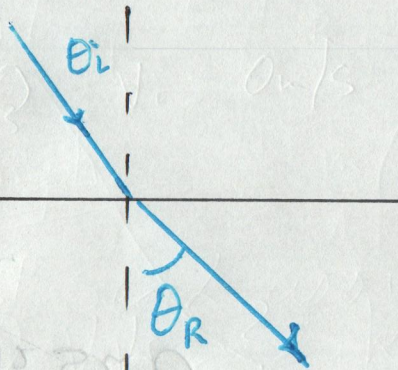


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2.

Glass  
 $n_1 = 1.50$

Water  
 $n_2 = 1.33$



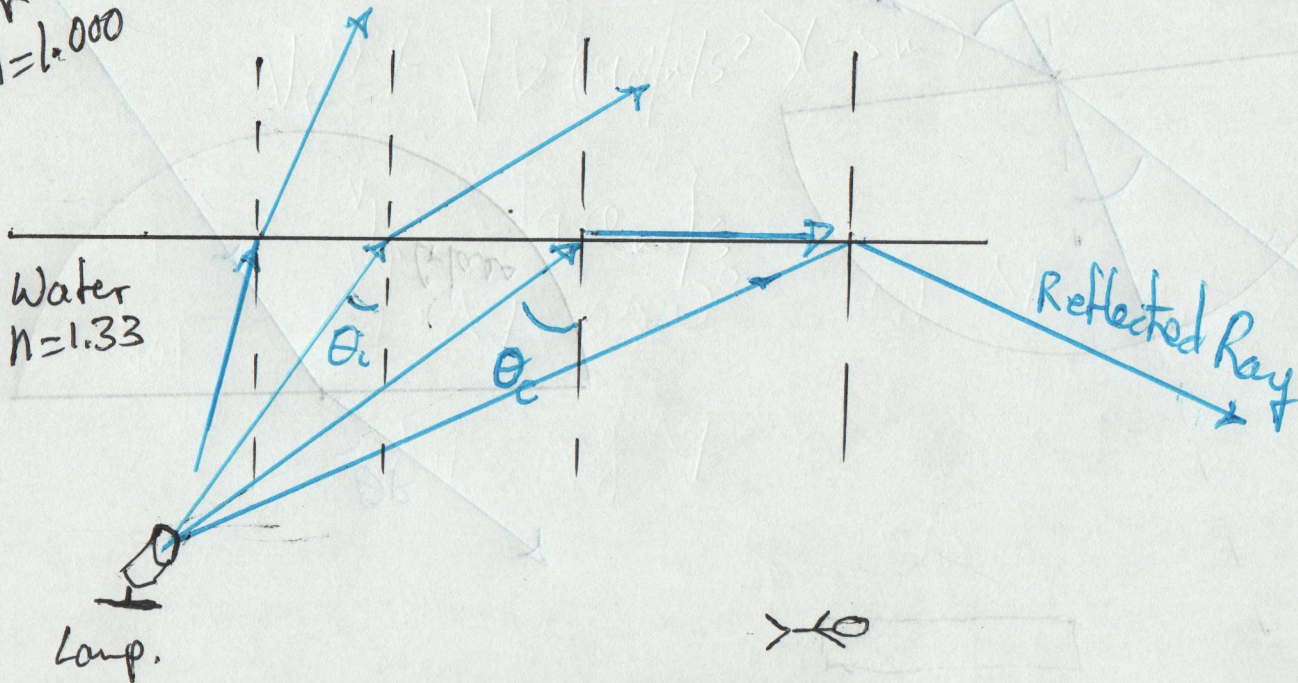
The ray bends away from the normal.

