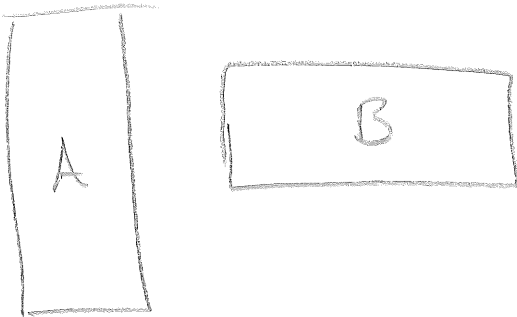


11.1



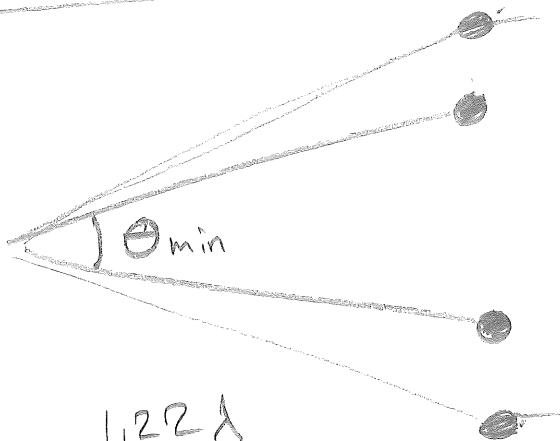
$$b \sin \theta = m \lambda$$

~~sin~~ $\sin \theta$ ökas \Rightarrow b minskas

11.2

Baserna har längre våglängd \Rightarrow θ ökar.

11.3



$$(\Delta \theta)_{\min} = \frac{1,22 \lambda}{D}$$

Vi vill öka $(\Delta \theta)_{\min} \Rightarrow$ Minska $D \Rightarrow$ **Tända!**

