5. We take the initial direction of motion to be positive and use F_{avg} to denote the magnitude of the average force, Δt as the duration of the force, m as the mass of the ball, v_i as the initial velocity of the ball, and v_f as the final velocity of the ball. The force is in the negative direction and the impulse-momentum theorem (Eq. 10-4 with Eq. 10-8) yields $-F_{\text{avg}}\Delta t = mv_f - mv_i$. Thus,

$$v_f = \frac{mv_i - F_{\text{avg}}\Delta t}{m} = \frac{(0.40\,\text{kg})(14\,\text{m/s}) - (1200\,\text{N})(27 \times 10^{-3}\,\text{s})}{0.40\,\text{kg}} = -67\,\text{m/s} .$$

The final speed of the ball is $67\,\text{m/s}$. The negative sign indicates that the velocity is opposite to the initial direction of travel.