$$\theta_R > \theta_i$$

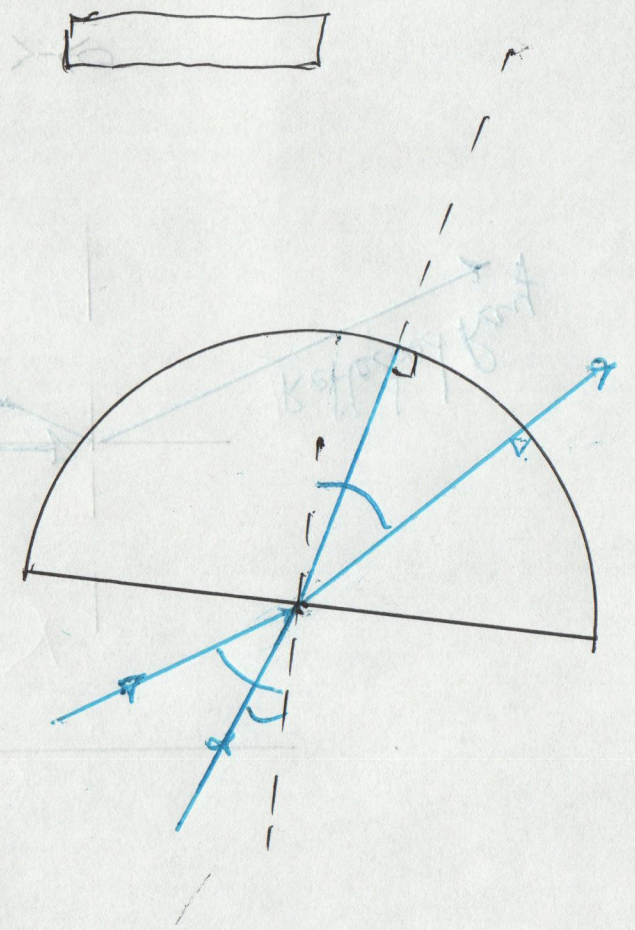
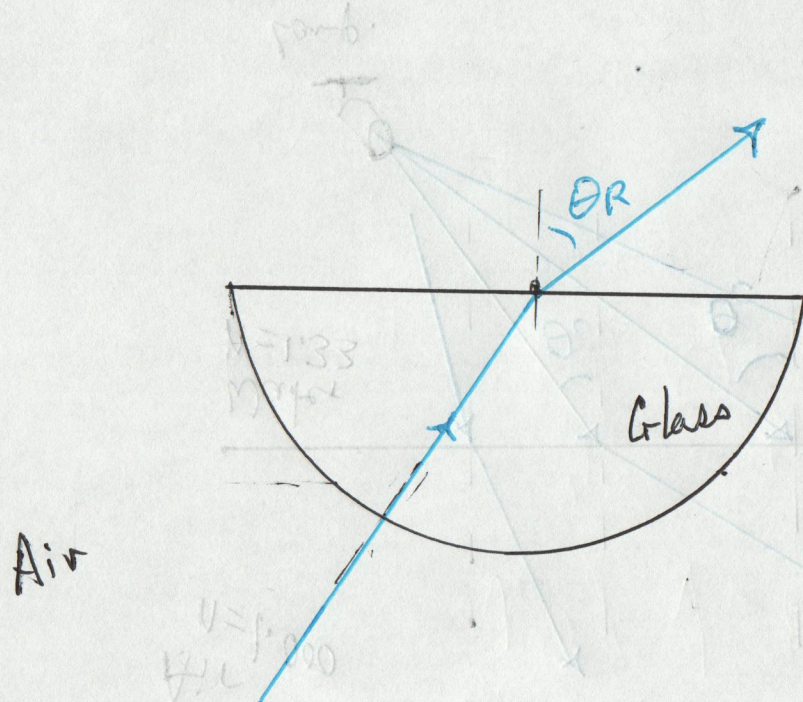
3. Skip

Air  
 $n = 1.000$

Water  
 $n = 1.33$







$\theta_i = 0^\circ$   
 $\theta_r = 0^\circ$

$n_1 \sin \theta_1 = n_2 \sin \theta_2$   
 $n_1 \sin 0^\circ = n_2 \sin 0^\circ$   
Go through.

