75. The beaker is indicated by the subscript b. The volume of the glass of which the beaker walls and base are made is $V_b = m_b/\rho_b$. We consider the case where the beaker is slightly more than half full (which, for calculation purposes, will be simply set equal to half-volume) and thus remains on the bottom of the sink – as the water around it reaches its rim. At this point, the force of buoyancy exerted on it is given by $F = (V_b+V)\rho_w g$, where V is the interior volume of the beaker. Thus $F = (V_b+V)\rho_w g = \rho_w g(V/2)+m_b$, which we solve for ρ_b:

$$\rho_b = \frac{2m_b\rho_w}{2m_b - \rho_w V} = \frac{2(390\,\text{g})(1.00\,\text{g/cm}^3)}{2(390\,\text{g}) - \left(1.00\,\text{g/cm}^3\right)(500\,\text{cm}^3)} = 2.79\ \text{g/cm}^3\ .$$