1. What is the period of a pendulum whose length is 0.098 m long? Assume that the pendulum is on Earth.
2. How long should a pendulum be in order to have a period of exactly 2.00 s on Earth?
3. A pendulum is used to determine the gravitational acceleration on a distant planet. If a pendulum whose length is 1.75 m is found to have a period of 2.00 s, what is the value of *g* on the planet?
4. If a simple pendulum whose length is 1.50 m makes 72 oscillations in 3.00 min, what is the acceleration of gravity at its location?
5. A 2500 kg demolition ball swings on a cable 17.0 m long. What is the period of swing?

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6. A pendulum makes 36 vibrations in exactly 60 s. What is its (*a*) period, and (*b*) frequency?
7. How long must a simple pendulum be if it is to make exactly one swing per second? (That is, one complete vibration takes exactly 2.0 s.)
8. A pendulum has a period of 0.80 s on Earth. What is its period on Mars, where the acceleration of gravity is about 0.37 that on Earth?
9. What is the period of a simple pendulum 80 cm long (*a*) on the Earth, and (*b*) when it is in a freely falling elevator?
10. The length of a simple pendulum is 0.760 m, the pendulum bob has a mass of 365 grams, and it is released at an angle of 12.0° to the vertical. (*a*) With what frequency does it vibrate? Assume SHM. (*b*) What is the pendulum bob's speed when it passes through the lowest point of the swing? (*c*) What is the total energy stored in this oscillation, assuming no losses?
11. Your grandfather clock's pendulum has a length of 0.9930 m. If the clock loses half a minute per day, how should you adjust the length of the pendulum?
12. Derive a formula for the maximum speed $v_{\max}$ of a simple pendulum bob in terms of *g*, the length *L*, and the angle of swing θ_0.
13. A clock pendulum oscillates at a frequency of 2.5 Hz. At $t = 0,$ it is released from rest starting at an angle of 15º to the vertical. Ignoring friction, what will be the position (angle) of the pendulum at (*a*) $t = 0.25\,\text{s},$ (*b*) $t = 1.60\,\text{s},$ and (*c*) $t = 500\,\text{s}?$ [*Hint*: Do not confuse the angle of swing θ of the pendulum with the angle that appears as the argument of the cosine.]