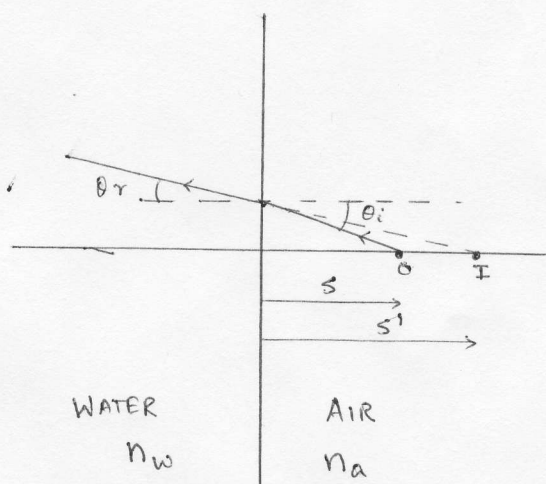


NAME:

Quiz #3b:
Phys270SOLUTION

Section 0104

1. [10 pts] A fish in a flat-sided aquarium sees a can of fish food on the counter. To the fish's eye, the can looks to be 40 cm outside the aquarium. What is the actual distance between the can and the aquarium. Ignore the thin glass wall of the aquarium, and note that the index of refraction of water is $4/3$. Show your work.



O = Object

I = Image

$$s' = 40 \text{ cm}$$

we have for small values of θ

$$\tan \theta_i = \sin \theta_i$$

$$\tan \theta_r = \sin \theta_r$$

$$\frac{s'}{s} = \frac{\tan \theta_i}{\tan \theta_r} = \frac{\sin \theta_i}{\sin \theta_r} = \frac{n_w}{n_a} = \frac{4}{3}$$

$$\text{then } s = \frac{3}{4} s' = \frac{3}{4} (40 \text{ cm}) = 30 \text{ cm}.$$