MECH105: Homework 11

An estimate of the minimum velocity required for a round flat stone to skip when it hits the water is given by:

$$V = \frac{\sqrt{\frac{16Mg}{\pi C \rho_w d^2}}}{\sqrt{1 - \frac{8M tan^2\beta}{\pi d^3 C \rho_w sin\theta}}}$$

(Source: Lyderic Bocquet, "The Physics of Stone Skipping" American Journal of Physics, vol. 71, no. 2, February 2003)

where M and d are the stone mass and diameter, ρ_w is the water density, C is a coefficient, θ is the tilt angle of the stone, β is the incidence angle, and $g = 9.81 m/s^2$.

Determine d if $V = 0.8 m/s$. Assume that $M = 0.1 kg$, $C = 1$, $\rho_w = 1000 kg/m^3$, and $\beta = \theta = 10°$