a) $L' = \frac{1}{2}\rho V_\infty^2 c\, c_\ell \qquad D' = \frac{1}{2}\rho V_\infty^2 c\, c_d$

$$L = \int_{-b/2}^{b/2} L'\,dy = \int_{-b/2}^{b/2} \underbrace{\tfrac{1}{2}\rho V_\infty^2 c\, c_\ell}_{\text{all constant}}\, dy = \tfrac{1}{2}\rho V_\infty^2 c\, c_\ell \cdot b = \tfrac{1}{2}\rho V^2 S c_\ell$$

$$C_L \equiv \frac{L}{\frac{1}{2}\rho V_\infty^2 S} = \frac{\frac{1}{2}\rho V_\infty^2 S c_\ell}{\frac{1}{2}\rho V_\infty^2 S} \Rightarrow \boxed{C_L = c_\ell}$$

likewise $\boxed{C_D = c_d}$

b) In level flight, $L = mg$ = constant

$$mg = \tfrac{1}{2}\rho V^2 S C_L$$

$$\rightarrow V(C_L) = \sqrt{\frac{mg}{S}\frac{2}{\rho C_L}} = \left(\frac{mg}{S}\frac{2}{\rho}\right)^{1/2} \frac{1}{C_L^{1/2}}$$

also $D = \frac{1}{2}\rho V^2 S C_D$

$$P = DV = \tfrac{1}{2}\rho V^3 S C_D = \tfrac{1}{2}\rho V^3 S\left[0.01 + 0.015\, C_L^3\right]$$

$$P(C_L) = \frac{1}{2}\rho S\left(\frac{mg}{S}\frac{2}{\rho}\right)^{3/2} \times \left[0.01 \frac{1}{C_L^{3/2}} + 0.015\, C_L^{3/2}\right]$$

Ignoring constants: $\bar{V}(C_L) = \dfrac{1}{C_L^{1/2}}$, $\bar{P}(C_L) = \dfrac{0.01}{C_L^{3/2}} + 0.015\, C_L^{3/2}$

Can plot $\bar{P}(C_L)$ verses $\bar{V}(C_L)$ with $C_L = 0.1 \ldots 1.2$

Or note that $\bar{P}(\bar{V}) = 0.01\,\bar{V}^3 + \dfrac{0.015}{\bar{V}^3}$, plot $\bar{P}(\bar{V})$