

84. (a) Using the same coordinate system assumed in Eq. 4-25, we find

$$y = x \tan \theta_0 - \frac{gx^2}{2(v_0 \cos \theta_0)^2} = -\frac{gx^2}{2v_0^2} \quad \text{if } \theta_0 = 0 .$$

Thus, with  $v_0 = 3 \times 10^6$  m/s and  $x = 1$  m, we obtain  $y = -5.4 \times 10^{-13}$  m which is not practical to measure (and suggests why gravitational processes play such a small role in the fields of atomic and subatomic physics).

- (b) It is clear from the above expression that  $|y|$  decreases as  $v_0$  is reduced.