

$$\boxed{2/42} \quad (a) \quad g_0 = 32.2 \text{ ft/sec}^2 = \text{constant}$$

$$v^2 = v_0^2 + 2a(s - s_0) : v^2 = 0^2 + 2(32.2)(500 \cdot 5280)$$

$$v = \underline{13,040 \text{ ft/sec}}$$

$$(b) \quad a = -g_0 \frac{R^2}{r^2} = v \frac{dv}{dr}$$

$$-g_0 R^2 \int_{R+h}^R \frac{dr}{r^2} = \int_{v_0=0}^v v dv$$

$$-g_0 R^2 \left(-\frac{1}{r} \right) \Big|_{R+h}^R = \frac{1}{2} v^2 \Big|_0^v$$

$$\Rightarrow v = \sqrt{\frac{2g_0 R h}{R+h}} = \sqrt{\frac{2(32.2)(3959)(500)(5280)^2}{(3959+500)(5280)}}$$

$$= \underline{12,290 \text{ ft/sec}}$$