

23. The constant-acceleration condition permits the use of Table 2-1.

(a) Setting  $v = 0$  and  $x_0 = 0$  in  $v^2 = v_0^2 + 2a(x - x_0)$ , we find

$$x = -\frac{1}{2} \frac{v_0^2}{a} = -\frac{1}{2} \left( \frac{5.00 \times 10^6}{-1.25 \times 10^{14}} \right) = 0.100 \text{ m} .$$

Since the muon is slowing, the initial velocity and the acceleration must have opposite signs.

(b) Below are the time-plots of the position  $x$  and velocity  $v$  of the muon from the moment it enters the field to the time it stops. The computation in part (a) made no reference to  $t$ , so that other equations from Table 2-1 (such as  $v = v_0 + at$  and  $x = v_0 t + \frac{1}{2}at^2$ ) are used in making these plots.

