Chapter 1

Additional Problem Set

Velocity, Frequency, & Wavelength of Light

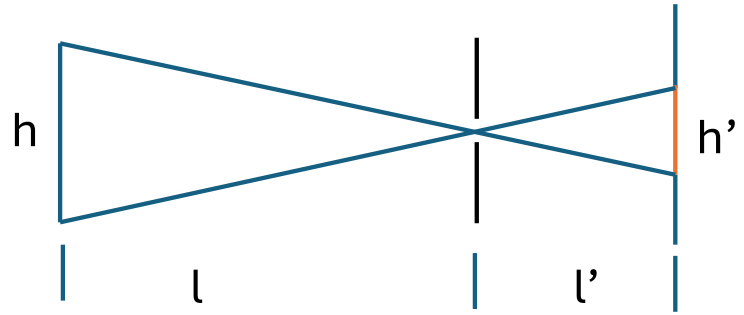
1. What is the frequency of light that has a wavelength of 750nm in air?

Velocity, Frequency, & Wavelength of Light

2. The light in the previous problem (750nm) is transmitted through an optical media that reduces velocity to 2.0×10^8 m/s. What is the wavelength of the light?

Pinhole Camera

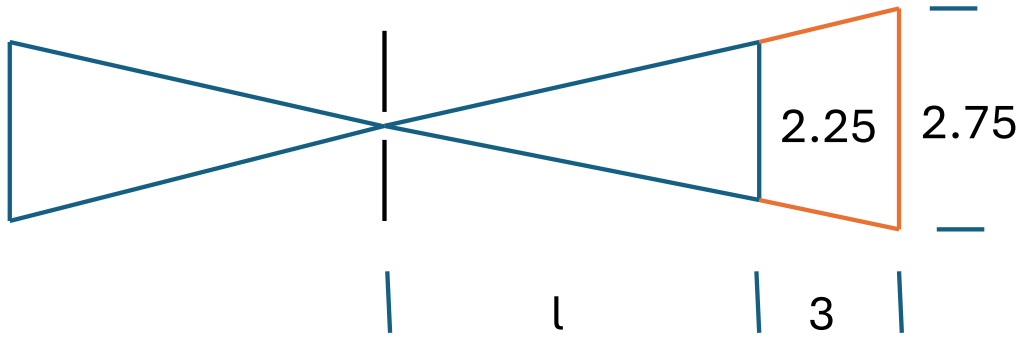
1. A pinhole camera is used to create an image of an object that is 20cm tall. If the object is 100cm in front of the pinhole and the image created of it is ¼ of the object's size, what is the distance from the pinhole to the screen?



Use similar triangles

Pinhole Camera

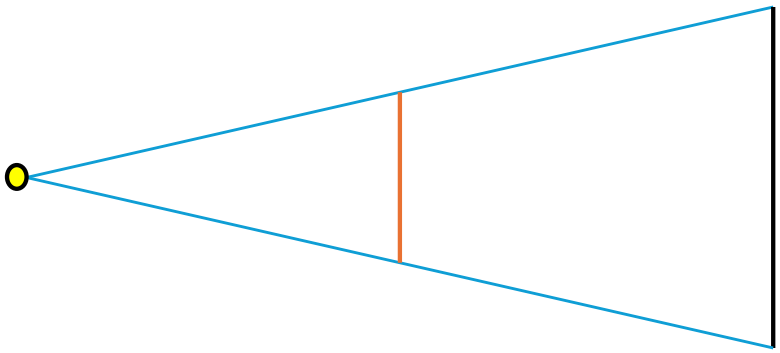
2. A pinhole camera produces an image 2.25 inches in diameter of a circular object. When the screen is moved 3 inches farther from the pinhole, the image increases to 2.75 inches in diameter. What was the original distance from the pinhole to the screen?

