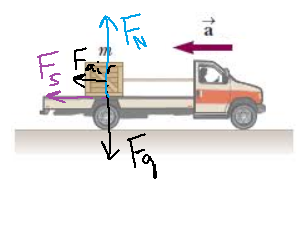
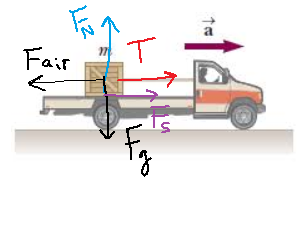
**Problem 7.** Draw the forces acting on the block? Yeah?



**Problem 8.** Draw the forces acting on the crate if…

(a) the truck is speeding up.

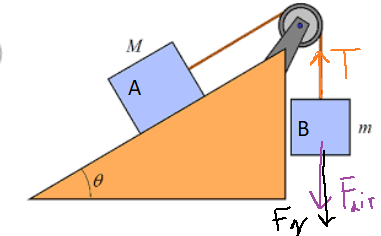
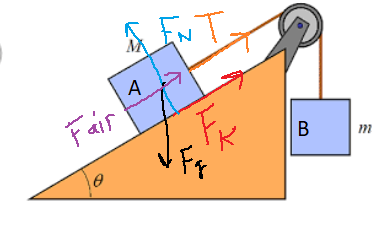
(b) the truck is slowing down, but the block is not slipping.



**Problem 9.** Suppose the plane has friction and block A is sliding down the plane. Draw the forces on….

(a) block A.

(b) block B.

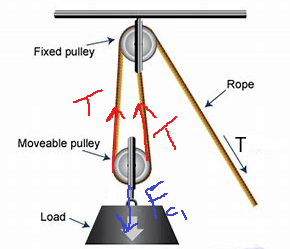
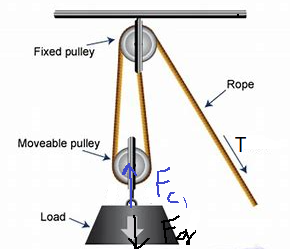
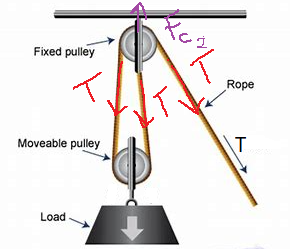


**Problem 10.** Microsoft Paint is the bane of my existence. Luckily there’s the internet, where I found this pulley! Suppose you’re puling on the rope, as shown, with a tension T. And for simplicity, you can assume the pulley is massless, and that nothing is moving (i.e., ignore air resistance)

(a) Draw the forces on the mass.

(b) Draw the forces on the bottom pulley.

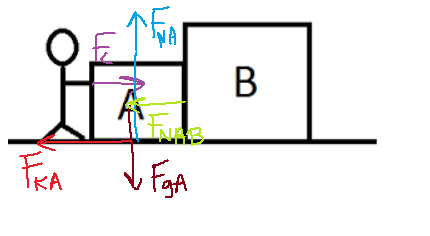
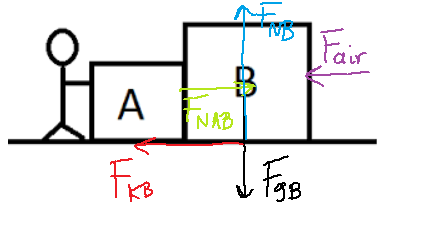
(c) Draw the forces on the top pulley.

**Problem 11.** Suppose the floor has friction, and the worker is pushing the crates to the right.Draw the forces on…

(a) crate A.

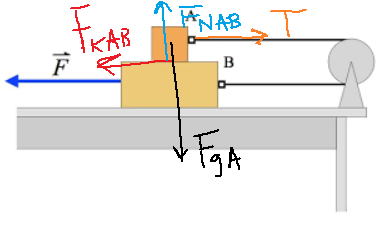
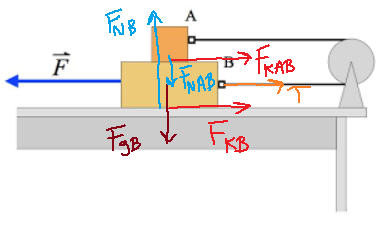
(b) crate B.