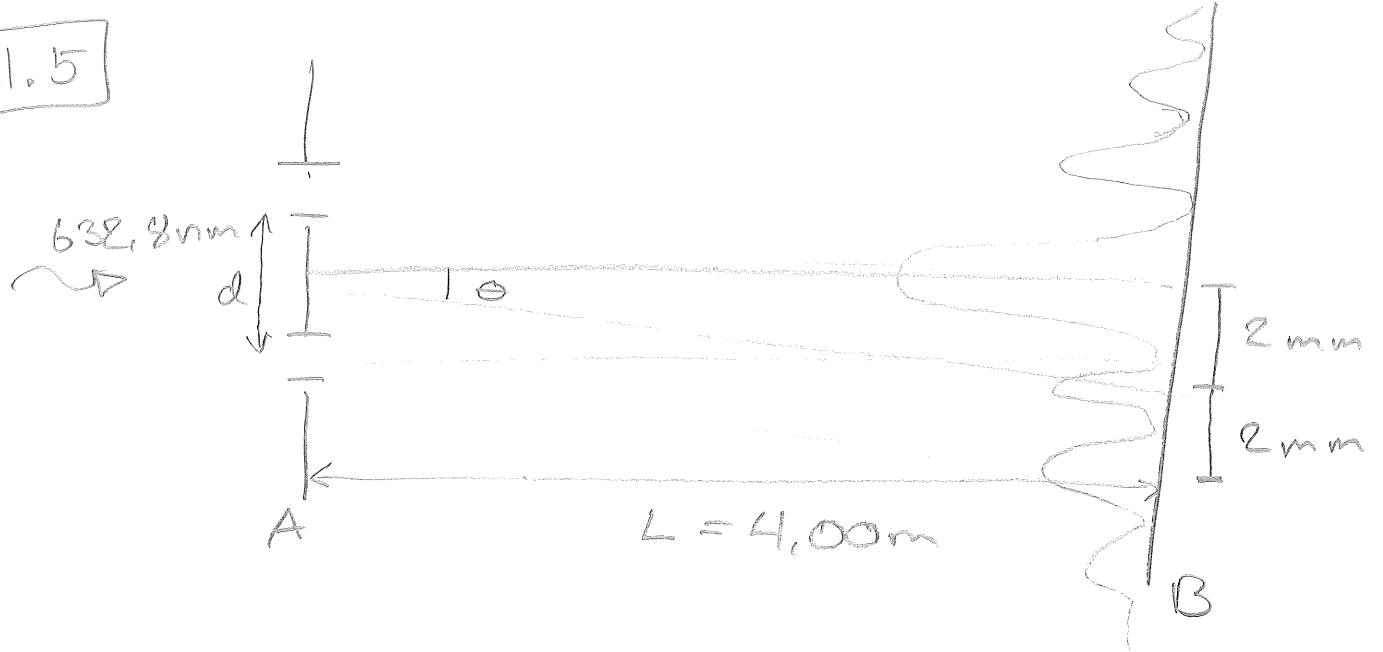
11.4

Inte interferens i

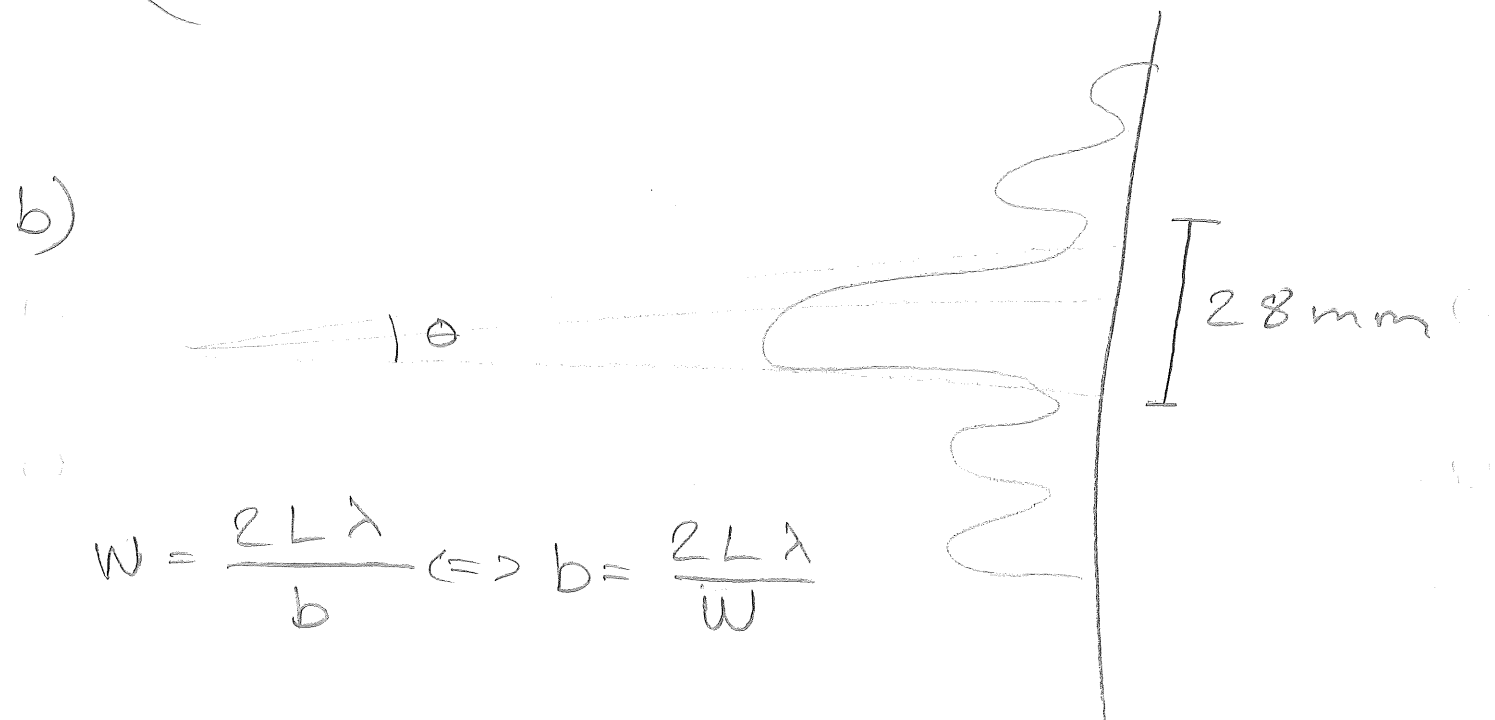
- en spalt.
- spalt för bred.

