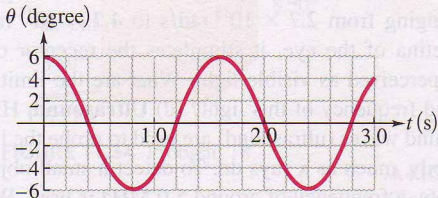


44. ● A science museum has asked you to design a simple pendulum that will make 25.0 complete swings in 85.0 s. What length should you specify for this pendulum?
45. ● A simple pendulum in a science museum entry hall is 3.50 m long, has a 1.25 kg bob at its lower end, and swings with an amplitude of  $11.0^\circ$ . How much time does the pendulum take to swing from its extreme right side to its extreme left side?
47. ●● **A pendulum on Mars.** A certain simple pendulum has a period on earth of 1.60 s. What is its period on the surface of Mars, where the acceleration due to gravity is  $3.71 \text{ m/s}^2$ ?
48. ●● In the laboratory, a student studies a pendulum by graphing the angle  $\theta$  that the string makes with the vertical as a function of time  $t$ , obtaining the graph shown in Figure 11.39. (a) What are the period, frequency, angular frequency, and amplitude of the pendulum's motion? (b) How long is the pendulum? (c) Is it possible to determine the mass of the bob?



▲ **FIGURE 11.39** Problem 48.