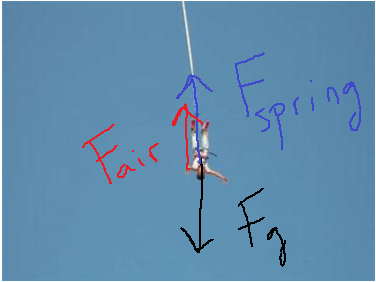
**Problem 12.** Mwa ha ha. You’ll never get *this* one. Suppose the table and blocks have friction. Ignoring air resistance, draw the forces on…

(a) block A.

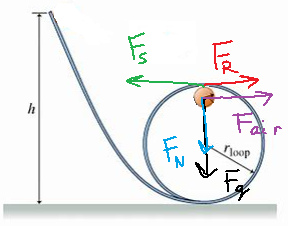
(b) block B.

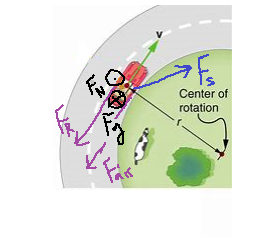
**Problem 13**. Draw the forces on this crazy bungee-jumpee, who I’m pretty sure is falling to their death.



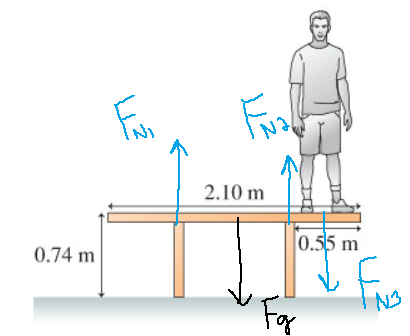
**Problem 14.** Now consider the ball rolling (without slipping) around the loop-the-loop. Draw the forces acting on the ball.



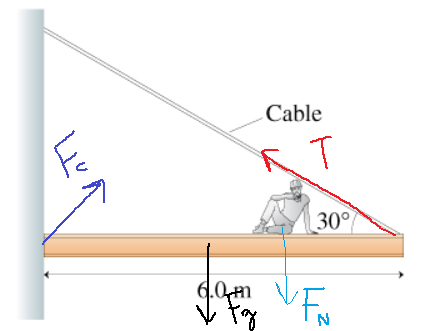
**Problem 15.** Now consider a car rounding a corner. Por favor, draw the forces acting on the car. You’ll have to use that special notation for gravity and the normal force. And you can combine all four normal forces into one, and all friction forces one, respectively.



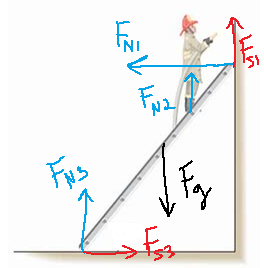
**Problem 16.** Pirates have forced this physicist to walk the plank, in revenge for using vectors to steal their treasure. Draw the forces on the plank.



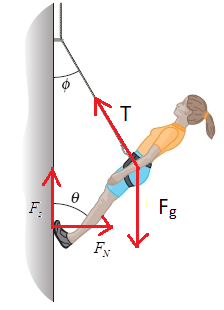
**Problem 17.** This guy is checking out the newest bar in town. Seems kind of empty. Draw the forces acting on the bar, assuming it is bolted to the wall.



**Problem 18.** How about this? Supposing there is friction in both the floor and wall, draw the forces on the ladder.



**Problem 19.** How the forces on this person chilling on a rock face. Break the contact force at her feet into normal and friction parts.



**Problem 20.** You were riding your unicycle, when the wheel fell off. All that you can do now is watch it roll down the hill, and draw the forces acting on it.

