

$$8. \quad \Delta E_k + \Delta E_p = 0$$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(v^2 - 0) = -(9.81 \text{ m/s}^2)(-8.0 \text{ m})$$

$$v = \sqrt{2(9.81 \text{ m/s}^2)(8.0 \text{ m})}$$

$$= 12.5 \text{ m/s} \approx 13 \text{ m/s}$$

$$9. \quad \Delta E_k + \Delta E_p = 0$$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(v^2 - 0) = -(9.81 \text{ m/s}^2)(-10.0 \text{ m})$$

$$v = \sqrt{2(9.81 \text{ m/s}^2)(10.0 \text{ m})}$$

$$= 14 \text{ m/s}$$

10.

$$\Delta E_k + \Delta E_p = 0$$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

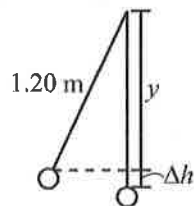
$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(0 - (3.5 \text{ m/s})^2) = -(9.81 \text{ m/s}^2)(\Delta h)$$

$$\Delta h = \frac{\frac{1}{2}(0 - (3.5 \text{ m/s})^2)}{-9.81 \text{ m/s}^2}$$

$$= 0.62 \text{ m}$$

11.

Find Δh first

$$\cos 25.0^\circ = \frac{y}{1.20 \text{ m}}$$

$$y = 1.09$$

$$\therefore \Delta h = 1.20 \text{ m} - y$$

$$= 1.20 \text{ m} - 1.09 \text{ m}$$

$$= 0.112 \text{ m}$$

$$\Delta E_k + \Delta E_p = 0$$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(v^2 - 0) = -(9.81 \text{ m/s}^2)(-0.112 \text{ m})$$

$$v = \sqrt{2(9.81 \text{ m/s}^2)(-0.112 \text{ m})}$$

$$= 1.5 \text{ m/s}$$

12. Note: Initial vertical speed is zero.

$$\Delta E_k + \Delta E_p = 0$$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(v^2 - 0) = -(9.81 \text{ m/s}^2)(-5.0 \text{ m})$$

$$v = \sqrt{2(9.81 \text{ m/s}^2)(-5.0 \text{ m})}$$

$$= 9.9 \text{ m/s}$$

13. $\Delta E_k + \Delta E_p = 0$

$$\Delta E_k = -\Delta E_p$$

$$\frac{1}{2}m(v^2 - v_0^2) = -mg\Delta h$$

$$\frac{1}{2}(v^2 - v_0^2) = -g\Delta h$$

$$\frac{1}{2}(v^2 - 0) = -(9.81 \text{ m/s}^2)(-2.0 \text{ m})$$

$$v = \sqrt{2(9.81 \text{ m/s}^2)(-2.0 \text{ m})}$$

$$= 6.3 \text{ m/s}$$