

Help with Chapter 16 Lon-Capa

Lines Problem:

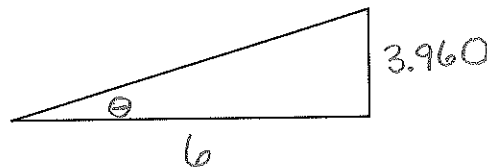
Solve for d first, which will be in meters. Remember this must be converted to cm before finding the reciprocal, so that you end up with lines/cm.

Example: If $d = 1.929 \times 10^{-6} \text{ m}$ then to get to cm you multiply by $\frac{100 \text{ cm}}{1 \text{ m}}$. After that, you still need a reciprocal to find lines/cm.

Lines in a Diffraction Grating Problem:

Example: The second order maximum is located 3.960 m from the line of symmetry on a screen 6.0 m from the diffraction grating.

Draw this picture to help find the angle.



$$\begin{aligned}\tan \theta &= \frac{3.960}{6} \\ \theta &= \tan^{-1}\left(\frac{3.960}{6}\right) \\ \theta &= 33.4^\circ\end{aligned}$$

Then find the lines/cm using the hints for the problem above.

Fringe Angles Problem:

For the second part, remember that the 1st dark fringe is order 0, not 1. (So you will need to subtract 1 from the order number given.) Also remember it is a DARK fringe.

Separation Between Maxima Problem

First, find d by taking the reciprocal of lines/cm to get cm. Then convert that to meters by $\frac{1 \text{ m}}{100 \text{ cm}}$.

Then find the angle for each maxima given.

Finally, you will subtract those two angles to get your answer.