8. We apply the law of refraction, assuming all angles are in radians:

$$\frac{\sin\theta}{\sin\theta'} = \frac{n_w}{n_{\rm air}} ,$$

which in our case reduces to $\theta' \approx \theta/n_w$ (since both θ and θ' are small, and $n_{\rm air} \approx 1$). We refer to our figure, below. The object O is a vertical distance h_1 above the water, and the water surface is a vertical distance h_2 above the mirror. We are looking for a distance d (treated as a positive number) below the mirror where the image I of the object is formed. In the triangle OAB

$$|AB| = h_1 \tan\theta \approx h_1\theta ,$$

and in the triangle CBD

$$|BC| = 2h_2 \tan\theta' \approx 2h_2\theta' \approx \frac{2h_2\theta}{n_w} .$$

Finally, in the triangle ACI, we have $|AI| = d + h_2$. Therefore,

$$\begin{aligned} d &= |AI| - h_2 = \frac{|AC|}{\tan\theta} - h_2 \\ &\approx \frac{|AB| + |BC|}{\theta} - h_2 \\ &= \left(\frac{h_1}{\theta} + \frac{2h_2\theta}{n_w}\right)\frac{1}{\theta} - h_2 = h_1 + \frac{2h_2}{n_w} - h_2 \\ &= 250\,\text{cm} + \frac{2(200\,\text{cm})}{1.33} - 200\,\text{cm} = 351\ \text{cm} . \end{aligned}$$