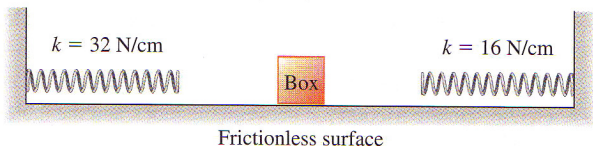


42. • Tall Pacific Coast redwood trees (*Sequoia sempervirens*) can reach heights of about 100 m. If air drag is negligibly small, how fast is a sequoia cone moving when it reaches the ground if it dropped from the top of a 100 m tree?
49. • **Tarzan and Jane.** Tarzan, in one tree, sights Jane in another tree. He grabs the end of a vine with length 20 m that makes an angle of  $45^\circ$  with the vertical, steps off his tree limb, and swings down and then up to Jane's open arms. When he arrives, his vine makes an angle of  $30^\circ$  with the vertical. Determine whether he gives her a tender embrace or knocks her off her limb by calculating Tarzan's speed just before he reaches Jane. You can ignore air resistance and the mass of the vine.
50. •• A slingshot obeying Hooke's law is used to launch pebbles vertically into the air. You observe that if you pull a pebble back 20.0 cm against the elastic band, the pebble goes 6.0 m high. (a) Assuming that air drag is negligible, how high will the pebble go if you pull it back 40.0 cm instead?
52. • A 1.5 kg box moves back and forth on a horizontal frictionless surface between two different springs, as shown in the accompanying figure. The box is initially pressed against the stronger spring, compressing it 4.0 cm, and then is released from rest. (a) By how much will the box compress the weaker spring? (b) What is the maximum speed the box will reach?



▲ **FIGURE 7.41** Problem 52.