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 at an angle $\theta + \frac{\pi}{2}$ with respect to the horizontal. The coefficient of friction between all surfaces is μ. What is the maximum tension in both strings so that neither block moves? Do not use the coefficient of friction in your answer. What is the coefficient of friction if neither block is moving? Do not use the tension in your answer.

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?