17. We choose $+y$ in the direction of the rebound (directly away from the wall) and $+x$ towards the right in the figure (parallel to the wall; see Fig. 10-30). Using unit-vector notation, the the ball's initial and final velocities are

$$\begin{aligned} \vec{v}_i &= v\cos\theta\,\hat{\mathrm{i}} - v\sin\theta\,\hat{\mathrm{j}} = 5.2\,\hat{\mathrm{i}} - 3.0\,\hat{\mathrm{j}} \\ \vec{v}_f &= v\cos\theta\,\hat{\mathrm{i}} + v\sin\theta\,\hat{\mathrm{j}} = 5.2\,\hat{\mathrm{i}} + 3.0\,\hat{\mathrm{j}} \end{aligned}$$

respectively (with SI units understood).

(a) With $m = 0.30$ kg, the impulse-momentum theorem (Eq. 10.4) yields

$$\vec{J} = m\vec{v}_f - m\vec{v}_i = 2(0.30)(3.0\,\hat{\mathrm{j}})$$

so that the magnitude of the impulse delivered on the ball by the wall is 1.8 N·s and its direction is directly away from the wall (which, in terms of Fig. 10-30, is "up").

(b) Using Eq. 10-8, the force on the ball by the wall is $\vec{J}/\Delta t = 1.8\hat{\mathrm{j}}/0.010 = 180\,\hat{\mathrm{j}}$ N. By Newton's third law, the force on the wall by the ball is $-180\,\hat{\mathrm{j}}$ N (that is, its magnitude is 180 N and its direction is directly into the wall, or "down" in the view provided by Fig. 10-30).