8.1

$\Delta d = 0,114\,cm$

$\Delta m = 523$

~~[illegible]~~

$$\Delta m = \frac{2\Delta d}{\lambda} \Leftrightarrow \lambda = \frac{2\Delta d}{\Delta m} = \boxed{435,9\,nm}$$

8.3

$35\lambda = 2d$

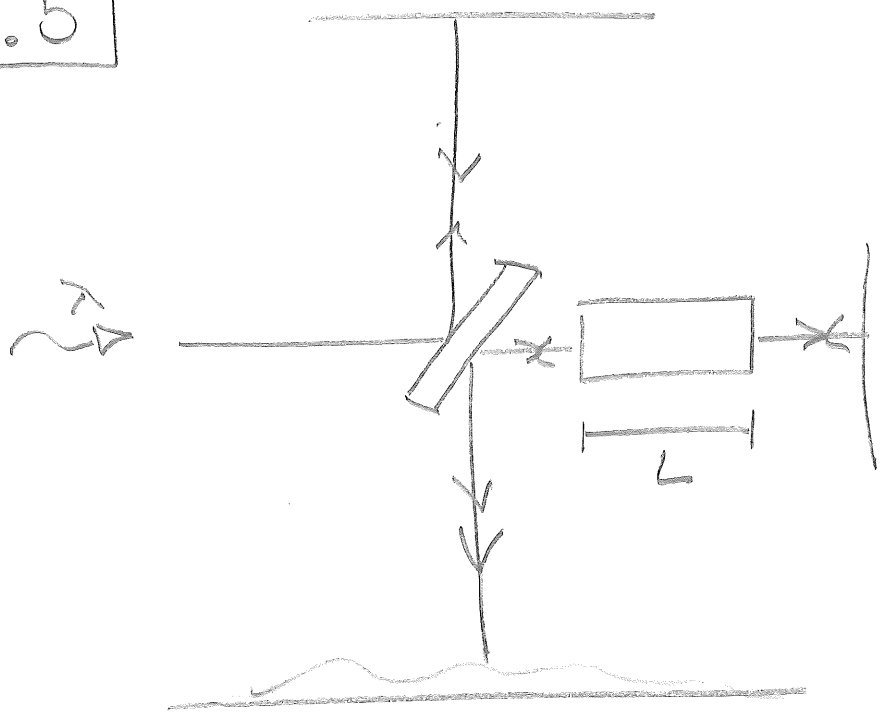
~~$d = \frac{35\lambda}{2n} = \frac{35 \cdot 589\,nm}{2 \cdot 1,464}$~~

$d = n \cdot d - d = d(n-1)$

$$\lambda = \frac{2d(n-1)}{35}$$

$$d = \frac{35\lambda}{2(n-1)} = \boxed{23,75\,\mu m}$$

8.5



a) $N\lambda = 2L(n-1)$

$N\lambda = 2Ln - 2L$

$$n = \frac{N\lambda + 2L}{2L} = \frac{N\lambda}{2L} + 1$$

$$\boxed{n = \frac{N\lambda}{2L} + 1}$$

b) $n = 1,00045$, $\lambda = 589 \cdot 10^{-9} m$, $L = 0,10m$

$$\Rightarrow \boxed{N = 153}$$

8.8

$r = 0,99 \quad \lambda = 656,3\,nm, \quad \Delta\lambda = 1,36\,nm$

a) resoluing power:

$$R = mF = m\frac{\pi r}{1-r^2}$$

8.12

$m = 150$

$$m = \frac{2d}{\lambda} \Leftrightarrow d = \frac{m\lambda}{2}$$

$$m_2 = m_1 + 150$$

$$d = \frac{m_1\lambda_1}{2} \quad , \quad d = \frac{(m_1+150)\lambda_2}{2}$$

$$m_1 = \frac{2d}{\lambda_1} \Rightarrow d = \frac{\left(\frac{2d}{\lambda_1}+150\right)\lambda_2}{2}$$

$$2d - \frac{2d\lambda_2}{\lambda_1} = 150\lambda_2$$

$$d = \frac{150\lambda_2}{2 - \frac{2\lambda_2}{\lambda_1}} = \frac{75\lambda_2}{1 - \frac{\lambda_2}{\lambda_1}} =$$

$$m_1 - m_2 = 150$$

m_1 större → λ_1 mindre

$$2d = m_1\lambda_1 = m_2\lambda_2$$

$$(150 + m_2)\lambda_1 = m_2\lambda_2$$

$$m_2 = \frac{150\lambda_1}{\lambda_2 - \lambda_1} = 592$$

$$d = \frac{m_2\lambda_2}{2} = \boxed{0{,}16\ \text{mm}}$$