**Måste vara
Diffraction!**

11.5



a)
$$\begin{cases} \tan \theta = \frac{y}{D} \\ d \sin \theta = m \lambda \end{cases} \Rightarrow d = \frac{D m \lambda}{y} = \boxed{1,3 \text{ mm}}$$



$$W = \frac{2L\lambda}{b} \Leftrightarrow b = \frac{2L\lambda}{W}$$

$$\boxed{b = 0,18 \text{ mm}}$$

11.8

a)



$$b = 38,1 \text{ cm}$$

$$\Delta \theta_{1/2} = \frac{\pi}{2}$$



$$\sin \theta_{1/2} = \frac{1,22 \lambda}{D} = \frac{1,22 v}{D f}$$

$$\Rightarrow f = \frac{1,22 v}{D \cdot \sin \theta_{1/2}} = \frac{1,22 \cdot 340}{38,1 \cdot 10^{-2} \cdot 1} = \boxed{1,09 \text{ kHz}}$$

b)



$$D \sin \theta = m \lambda$$

$$\sin \theta = \left(\frac{m \lambda}{D} \right) \Rightarrow \theta = \arcsin \left(\frac{m \lambda}{D} \right) =$$

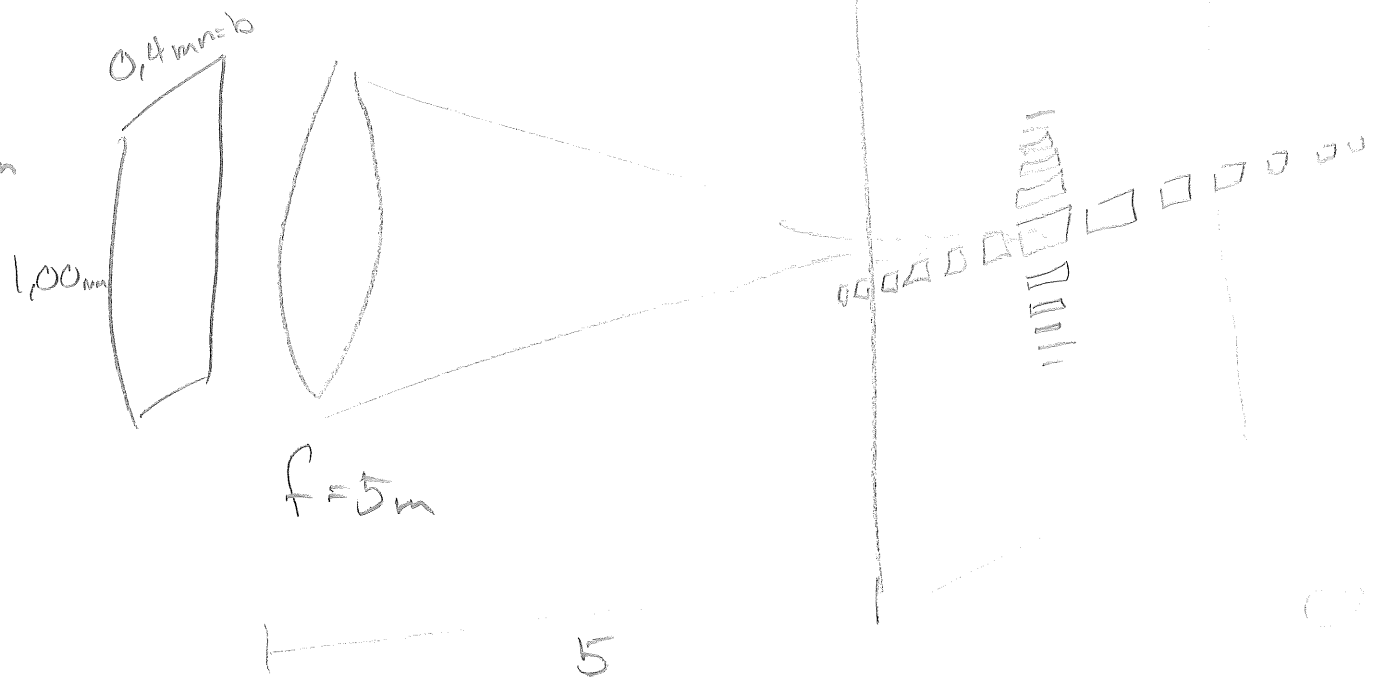
$$\lambda = \frac{v}{f} = \frac{340}{15 \cdot 10^3} =$$

$$m = 1,22 \Rightarrow \theta = 35,2^\circ$$

$$m = 2,23 \Rightarrow \theta = \text{--- ERROR}$$

11.7

$632,8 \text{ nm}$



$$y_m = \frac{m \lambda f}{b} \quad , \quad x_n = \frac{n \lambda f}{a}$$

$y_m = 15,8 \text{ mm}$	$x_n = 6,3 \text{ mm}$
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