Lecture F07 Mud: Elliptical Lift Distribution

1. **How do you solve for $\Gamma(y)$?** (1 student)
   We will look at that in the next few lectures.

2. **Is there an intuitive way to tell if downwash will be constant?** (1 student)
   Downwash is uniform only if $\Gamma(y)$ is elliptical. Any other $\Gamma(y)$ will give a nonuniform downwash.

3. **Why did you integrate $\int_\pi^0$ instead of $\int_0^\pi$?** (1 student)
   The starting point was the integral $\int_{-b/2}^{b/2}$. In the trig substitution $y \to \theta$, we have $-b/2 \to \pi$ and $b/2 \to 0$. Hence the integral becomes $\int_\pi^0$. I then switched the limits by changing sign.
   $$\int_\pi^0 \;=\; -\int_0^\pi$$

4. **How is $AR = S/b^2$?** (1 student)
   Aspect ratio is actually <u>defined</u> by $AR = b^2/S$. I might have written it flipped over, don't remember.

5. **What exactly is the profile drag coefficient?** (1 student)
   This is the drag caused by the action of viscosity, and is associated with viscous wall shear stress and boundary layers. Profile drag is all there is in steady 2-D flows. In 3-D flows, an induced drag appears which simply adds to the profile drag.

6. **No mud** (12 students)