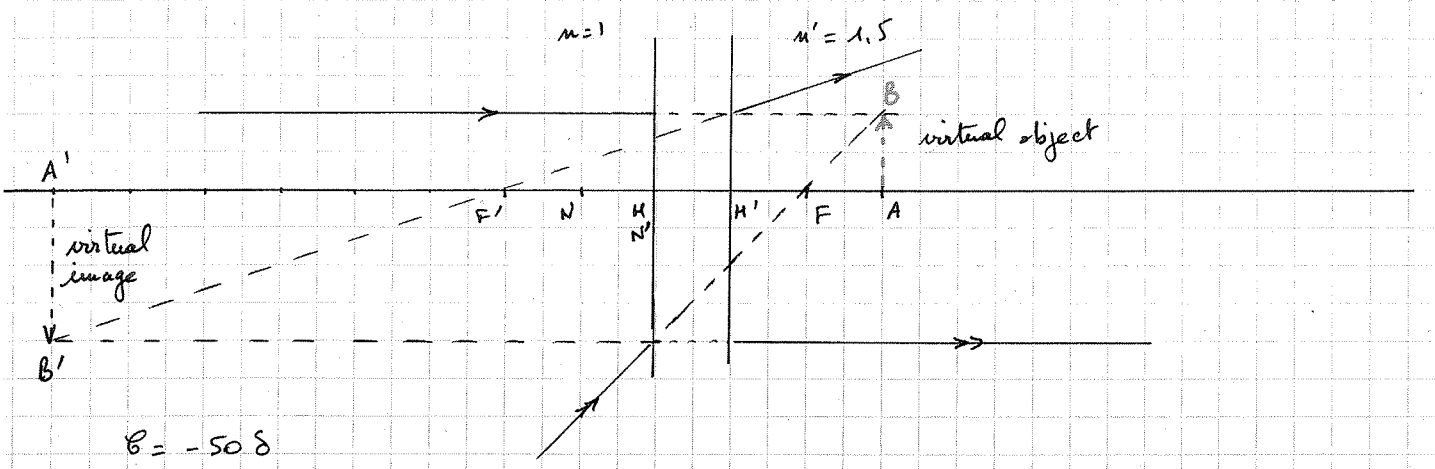
Exercise 2 - Homework n°3



$\mathcal{C} = -50\,\delta$

Positions of F and F' ?

$\mathcal{C} = -\frac{n}{f} = \frac{n'}{f'}$ $\Rightarrow$ $f = \overline{HF} = +20\text{ mm}$

$f' = \overline{H'F'} = -30\text{ mm}$

Positions of N and N' ?

$\overline{FN} = f'$ $\Rightarrow$ $\overline{FN} = -30\text{ mm}$

$\overline{F'N'} = f$ $\Rightarrow$ $\overline{F'N'} = +20\text{ mm}$ $\Rightarrow$ $N' = H$

Position of A' for $\overline{FA} = 10\text{ mm}$

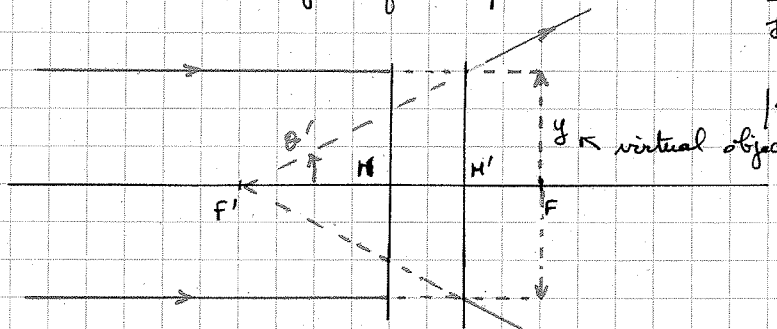
$\overline{F'A'} \times \overline{FA} = ff'$ $\Rightarrow$ $\overline{F'A'} = \frac{20 \times (-30)}{10} = \underline{-60\text{ mm}}$

