2. In Fig. 8-19, a small block is sent through point *A* with a speed of 9.0 m/s. Its path is without friction until it reaches the section of length L = 12 m, where the coefficient of kinetic friction is 0.70. The indicated heights are h_1 = 7.00 m and h_2 = 3.00 m. What are the speeds of the block at (a) point *B* and (b) point *C*? (c) Does the block reach point *D*? If so, what is its speed there; if not, how far through the section of friction does it travel?

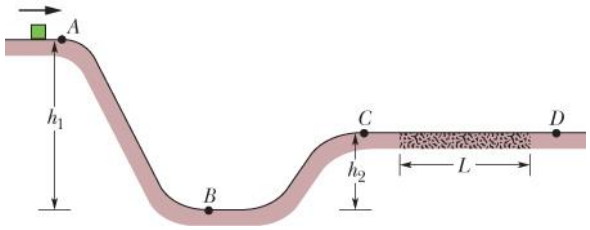

Figure 8-19 Problem 2.

9. A particle can slide along a track with elevated ends and a flat central part, as shown in Fig. 8-22. The flat part has length L = 60 cm. The curved portions of the track are frictionless, but for the flat part the coefficient of kinetic friction is μ_k = 0.20. The particle is released from rest at point *A*, which is at height $h = L/2$. How far from the left edge of the flat part does the particle finally stop?

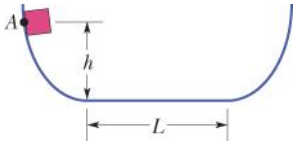

Figure 8-22 Problem 9.

10. A playground slide is in the form of an arc of a circle that has a radius of 12 m. The maximum height of the slide is h = 4.0 m, and the ground is tangent to the circle (Fig. 8-23). A 25 kg child starts from rest at the top of the slide and has a speed of 6.2 m/s at the bottom. (a) What is the length of the slide? (b) What average frictional force acts on the child over this distance? If, instead of the ground, a vertical line through the *top of the slide* is tangent to the circle, what are (c) the length of the slide and (d) the average frictional force on the child?

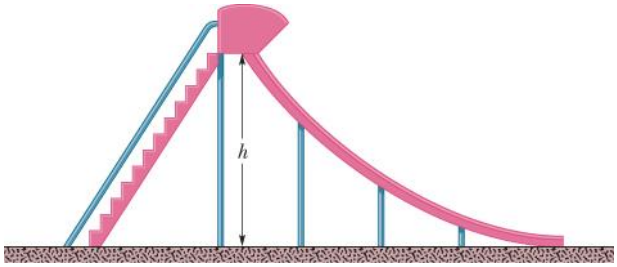

Figure 8-23 Problem 10.

21. Two blocks, of masses M = 2.80 kg and 2M, are connected to a spring of spring constant k = 230 N/m that has one end fixed, as shown in Fig. 8-25. The horizontal surface and the pulley are frictionless, and the pulley has negligible mass. The blocks are released from rest with the spring relaxed. (a) What is the combined kinetic energy of the two blocks when the hanging block has fallen 0.120 m? (b) What is the kinetic energy of the hanging block when it has fallen that 0.120 m? (c) What maximum distance does the hanging block fall before momentarily stopping?

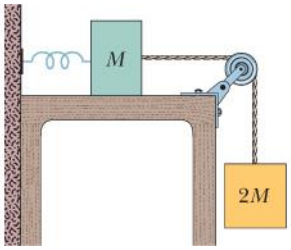

Figure 8-25 Problem 21.

51. A constant horizontal force moves a 42.0 kg trunk 5.20 m up a 30° incline at constant speed. The coefficient of kinetic friction is 0.170. What are (a) the work done by the applied force and (b) the increase in the thermal energy of the trunk and incline?

75. A boy is initially seated on the top of a hemispherical ice mound of radius R = 18.0 m. He begins to slide down the ice, with a negligible initial speed (Fig. 8-39). Approximate the ice as being frictionless. At what height does the boy lose contact with the ice?

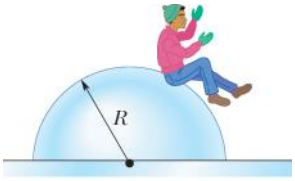

Figure 8-39 Problem 75.