

- 1) An opaque sheet has two fine slits in it that are separated by 100 microns. A collimated, monochromatic beam of light is incident on the slits. If the first dark fringe occurs at an angle of 0.0031, what is the wavelength of the light? [10 pts]

↓
radian

$$m=0$$

$$d \sin \theta = (m + \frac{1}{2}) \lambda$$

$$\lambda = \frac{d \sin \theta}{(m + \frac{1}{2})}$$

$$= \frac{(100 \times 10^{-6}) \sin(0.0031)}{(0 + \frac{1}{2})}$$

$$= 0.62 \times 10^{-6}$$

$$\boxed{\lambda = 620 \text{ nm}}$$

[if you take the angle in degrees,
then $\lambda = 1.08 \times 10^{-8} \text{ m}$]