Ms. Rosenthal P.3
Spring 2019

Geometric Optics

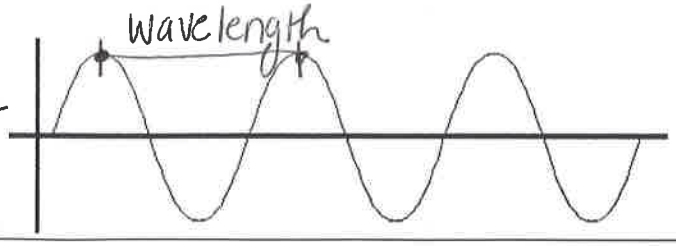
$V = \lambda f$

Wave-like properties of light

λ Wavelength: [m]
f Frequency: $\left(\frac{1}{s}\right)$ [Hz]
V Speed: $\left[\frac{m}{s}\right]$

$C = \lambda f$ ↑ speed of light

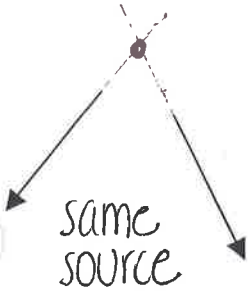
"C" = $3.00 \times 10^8 \frac{m}{s}$

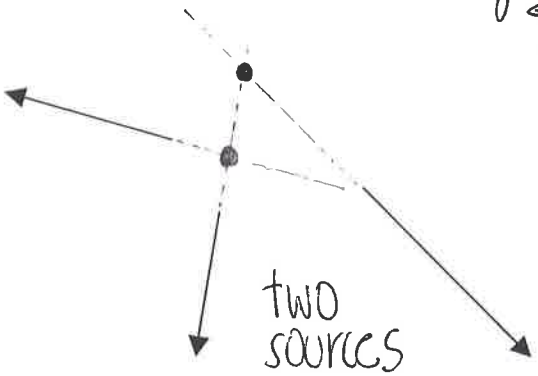


Ray Model

Point Source: A source of light or other radiation that can be considered to have negligible dimensions.

Locating a source

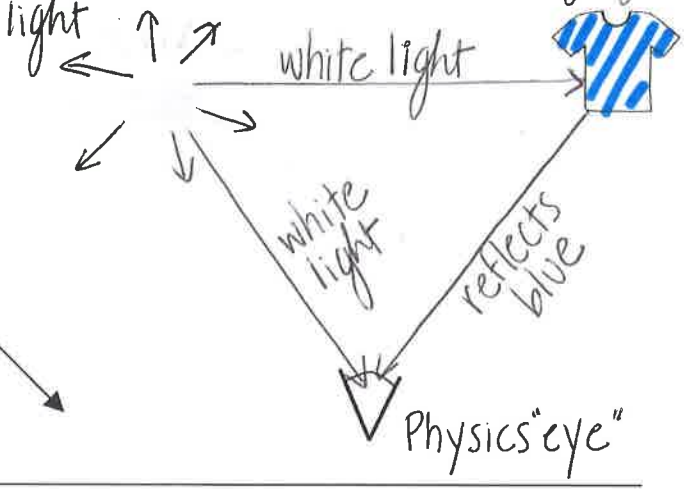




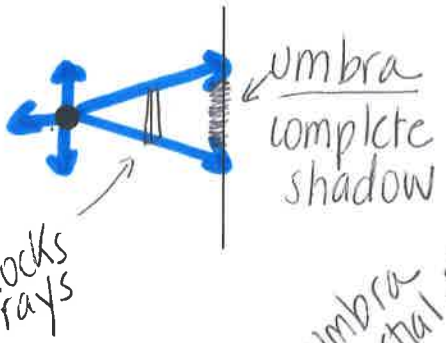
Luminous vs. Illuminated

produces light ↑ ↗

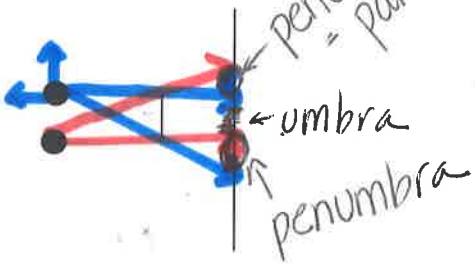
receiving light

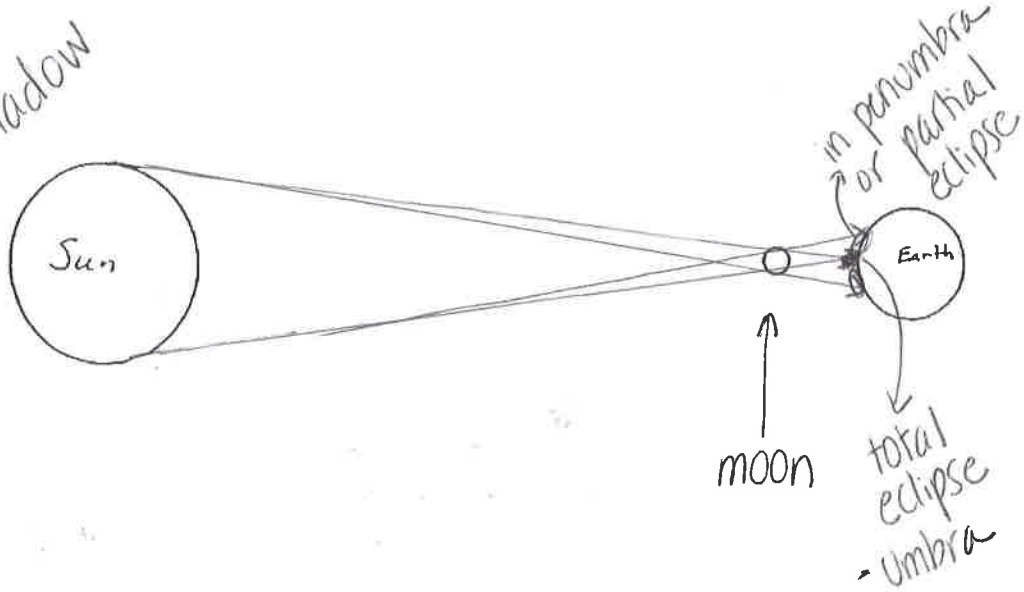


Shadows (Umbra and Penumbra)



