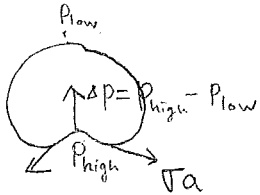
5. In order not to be breakable, the surface tension of a drop should be greater than the pressure difference between top and bottom of the drop.

It implies that $\sigma a \sim \Delta p a^2$.



4/4

And Δp is equal to $\rho_{air} v^2$.

$\therefore \sigma a \sim \rho_{air} v^2 a^2 \quad \therefore \rho_{air} v^2 \sim \frac{\sigma}{a}$

At the terminal velocity, drag force is equal to gravity

$\therefore D = \rho_{air} v^2 a^2 \sim mg \sim \rho_w a^3 g$

$\therefore \frac{\sigma}{a} \cdot a^2 = \sigma a \sim \rho_w a^3 g \quad \therefore a \sim \sqrt{\frac{\sigma}{\rho_w g}}$