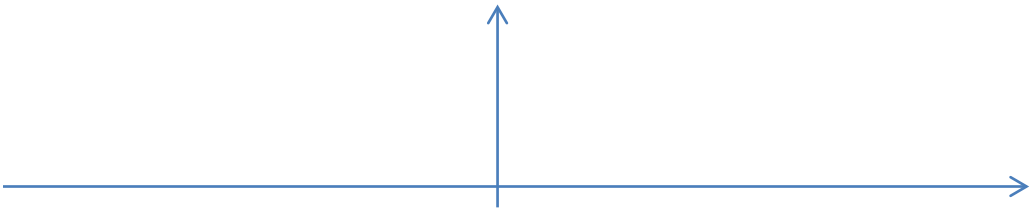
Diffraction Gratings Name .....

1. A laser is directed through a diffraction grating at a screen.
    a. Draw the fringe pattern you would expect to see, and label the orders:

    b. Represent this as an intensity plot:



    c. Write the formula for diffraction gratings. Define all quantities and give their units:

2. A grating has a line density of 500 lines per millimetre. Determine the grating spacing and give the unit.

3. A grating has a line spacing of 0.04mm. Find the line density in lines per mm.

4. A green laser of wavelength 532nm is directed at a grating. The first order maximum is observed at an angle of 12° from the zero order. Determine the grating spacing and the line density of the grating.

5. A laser is directed at a grating of line density 600 lines mm^{-1}. The second order beam is observed at an angle of 42°. Determine the wavelength of the laser.

6. A 650nm laser is directed at a grating with spacing 0.01mm. At what angle will the third order fringe be observed?

7. Describe the pattern you would expect to see if a grating was illuminated with a narrow beam of white light.