A Problem of Forces

For each of the following scenarios, draw a free-body diagram. In addition, in the box to the right of each free-body diagram, draw vectors that represent the instantaneous linear and angular velocities and the instantaneous linear and angular accelerations.

At rest









v and ω

a and α

Rolling to right at constant v





Rolling **down** an incline without sliding



Rolling **up** an incline without sliding





Previously rolling and then moving up an incline without friction



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