

Advanced Reading Questions: Interference and Diffraction Lab

1. A diffraction grating is 20.0 mm wide and has 6000 rulings (separate slits).
 - (a) Calculate the slit spacing d (the distance from the left edge of one slit to the left edge of the next).

 - (b) Calculate the angle of the third ($m = 3$) intensity maximum if the incident light has a wavelength of 589 nm.

 - (c) A screen is placed 1.2 m away from the diffraction grating. Calculate the distance, Δy_3 , of the third maximum from the center of the interference pattern. (Hint: first decide if the small angle approximation is valid or not!)

 - (d) A second, unknown wavelength, λ , is passed through the diffraction grating. It is found that the fourth ($m = 4$) maximum of this wavelength lies at exactly the same position as the third maximum of the 589 nm radiation. Find λ .