

48. ● (a) If a flea can jump straight up to a height of 22.0 cm, what is its initial speed (in m/s) as it leaves the ground, neglecting air resistance? (b) How long is it in the air? (c) What are the magnitude and direction of its acceleration while it is (i) moving upward? (ii) moving downward? (iii) at the highest point?
49. ● A brick is released with no initial speed from the roof of a building and strikes the ground in 2.50 s, encountering no appreciable air drag. (a) How tall, in meters, is the building? (b) How fast is the brick moving just before it reaches the ground? (c) Sketch graphs of this falling brick's acceleration, velocity, and vertical position as functions of time.
52. ● **Measuring g .** One way to measure g on another planet or moon by remote sensing is to measure how long it takes an object to fall a given distance. A lander vehicle on a distant planet records the fact that it takes 3.17 s for a ball to fall freely 11.26 m, starting from rest. (a) What is the acceleration due to gravity on that planet? Express your answer in m/s^2 and in earth g 's. (b) How fast is the ball moving just as it lands?
57. ● A rock is thrown vertically upward with a speed of 12.0 m/s from the roof of a building that is 60.0 m above the ground. (a) In how many seconds after being thrown does the rock strike the ground? (b) What is the speed of the rock just before it strikes the ground? Assume free fall.