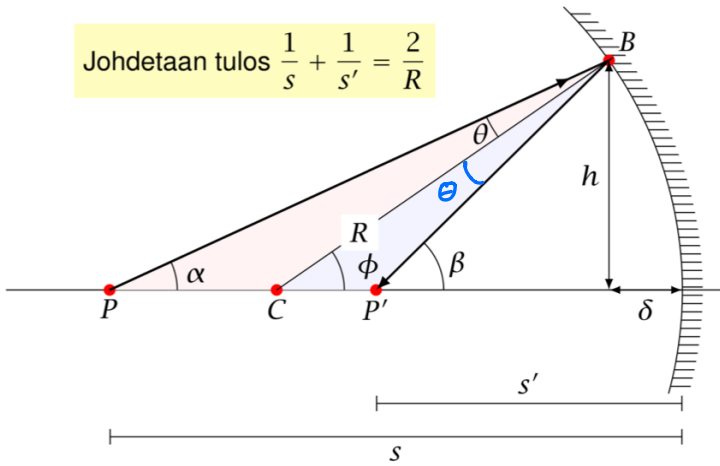


Johdetaan tulos $\frac{1}{s} + \frac{1}{s'} = \frac{2}{R}$



[kalvo 12]

$$\alpha + \theta + \pi - \phi = \pi$$

$$\Rightarrow \alpha = \phi - \theta$$

$$\phi + \theta + \pi - \beta = \pi$$

$$\Rightarrow \beta = \phi + \theta$$

$$\boxed{\alpha + \beta = 2\phi}$$

d pieni $\Rightarrow \tan d \approx d$

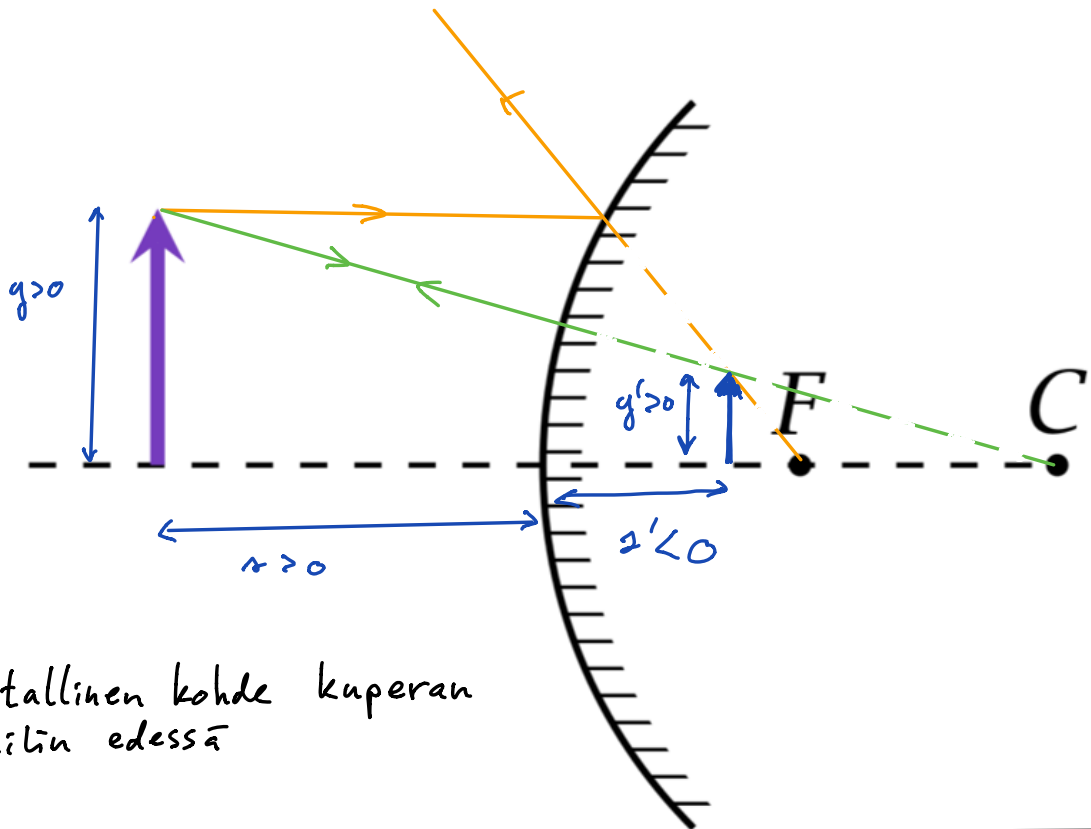
$\Rightarrow \delta \ll s, s'$

$$d \approx \tan d = \frac{h}{s - \delta} \approx \frac{h}{s}$$

