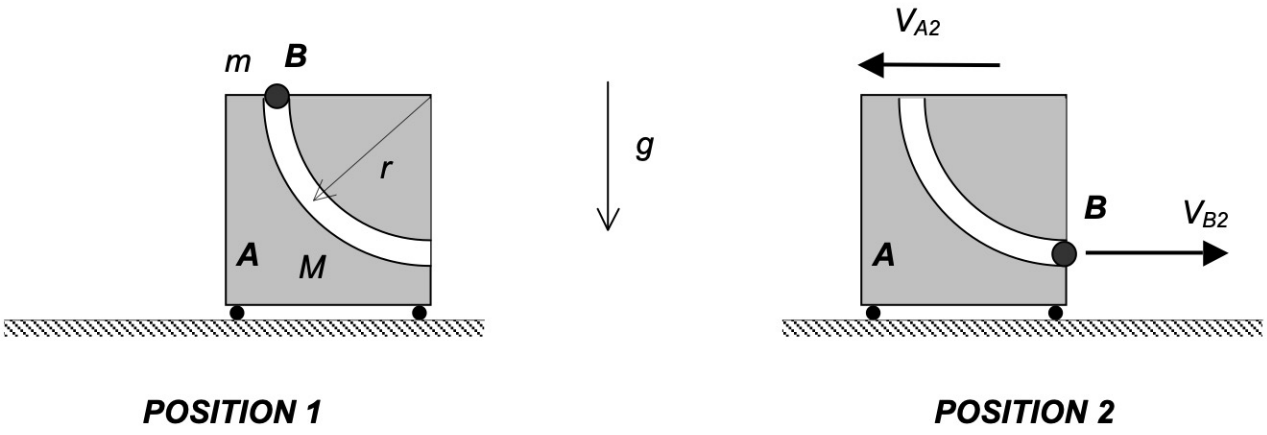
Homework H.4.N

Given: A smooth, circular slot is cut into block A with block A being constrained to move along a smooth, horizontal surface. The slot is vertical at the top surface of the block with the slot being horizontal at the right edge of the block, as shown in the figures below. In Position 1, block A is stationary, and a particle B is released from rest into the upper opening of the slot. At Position 2 shown below, particle B is exiting the slot at the right edge of the block. The masses of A and B are M and m, respectively. The radius of the circular slot is r.

Find: Determine the velocity of block A and the velocity of particle B at position 2.



Use the following parameters in your analysis: $m = 20$ kg, $M = 40$ kg and $r = 2$ m.