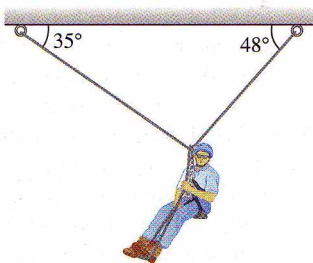


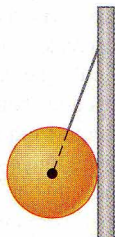
12. ●● In a rescue, the 73 kg police officer is suspended by two cables, as shown in Figure 5.44. (a) Sketch a free-body diagram of him. (b) Find the tension in each cable.



▲ **FIGURE 5.44** Problem 12.

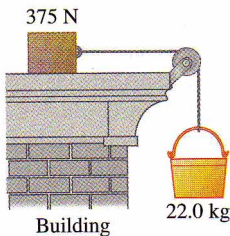
13. ●● A tetherball leans against the smooth, frictionless post to which it is attached. (See Figure 5.45.)

The string is attached to the ball such that a line along the string passes through the center of the ball. If the string is 1.40 m long and the ball has a radius of 0.110 m with mass 0.270 kg, (a) make a free-body diagram of the ball. (b) What is the tension in the rope? (c) What is the force the pole exerts on the ball?



27. ● A skier approaches the base of an icy hill with a speed of 12.5 m/s. The hill slopes upward at 24° above the horizontal. Ignoring all friction forces, find the acceleration of this skier (a) when she is going up the hill, (b) when she has reached her highest point, and (c) after she has started sliding down the hill. In each case, start with a free-body diagram of the skier.

28. ● At a construction site, a 22.0 kg bucket of concrete is connected over a very light frictionless pulley to a 375 N box on the roof of a building. (See Figure 5.49.) There is no appreciable friction on the box, since it is on roller bearings. The box starts from rest. (a) Make free-body diagrams of the bucket and the box. (b) Find the acceleration of the bucket. (c) How fast is the bucket moving after it has fallen 1.50 m



▲ **FIGURE 5.49** Problem 28.

(assuming that the box has not yet reached the edge of the roof)?