

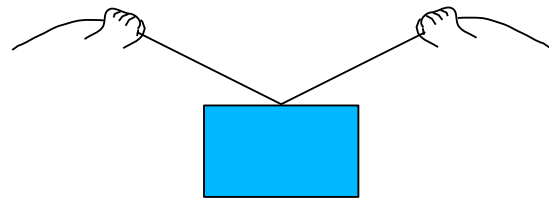
Physics 10310
Discussion Section Questions

Set 4

Directions: One person in your group should act as "scribe" to record your group's solution on a sheet of paper. Please make sure your answers are legible and comprehensible.

1. A person pulls equally hard on two massless strings that are attached to a block as shown. The strings remain taut and symmetrical, forming the same angle with the horizontal at all times. Draw and label a free-body diagram for the block in each of the following four cases. In each case, indicate the relative magnitudes of the forces by the relative lengths of the force vectors. As best you can, *draw all diagrams to the same scale*.

- Cases:
1. Block speeds up while moving downward.
 2. Block slows down while moving downward.
 3. Block speeds up while moving upward.
 4. Block slows down while moving upward.



2. A block of mass M is pulled along a flat, frictionless surface. In order to move it, a force F acts at the end of a massless string, as shown, where the string makes an angle θ with respect to the horizontal.

- a) What is the maximum value $|F|$ can have such that the block stays in contact with the plane?
- b) For an arbitrary value of $|F|$, but less than the maximum value from part (a), find the acceleration of the block (magnitude and direction).

The horizontal plane has a length L , and sits a height H above another long, horizontal surface. The force only accelerates the block on the horizontal surface, *i.e.*, it stops acting as soon as the block clears the edge. Assume that the block starts from rest, then accelerates.

- c) In terms of given constants (and g), how far (D) from the base of the platform does the block land?