$\theta_r > \theta_i$

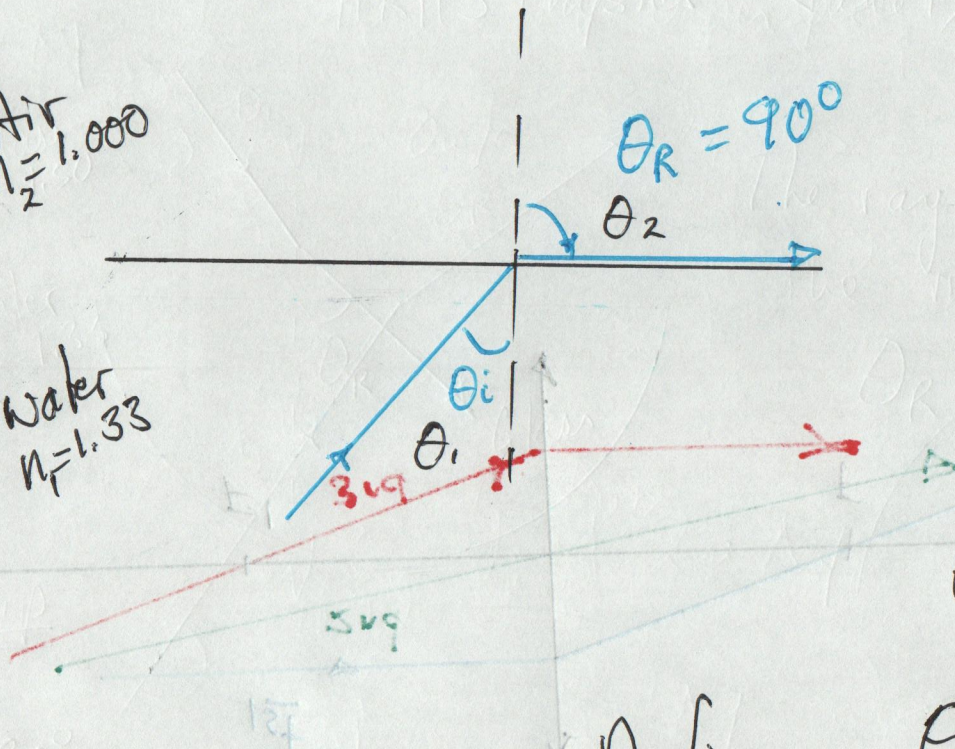
for total internal reflection  
 the ray must be incident from



Ch. 3.5

Air  
 $n_2 = 1.000$

Water  
 $n_1 = 1.33$



$$n_1 \sin \theta_i = n_2 \sin \theta_2 \quad (3)$$

$$n_1 \sin \theta_i = n_2 \sin 90^\circ$$

$$\sin \theta_i = \frac{n_2}{n_1}$$

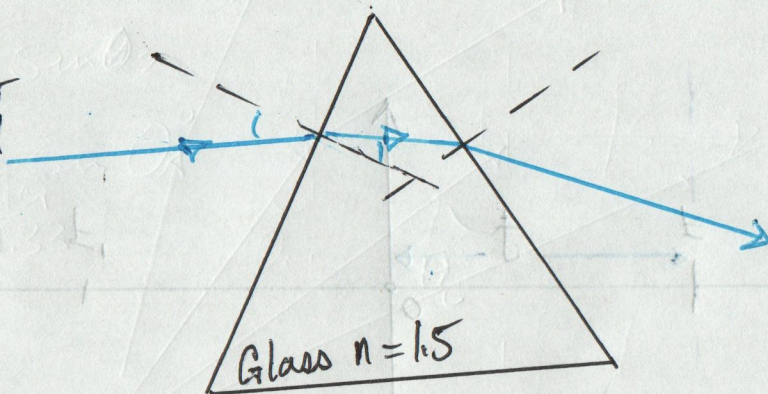
$$\theta_i = \arcsin\left(\frac{n_2}{n_1}\right)$$

