# Physics 345   Pre-lab 1

Suppose we have a circular aperture in a baffle and two light sources, a point source and a line source.

1. (a) Consider a small light bulb with an even tinier filament (point source). If the small light bulb is held one meter from the screen, carefully draw rays on the diagram in order to determine the extent of the illumination on the screen.

Screen view

1 m
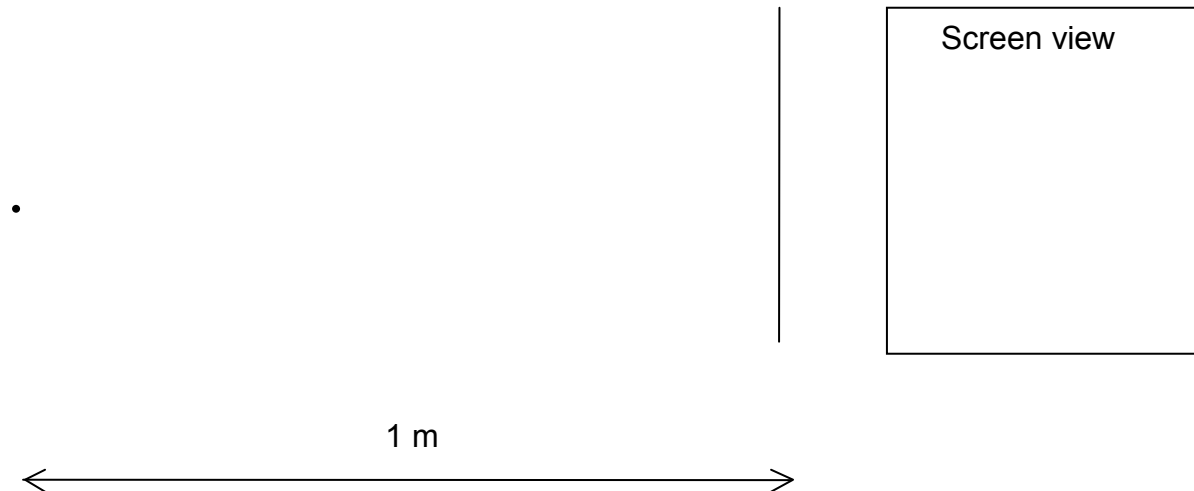
2. (b) Now imagine a thin fluorescent tube (extended source). If the fluorescent tube is held one meter from the screen, carefully draw rays on the diagram in order to determine the extent of the illumination on the screen.

Screen view

1 m
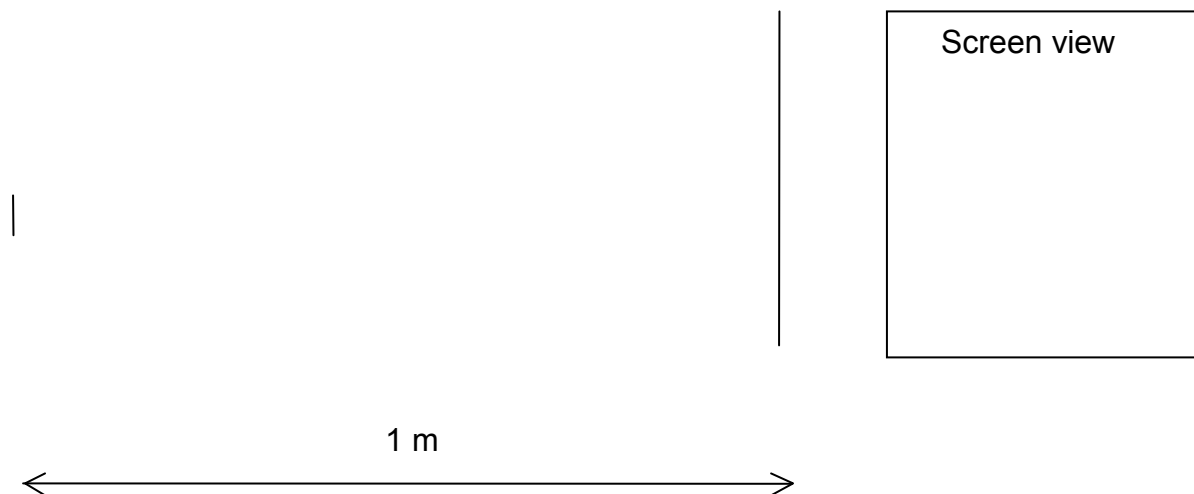
3. Now the light from the point source passes through a small circular hole in opaque material. Carefully draw rays on the diagram in order to determine the extent of the illumination on the screen for the point source. Draw the pattern of illumination you would expect to see on the screen to SCALE.

