

27. • The upward normal force exerted by the floor is 620 N on an elevator passenger who weighs 650 N. What are the reaction forces to these two forces? Is the passenger accelerating? If so, what are the magnitude and direction of the acceleration?
28. • A person throws a 2.5 lb stone into the air with an initial upward speed of 15 ft/s. Make a free-body diagram for this stone (a) after it is free of the person's hand and is traveling upward, (b) at its highest point, (c) when it is traveling downward, and (d) while it is being thrown upward, but is still in contact with the person's hand.
31. •• Two crates, *A* and *B*, sit at rest side by side on a frictionless horizontal surface. The crates have masses  $m_A$  and  $m_B$ . A horizontal force  $\vec{F}$  is applied to crate *A* and the two crates move off to the right. (a) Draw clearly labeled free-body diagrams for crate *A* and for crate *B*. Indicate which pairs of forces, if any, are third-law action–reaction pairs. (b) If the magnitude of force  $\vec{F}$  is less than the total weight of the two crates, will it cause the crates to move? Explain.
42. •• **BIO Human biomechanics.** The fastest pitched baseball was measured at 46 m/s. Typically, a baseball has a mass of 145 g. If the pitcher exerted his force (assumed to be horizontal and constant) over a distance of 1.0 m, (a) what force did he produce on the ball during this record-setting pitch? (b) Make free-body diagrams of the ball during the pitch and just *after* it has left the pitcher's hand.