

If you haven't, then finish reading §3 *Optical Diffraction and Imaging*, start to read §4 *Index of Refraction, Dispersion*

1. Assume that the resolution limit of the eye is 1 arcminute. At what distance can the eye see a black circle of diameter 6" on a white background?
2. Calculate the linear separation of two objects on the surface of the moon that may be barely resolved by the 200" telescope on Palomar Mountain; neglect atmospheric effects.
3. Determine the diameter of a telescope that would be required to resolve the two equally bright components of a double star whose linear separation is 10^8 km at a distance of 10 light years.
4. The neoimpressionist painter George Seurat produced paintings composed of a large number of closely spaced "dots" of unmixed pigments. The colors are mixed in the eye of the observer to blend into the desired colors. Assume that the diameters and center-to-center spacings of the dots are both $\frac{1}{10}$ in. How far must the observer stand from the painting to obtain the necessary mixing of color?
5. A glass plate is sprayed with circular "dots" of pigment of the same size that are randomly distributed over the plate. If a distant point source of light is observed by eye through the plate, a diffuse halo is seen whose angular width is 2° . Estimate the diameter of the particles.