Screen view

1 m
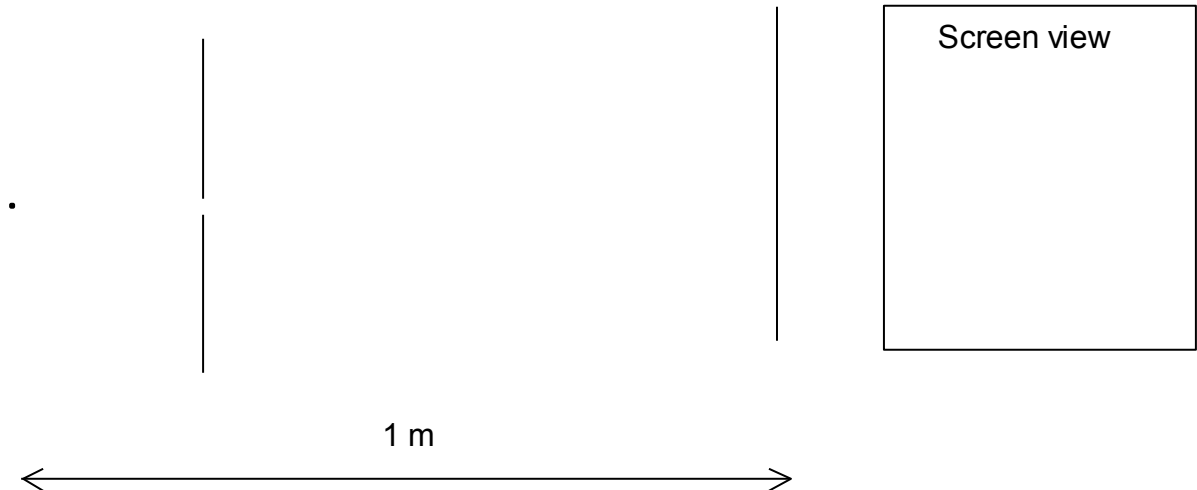
4. The light from the extended source now passes through a small circular hole in opaque material. Three different observers place their eyes one meter from the light source (on the opposite side of the opaque material) as shown in the scaled figure below. (a) Which of the observers can see the top of the the extended source. Explain. (b) Which of the observers can see the bottom of the extended source. Explain. (c) How many of the observers can see all of the extended source through the aperture? Explain.

A

B

C

1 m
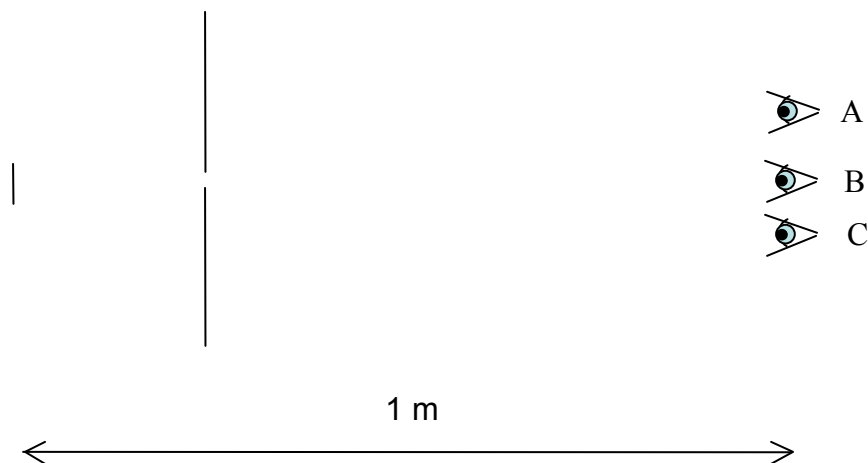
5. Now a screen replaces the three observers.. Carefully draw rays on the diagram in order to determine the extent of the illumination on the screen. Draw the pattern of illumination you would expect to see on the screen to SCALE.

Screen view

1 m
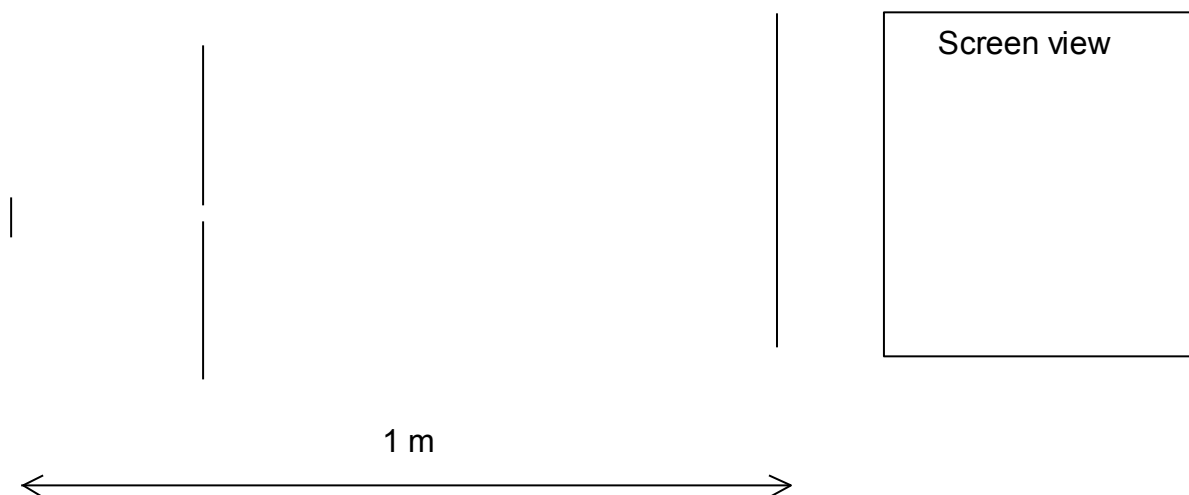
6. What is the minimum number of rays needed to determine the horizontal and vertical extent of the illumination on the screen in problem 5? Explain your reasoning.