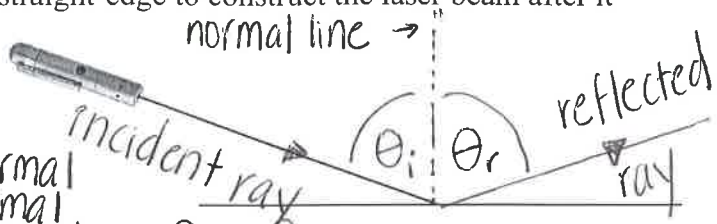
The sketch represents an eclipse of the sun. Sketch carefully the shadow cast by the moon on the earth, indicating umbra and penumbra





Plane Mirrors

A laser pointer is aimed at the surface of a plane mirror. Use a straight-edge to construct the laser beam after it reflects from the mirror.



Plane Mirror: flat mirror

Normal: line perpendicular to surface

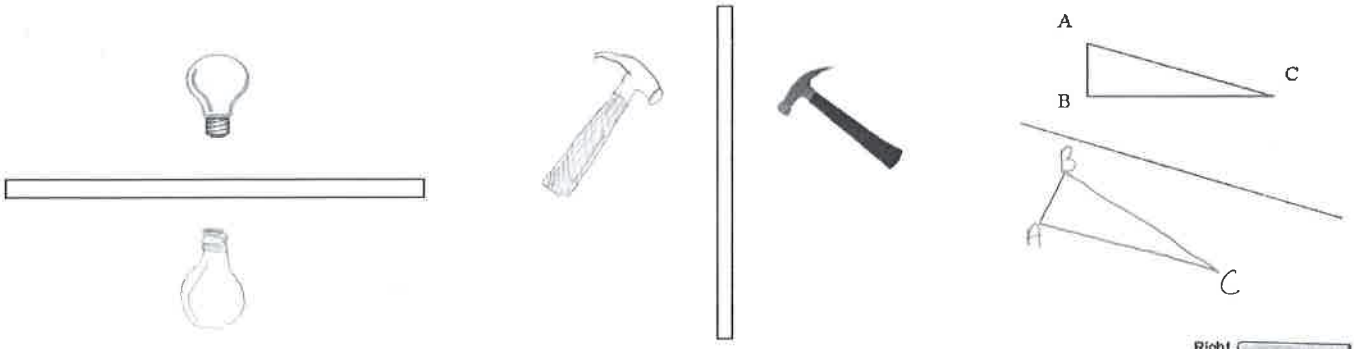
Angle of reflection: angle between reflected ray + normal

Angle of incidence: angle between incident ray + normal

Law of Reflection incident angle = reflected angle $\theta_i = \theta_r$

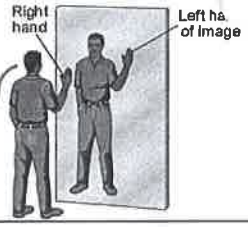
Properties of Images formed by Plane Mirrors

Each object below is in front of a plane mirror (seen on edge). Sketch the image that you would see in each case if you were looking into the mirror. Then, check your result by placing a plane mirror on top of this page at each location and looking into it.

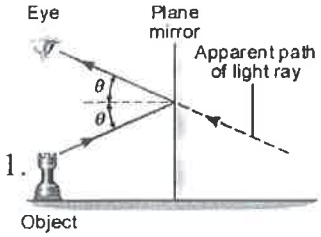


What are some properties of images formed by plane mirrors?

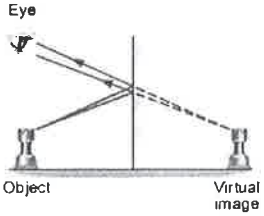
1. upright
2. same size
3. orientation is reversed
4. same distance away from mirror
5. virtual image



Locating Images using the Law of Reflection



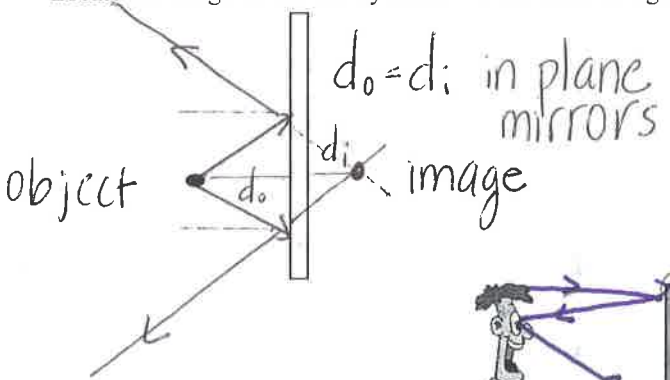
1.



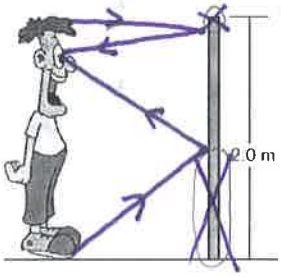
2.

Only need mirror ½ of body height!

Locate the image of this dot by means of two lines of sight.



How much of this 2.0 meter tall mirror is actually needed for the man to see the reflection of his entire body? 1.0 m



Virtual Image: An image formed by light rays that only appear to intersect or converge, but do not actually intersect.