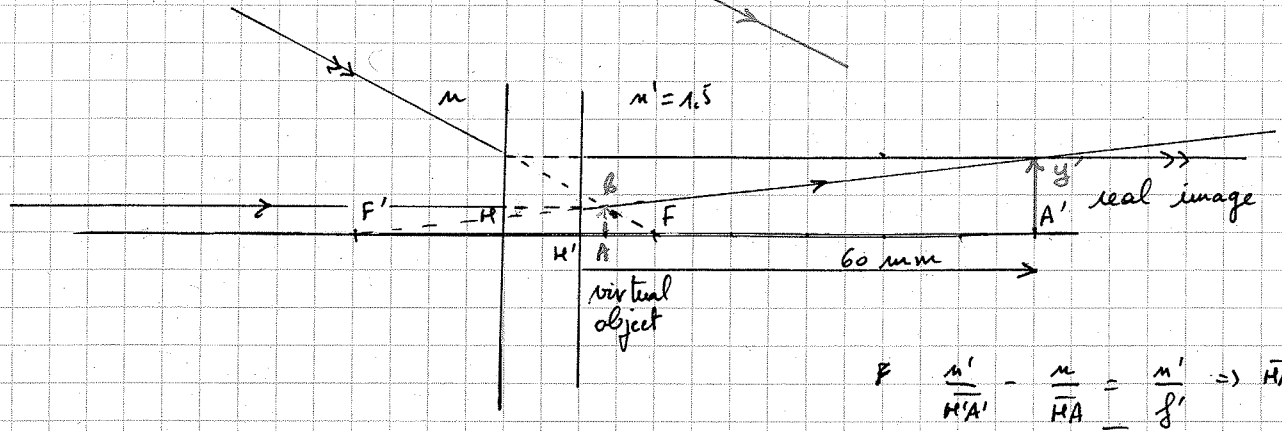
$(\gamma_\gamma)_{A\to A'} = \frac{n}{n'}\frac{\overline{H'A'}}{\overline{HA}} = \frac{1}{1,5}\cdot\frac{-30}{30} = \underline{-2}$

Cross-check using Newton's formula: $(\gamma_\gamma)_{A\to A'} = -\frac{f}{\overline{FA}} = \underline{-2}$

Image of a disc in the object focal plane : $\theta' = -\frac{y}{f'} = 30°$.

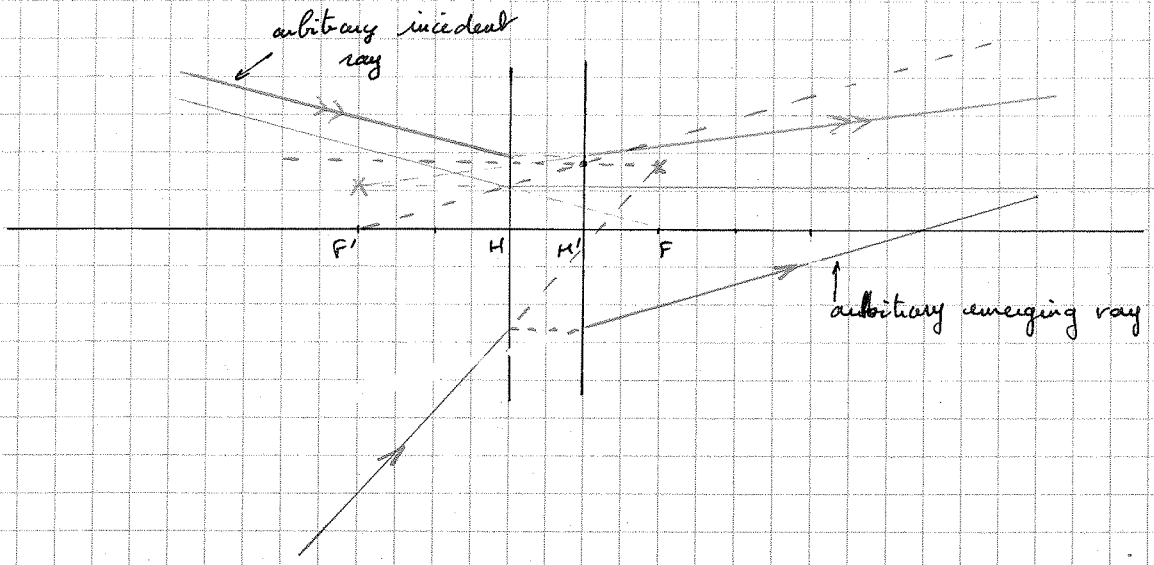
$|2\theta'| = 2 \times 30°$.





$\Leftrightarrow$ $\frac{n'}{\overline{H'A'}} - \frac{n}{\overline{HA}} = \frac{n'}{f'}$ $\Rightarrow$ $\overline{HA} = 13,3\text{ mm}$

$(\gamma_\gamma) = \frac{n}{n'}\frac{\overline{H'A'}}{\overline{HA}} = +3$.


arbitrary incident ray
F'
H
H'
F
arbitrary emerging ray