

$$1) s = t^2 - 4t + 3$$

$$v = 2t - 4$$

$$a = 2$$

$$2) s = 2t^3 - 5t^2 + 4t - 3$$

$$v = 6t^2 - 10t + 4$$

$$a = 12t - 10$$

$$3) s = 3 + 4t - t^2$$

$$v = 4 - 2t$$

$$a = -2$$

$$4) s = (2t + 3)^2$$

$$v = 2(2t + 3) \cdot 2 = 4(2t + 3)$$

$$a = 8$$

$$5) s = gt^2 + v_0 t + s_0$$

$$v = 2gt + v_0$$

$$a = 2g$$

$$6) s = 160t - 16t^2$$

$$a) v = 160 - 32t = 0$$

$$t = 5$$

$\begin{array}{c} \text{v} \\ | \quad + \quad - \\ 0 \quad 5 \end{array} \rightarrow \text{max}$

$$s(5) = 160(5) - 16(25)$$

$$= 400 \text{ ft}$$

At $t = 5$, the object reaches a max height of 400 ft.

$$7) a(t) = \frac{3}{t^2} = 3t^{-2}$$

At $t = 1$,

$$x(1) = 6 \quad ; \quad v(1) = 2$$

$$a) v(t) = -3t^{-1} + C$$

$$2 = -3 + C$$

$$5 = C$$

$$v(t) = -3t^{-1} + 5$$

$$b) 160t - 16t^2 = 256 \text{ Find } t \text{ when } s = 256$$

$$16t^2 - 160t + 256 = 0$$

$$16(t^2 - 10t + 16) = 0$$

$$(t - 8)(t - 2) = 0$$

$$t = 8 \quad t = 2$$

$$v(2) = 96 \text{ ft/sec} \leftarrow \text{traveling up}$$

$$v(8) = -96 \text{ ft/sec} \leftarrow \text{traveling down}$$

$$b) x(t) = -3 \ln t + 5t + C$$

$$6 = -3 \ln 1 + 5 + C$$

$$6 = 5 + C$$

$$1 = C$$

$$x(t) = -3 \ln t + 5t + 1$$

$$c) x(e) = -3 \ln e + 5e + 1$$

$$x(e) = -3 + 5e + 1$$

$$= 5e - 2$$