

91. (a) Using the same coordinate system assumed in Eq. 4-21 and Eq. 4-22 (so that  $\theta_0 = -20.0^\circ$ ), we use  $v_0 = 15.0$  m/s and find the horizontal displacement of the ball at  $t = 2.30$  s:

$$\Delta x = (v_0 \cos \theta_0) t = 32.4 \text{ m} .$$

- (b) And we find the vertical displacement:

$$\Delta y = (v_0 \sin \theta_0) t - \frac{1}{2} g t^2 = -37.7 \text{ m} .$$