An inviscid, incompressible fluid flows steadily through a circular pipe with a contraction. At the entrance section, the velocity is purely in the axial direction and is given by:

\[ u_1(r) = V_o \left( 1 - \left( \frac{r}{R_1} \right)^2 \right) \]

(a) What does the vorticity field look like at the entrance section?

(b) What is the velocity profile at the exit?