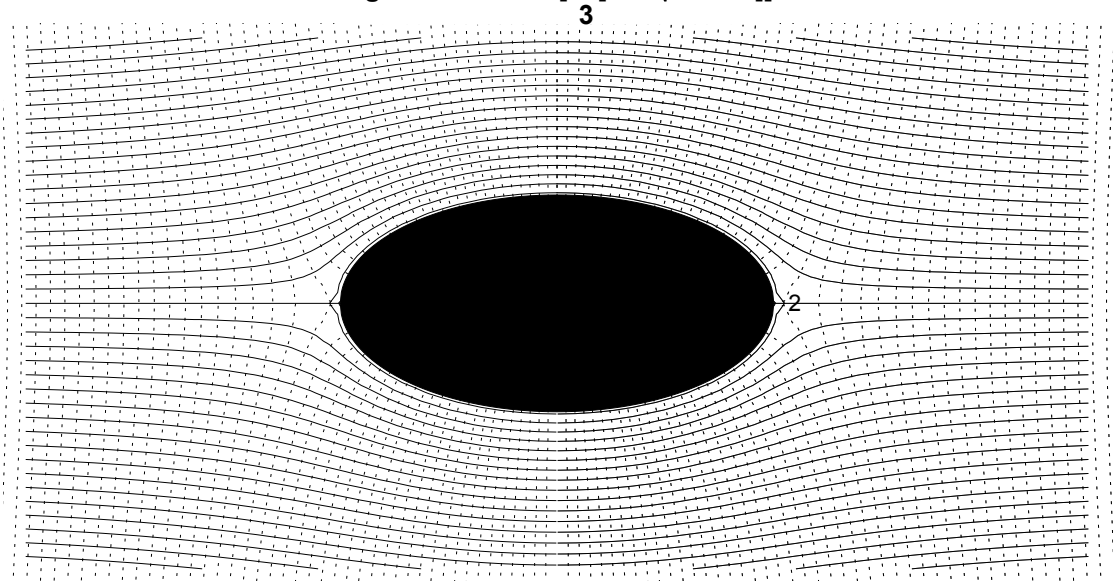
Notes on Chapter 12, Section V, Flow Around an Obstacle, Ellipse
April 19, 2019, 1:40 pm PST

Figure 12. $\Omega = \mathrm{Im}\left[\frac{4}{3}\left[2z - \sqrt{z^2 - 3}\right]\right]$



P. 538 Schwarzian reflection of uniform rightward flow on eclipse. Compare [22].

$$\Omega_u(z) = z$$

$$\mathcal{R}_K(z) = \frac{1}{3}\left[5\,\bar{z} - 4\sqrt{\bar{z}^2 - 3}\right] \quad (* \text{ reflection in ellipse } *)$$

$$\Omega_u^{\ddagger}(z) = \overline{\Omega_u(\mathcal{R}_K(z))} = \frac{1}{3}\left[5\,z - 4\sqrt{z^2 - 3}\right] \quad (* \text{ continuation across real line } *)$$

$$\Omega_d(z) = \Omega_u(z) + \Omega_u^{\ddagger}(z) = z + \frac{1}{3}\left[5\,z - 4\sqrt{z^2 - 3}\right] \quad (* \text{ disturbed flow } *)$$

$$= \frac{4}{3}\left[2\,z - \sqrt{z^2 - 3}\right]$$

To program the plot of the streamlines,
let $\psi = \mathrm{Im}[\Omega]$. ContourPlot would not extend the uniform flow across the y axis,
so that part had to be separately programmed.