87. Using the same coordinate system assumed in Eq. 4-25, we find x for the elevated cannon from

$$y = x\tan\theta_0 - \frac{gx^2}{2\left(v_0\cos\theta_0\right)^2} \quad \text{where } y = -30 \text{ m}.$$

Using the quadratic formula (choosing the positive root), we find

$$x = v_0\cos\theta_0\left(\frac{v_0\sin\theta_0 + \sqrt{\left(v_0\sin\theta_0\right)^2 - 2gy}}{g}\right)$$

which yields $x = 715$ m for $v_0 = 82$ m/s (from Sample Problem 4-7) and $\theta_0 = 45°$. This is 29 m longer than the 686 m found in that Sample Problem. The "9" in 29 m is not reliable, considering the low level of precision in the given data.