1. Determine the wavelength of monochromatic light that produces an order $m = 1$ fringe pattern on the screen at $\theta = 25^\circ$ when it is incident upon a diffraction grating of 5200 lines/cm.

2. Match the correct approximation(s) on the right with each statement on the left. Note that $a$ is the width of a single slit and $\lambda$ is the wavelength of light incident on that slit.

- **a.** $a <\ll \lambda$
  - A. The ray approximation is no longer valid. Light is wavelike.
- **b.** $a \sim \lambda$
  - B. The primary effect of the opening is to act like a point source of waves.
- **c.** $a \gg \lambda$
  - C. The primary effect of the opening is minimal; light travels in a straight line through it.
  - D. The primary effect of the opening is to diffract the light.

3. Explain, in a single sentence, how diffraction affects multiple-slit patterns. Sketch the intensity patterns as a function of $\sin \theta$, where $\theta$ is the angle of incidence, for a two-slit and three-slit setup. Assume $a \sim \lambda$. 