AP Forces Problem Set 2

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1 Problems

1. A block of mass m rests on a table and is being pulled by a string with tension T at angle θ with respect to the table (horizontal). A frictional force with coefficient of friction μ acts on the block. What can be the maxium tension in the string so that the block will not move?

2. Consider the same scenario as above, except now we will make the following modifications. A block of mass M is now placed on top of the other mass. This second block is being pulled by another string with tension T_2 at an angle $\pi - \theta$ with respect to the horizontal. The coefficient of friction between all surfaces is μ. What is T_1 as a function of T_2?

3. A block of mass M rests on top of a block of mass m, which rests on a table. A pulley connects the two. The mass on the bottom is being pulled by a force F. The coefficient of friction between all surfaces is μ. What is the tension in the pulley? What is the acceleration of the blocks?