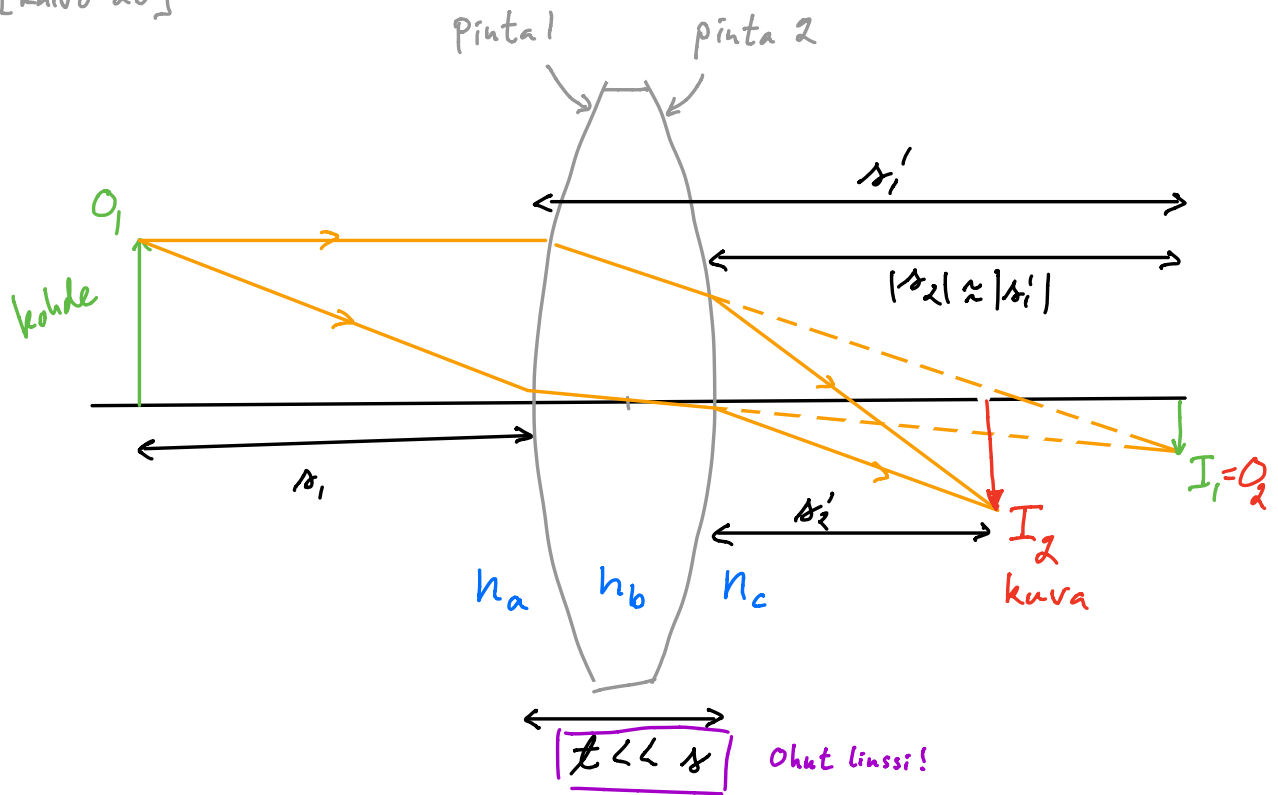
$$\beta \approx \tan \beta = \frac{h}{s' - \delta} \approx \frac{h}{s'}$$

$$\phi \approx \tan \phi = \frac{h}{R - \delta} \approx \frac{h}{R}$$

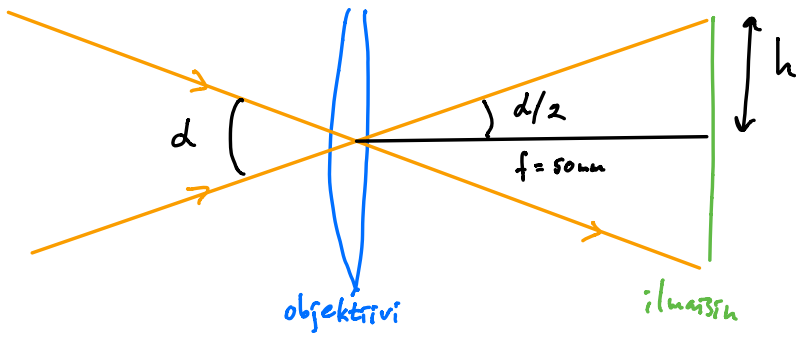
$$\boxed{\frac{1}{s} + \frac{1}{s'} = \frac{2}{R}}$$



[kalvo 20]



[kelvo 26]



$$\tan \frac{d}{2} = \frac{h}{f}$$

$$d = 2 \arctan \frac{h}{f}$$

$$\approx \begin{cases} 27^\circ, & h = 12\text{mm} \\ 40^\circ, & h = 18\text{mm} \end{cases}$$