

① a) $f = \frac{c}{\lambda} \approx 4.742 \cdot 10^{14} \text{ Hz}$

$E(1 \text{ Photon}) = h \cdot f$

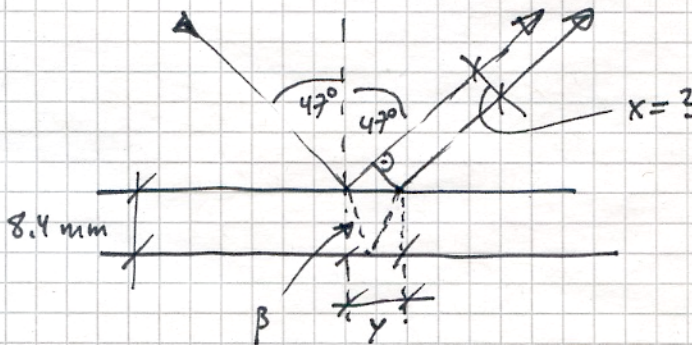
$N(\text{Photon pro sec}) = 0.005 \text{ J} / h \cdot f \approx \underline{\underline{1.591 \cdot 10^{16} \text{ s}^{-1}}}$

b) $\tan d = 1.995 \text{ m} / 3.40 \text{ m} \rightarrow d \approx 30.403^\circ$

$\sin d = \frac{\lambda}{d} \Rightarrow d = \frac{\lambda}{\sin d} \approx 1249.216 \text{ nm}$

Anzahl Linien pro mm = $\frac{1 \text{ mm}}{d} \approx \underline{\underline{800.5 \text{ Linien/mm}}}$

c)



$\frac{\sin 47^\circ}{\sin \beta} = n_{12} \approx 1.457 \Rightarrow \beta \approx 30.130^\circ$

$\frac{y \cdot \frac{1}{2}}{8.4 \text{ mm}} = \tan \beta ; y \cdot \frac{1}{2} = \tan \beta \cdot 8.4 \text{ mm} \approx 4.875 \text{ mm}$

$y \approx 9.750375 \text{ mm}$

$\frac{x}{y} = \cos(47^\circ) ; x = y \cdot \cos(47^\circ) \approx \underline{\underline{6.6497 \text{ mm}}}$