

Homework Solutions
9/19/2007

Problems

27.

$$PE_i + KE_i = PE_f + KE_f$$

$$mgh_i + \frac{1}{2}mv_i^2 = mgh_f + \frac{1}{2}mv_f^2$$

$$mgh_i + 0 = 0 + \frac{1}{2}mv_f^2$$

$$h_i = \frac{v_f^2}{2g} = \frac{\left(3.00 \frac{m}{s}\right)^2}{2\left(9.81 \frac{m}{s^2}\right)} = 0.487m$$

28. a.

$$PE_i + KE_i = PE_f + KE_f$$

$$mgh_i + \frac{1}{2}mv_i^2 = mgh_f + \frac{1}{2}mv_f^2$$

$$mgh_i + 0 = 0 + \frac{1}{2}mv_f^2$$

$$v_f = \sqrt{2gh_i} = \sqrt{2\left(9.81 \frac{m}{s^2}\right)(5.00m)} = 9.90 \frac{m}{s}$$

b.

$$PE_i + KE_i = PE_f + KE_f$$

$$mgh_i + \frac{1}{2}mv_i^2 = mgh_f + \frac{1}{2}mv_f^2$$

$$mgh_i + 0 = mgh_f + \frac{1}{2}mv_f^2$$

$$v_f = \sqrt{2g(h_i - h_f)}$$

$$v_f = \sqrt{2\left(9.81\frac{m}{s^2}\right)(3.00m)} = 7.67\frac{m}{s}$$

56. Work is the area under the curve.

a.

$$W = \frac{1}{2}(3.0N)(5.0m) = 7.5J$$

b.

$$W = (3.0N)(5.0m) = 15J$$

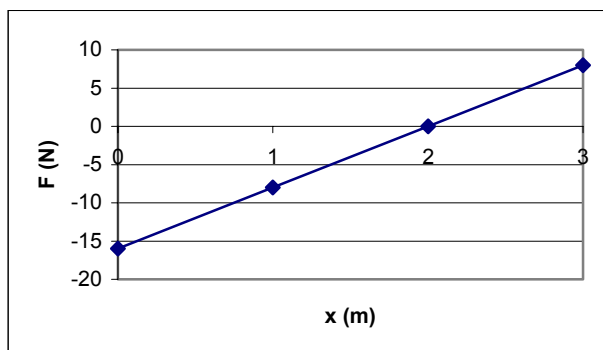
c.

$$W = \frac{1}{2}(3.0N)(5.0m) = 7.50J$$

d.

$$W_{total} = 7.5J + 15J + 7.5J = 30.J$$

57. a.



b.

$$W = \frac{1}{2}(-16.0N)(2.0m) + \frac{1}{2}(8.0N)(1.0m) = -12J$$

58.

$$h = 2 - 2 \cos 25^\circ$$

$$h = 0.187m$$

$$PE_i + KE_i = PE_f + KE_f$$

$$mgh_i + \frac{1}{2}mv_i^2 = mgh_f + \frac{1}{2}mv_f^2$$

$$mgh_i + 0 = 0 + \frac{1}{2}mv_f^2$$

$$gh_i = \frac{1}{2}v_f^2$$

$$v_f = \sqrt{2gh_i} = \sqrt{2\left(9.81\frac{m}{s^2}\right)(0.187m)} = 1.9\frac{m}{s}$$