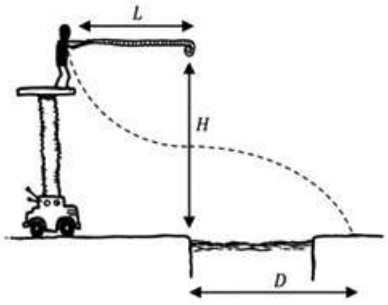
NAME _____ DATE _____

Scenario

A designer is creating an obstacle for an obstacle course where a person starts on a moveable platform of height H *from the ground. The person grabs a rope of length* L *and swings downward. At the instant the rope is vertical, the person lets go of the rope and attempts to reach the far side of a water-filled moat. The left side of the moat is directly below the position where the person will let go of the rope. The designer runs several tests in which the rope has different lengths and moves the platform such that the rope is always initially horizontal. The designer notices that the person cannot land on the other side if the length* L *is very short. The designer also notices that the person also cannot land on the other side if the length* L *is very close to the height* H.



Assume the size of the person is much smaller than the lengths L and H. Let D represent the horizontal distance from below the release point to where the person lands.

Data Analysis

PART A: Answer the following qualitatively, citing physical principles but without manipulating equations.

i. Why does the person land in the moat if the rope's length is very short?

ii. Why does the person land in the moat if the rope's length is nearly the same as the height of the platform?

Quantitative Analysis

PART B: Using the variables given above and fundamental constants, write mathematical expressions for the following:

i. v, the horizontal speed of the person at the moment they let go of the rope

ii. The distance D

Argumentation

PART C: i. Describe how your equations from Part B (i) and (ii) support your reasoning in Part A (i).

ii. Describe how your equations from Part B (i) and (ii) support your reasoning in Part A (ii).