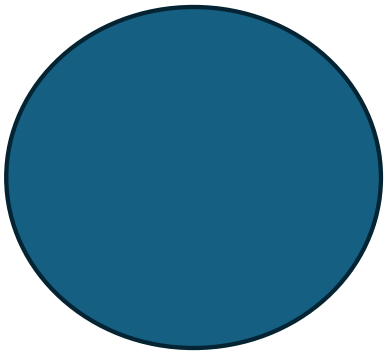


Use similar triangles

Shadows and Obstruction of light

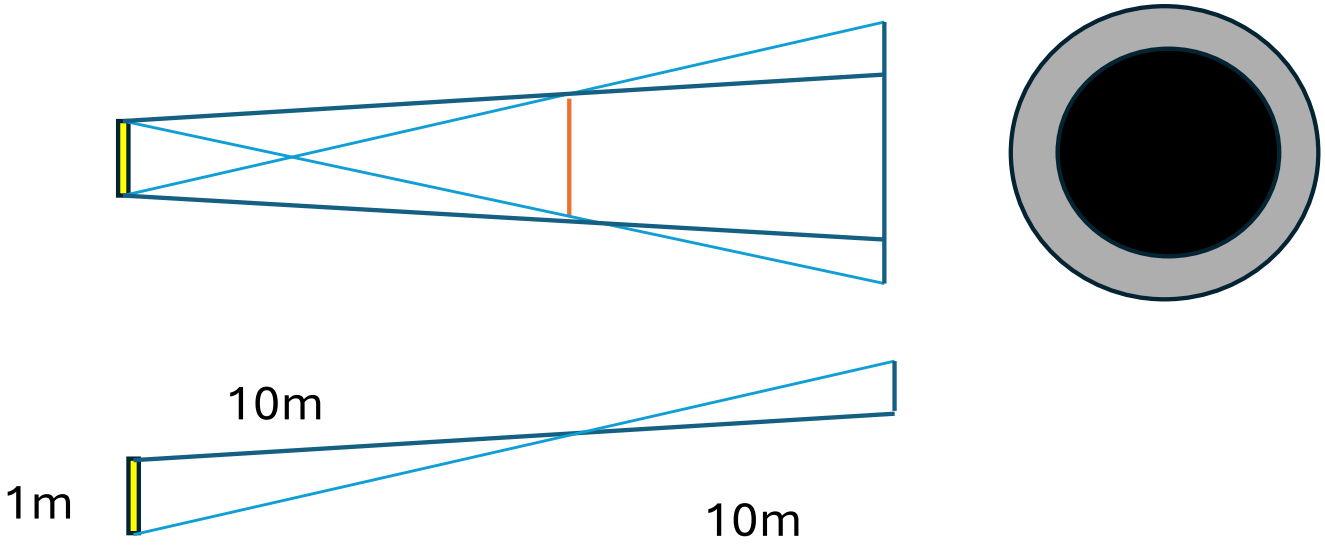
1. Find the size of the shadow created by a point source of light and a 2m diameter opaque disk if the screen is 20m from the light and the disk is 10m from the screen.





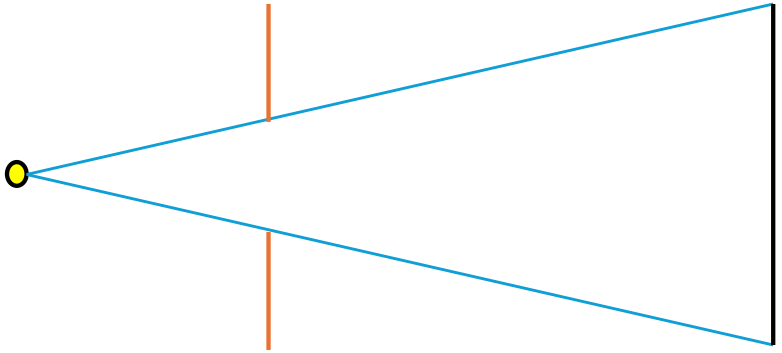
Shadows and Obstruction of light

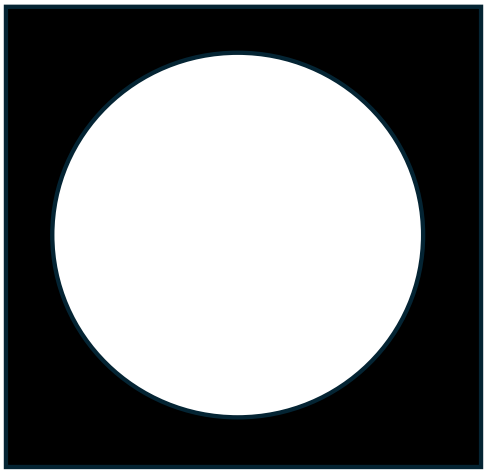
2. The point source in the previous problem is replaced with an extended source 1m in diameter. What is the width of the penumbra formed?



Full and Partial Illumination

1.What is the diameter of the circle illuminated on a screen 15m from a point source of light if the light travels through an aperture (located 5m from the light source) that is 1m in diameter?





Full and Partial Illumination

2. The point source in the previous problem is replaced with an extended source 50cm in diameter. What is the diameter of the area of full illumination?