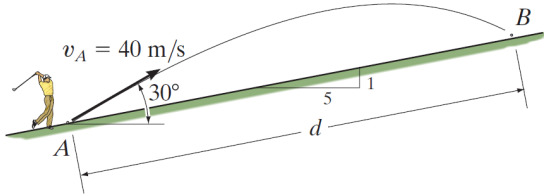


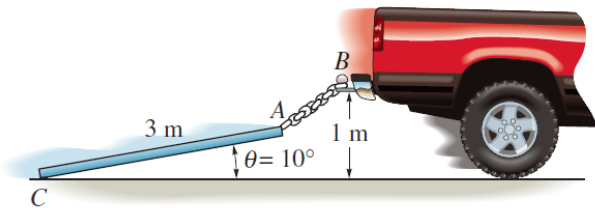
**Exercise 1.**

The golf ball is hit at  $A$  with a speed of  $v_A = 40$  m/s and directed at an angle of  $30^\circ$  with the horizontal as shown. Determine the distance  $d$  where the ball strikes the slope at  $B$ . **(15pts)**



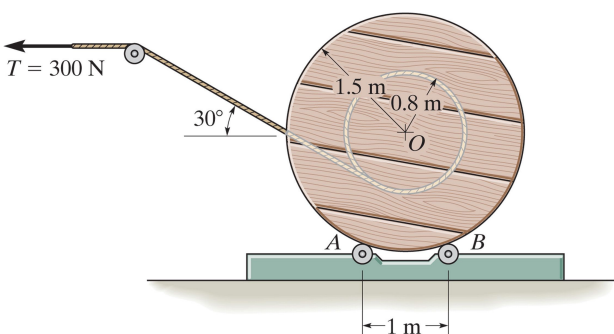
**Exercise 2.**

The pipe has a length of 3 m and a mass of 500 kg. It is attached to the back of the truck using a 0.6-m-long chain  $AB$ . If the coefficient of kinetic friction at  $C$  is  $\mu_k = 0.4$ , determine the acceleration of the truck if the angle  $\theta = 10^\circ$  with the road as shown. **(20pts)**



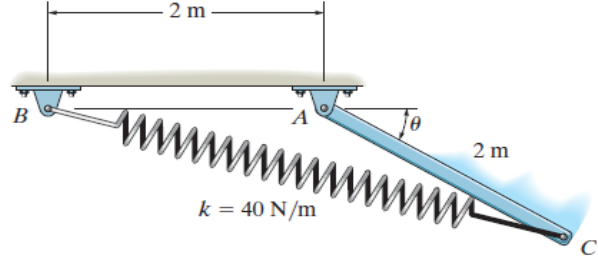
**Exercise 3.**

Cable is unwound from a spool supported on small rollers at  $A$  and  $B$  by exerting a force  $T = 300$  N on the cable. Compute the time needed to unravel 5 m of cable from the spool if the spool and cable have a total mass of 600 kg and a radius of gyration of  $k_O = 1.2$  m. For the calculation, neglect the mass of the cable being unwound and the mass of the rollers at  $A$  and  $B$ . The rollers turn with no friction. **(20pts)**



**Exercise 4.**

The 12-kg slender rod is attached to a spring, which has an unstretched length of 2 m. If the rod is released from rest when  $\theta = 30^\circ$ , determine the angular velocity of the rod the instant the spring becomes unstretched. **(20pts)**



**Exercise 5.**

If member  $AB$  has the angular motion shown, determine the velocity and acceleration of point  $C$  at the instant shown. **(25pts)**