Define  $\theta_c = \sin^{-1}\left(\frac{n_2}{n_1}\right)$

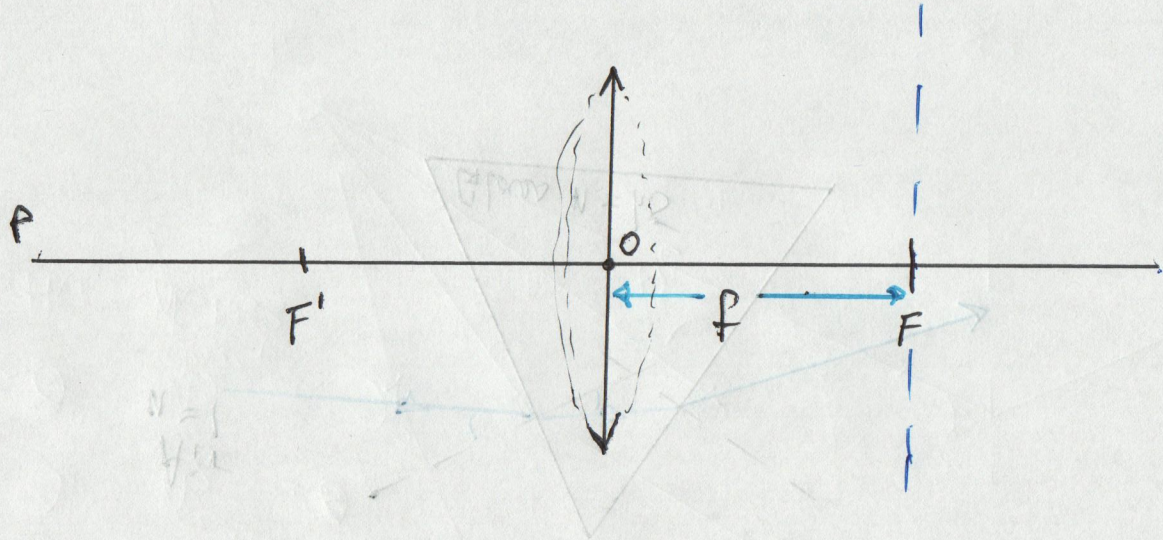
Ch. 4.2

Air  
 $n = 1$

Glass  $n = 1.5$

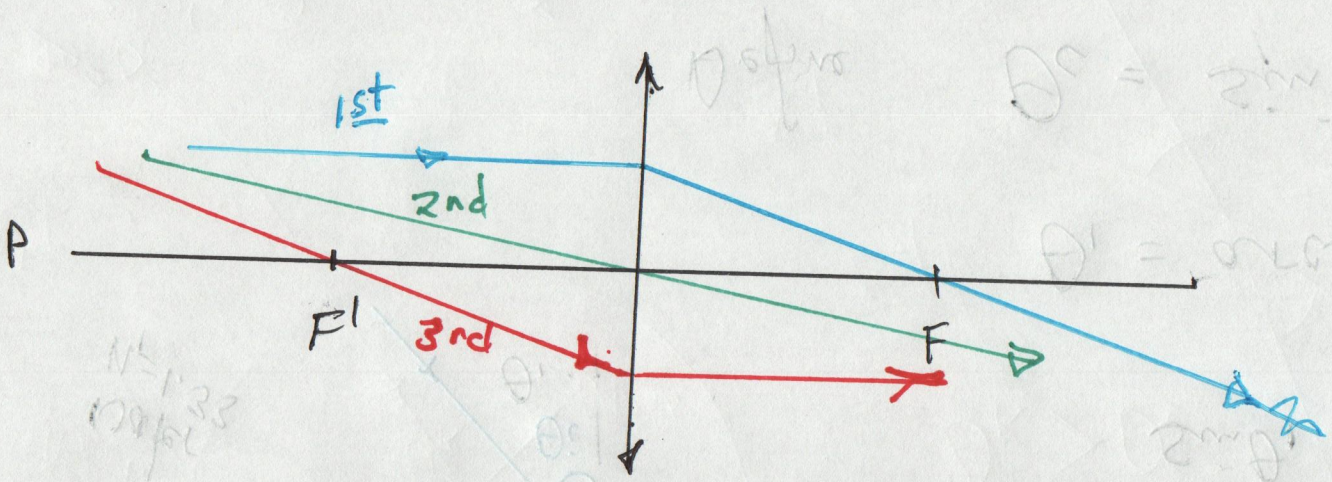






G.M.D.S

$n = 1.5$



$n = 1.33$

$n = 1.5$

$$\theta = \sin^{-1} \left( \frac{n_1}{n_2} \right)$$

$$\theta' = \sin^{-1} \left( \frac{n_1}{n_2} \right)$$

$$\theta = \frac{n_1}{n_2}$$

$$n_1 \sin \theta = n_2 \sin \theta'$$

$$n_1 \sin \theta = n_2 \sin \theta'$$