p. 74

(42) $v_i = 0\ m/s$, $\Delta t = 4.0\ s$, $g = -9.80\ m/s^2$

a) $v_f = v_i + g\Delta t$

$= 0 + (-9.80)(4.0)$

$= -39\ m/s$

b) $\Delta d = v_i \Delta t + \frac{1}{2} g \Delta t^2$

$= 0 + \frac{1}{2}(-9.80)(4.0\ s)^2$

$= 78\ m$

(44) $\Delta d = -3.5\ m$, $v_i = 0\ m/s$, $g = -9.80\ m/s^2$

$v_f^2 = v_i^2 + 2g\Delta d$

$v_f = \sqrt{0 + 2(-9.80)(-3.5)}$

$= 8.3\ m/s$

(45) $v_i = 22.5\ m/s$, $\Delta d = ?$, $v_f = 0\ m/s$, $g = -9.80\ m/s^2$

a) $v_f^2 = v_i^2 + 2g\Delta d$

$\Delta d = \frac{v_f^2 - v_i^2}{2g}$

$= \frac{0 - (22.5)^2}{2(-9.80)}$

$= 25.8\ m$

(46) $\Delta d = .25\ m$, $v_f = 0\ m/s$, $g = -9.80\ m/s^2$

$v_f^2 = v_i^2 + 2g\Delta d$

$v_i^2 = v_f^2 - 2g\Delta d$

a) $v_i = \sqrt{0 - 2(-9.80)(.25)}$

$= 2.2\ m/s$

b) $v_f = v_i + g\Delta t$

$\Delta t = \frac{v_f - v_i}{g}$

$= \frac{0 - 22.5}{-9.80}$

$= 2.30\ s \times 2 = 4.60\ s$

b) $\Delta d = 0$, $v_i = 2.2\ m/s$, $v_f = -2.2\ m/s$

$v_f = v_i + g\Delta t$

$\Delta t = \frac{v_f - v_i}{g}$

$= \frac{-2.2 - 2.2}{-9.80}$

$= .45\ s$

(47) on your own

(48) on your own

(50) $\Delta t = 3.0\ s$, at $1.5\ s$ $v_f = 0\ m/s$, $g = -9.80\ m/s^2$

$v_f = v_i + g\Delta t$

$v_i = v_f - g\Delta t$

$= 0 - (-9.80)(1.5)$

$= 15\ m/s$

p. 81 (75) on your own

(76) on your own

(77) on your own

(78) on your own

(51) $v_i = 15\ m/s$, $v_f = 0\ m/s$, $g = -9.80\ m/s^2$

$\Delta d = \frac{v_f^2 - v_i^2}{2a}$

$= \frac{0 - 15^2}{2(-9.80)} = 12\ m$

p. 82 (96) on your own

(97) $\Delta d = -1.2\ m$, $v_i = 0\ m/s$, $g_m = -1.62\ m/s^2$

$\Delta d = v_i \Delta t + \frac{1}{2} g \Delta t^2$

$\Delta d = \frac{1}{2} g \Delta t^2$

$\Delta t^2 = \frac{2\Delta d}{g}$

$\Delta t = \sqrt{\frac{2\Delta d}{g}} = \sqrt{\frac{2(-1.2)}{(-1.62)}} = 1.2\ s$

(100) $v_i = -2.0\ m/s$, $v_f = ?$, $g = -9.80\ m/s^2$, $\Delta d = -2.5\ m$

$v_f^2 = v_i^2 + 2g\Delta d$

$v_f = \sqrt{-2.0^2 + 2(-9.80)(-2.5)}$

$= 7.3\ m/s$

(101) $v_i = 2.0\ m/s$

$v_f = ?$

$g = -9.80\ m/s^2$

$\Delta d = -2.5\ m$

$v_f^2 = v_i^2 + 2g\Delta d$

$v_f = \sqrt{2.0^2 + 2(-9.80)(-2.5)}$

$= 7.3\ m/s$

(102) $\Delta t = 1.1\ s$

$v_f = 0\ m/s$

$g = -9.80\ m/s^2$

b) $v_f = v_i + g\Delta t$

$v_i = v_f - g\Delta t$

$= 0 - (-9.80)(1.1)$

$= 11\ m/s$

a) $\Delta d = v_i \Delta t + \frac{1}{2} g \Delta t^2$

$\Delta d = (11)(1.1) + \frac{1}{2}(-9.80)(1.1)^2$

$= 12 + (-5.9)$

$= 6.1\ m$

(110) $v_i = 0\ m/s$

$v_f = 444\ m/s$

$\Delta t = 1.80\ s$

a) $v_f = v_i + \bar{a}\Delta t$

$\bar{a} = \frac{v_f - v_i}{\Delta t}$

$= \frac{444 - 0}{1.80}$

$= 247\ m/s^2 \times \frac{1\ g}{9.80\ m/s^2} = 25.2\ g$

b) $v_i = 444\ m/s$

$v_f = 0\ m/s$

$\Delta t = 2.15\ s$

$v_f = v_i + \bar{a}\Delta t$

$\bar{a} = \frac{v_f - v_i}{\Delta t}$

$= \frac{0 - 444}{2.15}$

$= -207\ m/s^2 \times \frac{1\ g}{9.80\ m/s^2} = 21.1\ g$

(114) on your own

(115) $v_i = 5.0\ m/s$

$\Delta t = 2.0\ s$

$g = -9.80\ m/s^2$

$v_f = v_i + g\Delta t$

a) $= 5.0 + (-9.80)(2.0)$

$= -15\ m/s$

b) $v_i = 5.0\ m/s$

$\Delta t = 2.0\ s$

$g = -9.80\ m/s^2$

$\Delta d = v_i \Delta t + \frac{1}{2} g \Delta t^2$

$= (5.0)(2.0) + \frac{1}{2}(-9.80)(2.0)^2$

$= 10 + (-20)$

$= 10.\ m$

c) $v_i = 5.0\ m/s$

$\Delta t = 2.0\ s$

$\Delta d = v_i \Delta t$

$= (5.0)(2.0)$

$= 10\ m$

↑ helicopter continued rising

so after 2.0s the bag is 20m below the helicopter