Answer Key

1) a) L = 115 kgm^2/s (into the page)
   b) dL/dt = 125 kgm^2/s^2 (out of the page)
2) 0.223 rad/s
3) 29.0 m/s
4) a) 2.00 rad/s

   b) 6.58 rad/s

Hints:

1) a) Use the formula of angular momentum of a particle (r x mv).
   b) The rate of change of angular momentum is the torque, in this case due to gravity.
2) Use conservation of angular momentum, keeping in mind the form for a particle (r x mv) and for an extended object (Iw).
3) Use conservation of energy for the rough section, keeping in mind v=wR, then use conservation of energy for the smooth section. Without friction, the rotational kinetic energy on the smooth section will not change.
4) a) Use conservation of angular momentum.

   b) Use conservation of energy.