

26. ● How many kilometers would you have to go above the *surface* of the earth for your weight to decrease to half of what it was at the surface?
29. ●● **Huygens probe on Titan.** In January 2005 the *Huygens* probe landed on Saturn's moon Titan, the only satellite in the solar system having a thick atmosphere. Titan's diameter is 5150 km, and its mass is 1.35×10^{23} kg. The probe weighed 3120 N on the earth. What did it weigh on the surface of Titan?
37. ●● **Communications satellites.** Communications satellites are used to bounce radio waves from the earth's surface to send messages around the curvature of the earth. In order to be available all the time, they must remain above the same point on the earth's surface and must move in a circle above the equator. (a) How long must it take for a communications satellite to make one complete orbit around the earth? (Such an orbit is said to be *geosynchronous*.) (b) Make a free-body diagram of the satellite in orbit. (c) Apply Newton's second law to the satellite and find its altitude above the earth's *surface*. (d) Draw the orbit of a communications satellite to scale on a sketch of the earth.
41. ●● **Baseball on Deimos!** Deimos, a moon of Mars, is about 12 km in diameter, with a mass of 2.0×10^{15} kg. Suppose you are stranded alone on Deimos and want to play a one-person game of baseball. You would be the pitcher, and you would be the batter! With what speed would you have to throw a baseball so that it would go into orbit and return to you so you could hit it? Do you think you could actually throw it at that speed?