

102. Let the vertical distances between Jim's and Clara's feet and the jump-off level be  $H_J$  and  $H_C$ , respectively. At the instant this photo was taken, Clara has fallen for a time  $T_C$ , while Jim has fallen for  $T_J$ . Thus (using Eq. 2-15 with  $v_0 = 0$ ) we have

$$H_J = \frac{1}{2}gT_J^2 \quad \text{and} \quad H_C = \frac{1}{2}gT_C^2 .$$

Measuring directly from the photo, we get  $H_J \approx 3.6$  m and  $H_C \approx 6.3$  m, which yields  $T_J \approx 0.86$  s and  $T_C \approx 1.13$  s. Jim's waiting time is therefore  $T_C - T_J \approx 0.3$  s.