(a) $V = \ell wh$, so by the Chain Rule,

$$\frac{dV}{dt} = \frac{\partial V}{\partial \ell}\frac{d\ell}{dt} + \frac{\partial V}{\partial w}\frac{dw}{dt} + \frac{\partial V}{\partial h}\frac{dh}{dt} = wh\frac{d\ell}{dt} + \ell h\frac{dw}{dt} + \ell w\frac{dh}{dt}$$
$$= 8 \cdot 8 \cdot 6 + 2 \cdot 8 \cdot 6 + 2 \cdot 8 \cdot (-5) = 400 \ \text{m}^3/\text{ s.}$$

(b) $S = 2(\ell w + \ell h + wh)$, so by the Chain Rule,

$$\frac{dS}{dt} = \frac{\partial S}{\partial \ell}\frac{d\ell}{dt} + \frac{\partial S}{\partial w}\frac{dw}{dt} + \frac{\partial S}{\partial h}\frac{dh}{dt} = 2(w+h)\frac{d\ell}{dt} + 2(\ell+h)\frac{dw}{dt} + 2(\ell+w)\frac{dh}{dt}$$
$$= 2(8+8)6 + 2(2+8)6 + 2(2+8)(-5) = 212 \ \text{m}^2/\text{s}$$

(c) $L^2 = \ell^2 + w^2 + h^2 \quad \Rightarrow$

$$2L\frac{dL}{dt} = 2\ell\frac{d\ell}{dt} + 2w\frac{dw}{dt} + 2h\frac{dh}{dt} = 2(2)(6) + 2(8)(6) + 2(8)(-5) = 40 \quad \Rightarrow$$

$$dL/dt = \frac{40}{2\sqrt{132}} \approx 1.74 \ \text{m/ s.}$$