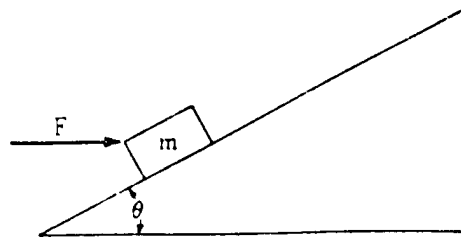


Directions: Show all of your work in order to receive full credit. Include all of your givens, units, and original equations used in each solution. If you have any questions, be sure to ask.



A block of mass  $m$ , acted on by a force of magnitude  $F$  directed horizontally to the right as shown above, slides up an inclined plane that makes an angle  $\theta$  with the horizontal. The coefficient of sliding friction between the block and the plane is  $\mu$ .

- a. On the diagram of the block below, draw and label all the forces that act on the block as it slides up the plane.



- b. Develop an expression in terms of  $m$ ,  $\theta$ ,  $F$ ,  $\mu$ , and  $g$ , for the block's acceleration up the plane.

- c. Develop an expression for the magnitude of the force  $F$  that will allow the block to slide up the plane with constant velocity. What relation must  $\theta$  and  $\mu$  satisfy in order for this solution to be physically meaningful?