PHYS 1512: Week 8

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Equations

$$\theta_i = \theta_r \quad \text{(Law of Reflection)} \tag{1}$$

$$n = \frac{c}{v} \quad \text{(Index of Refraction)} \tag{2}$$

$$f = \pm\frac{R}{2} \quad \text{(Concave/Convex mirror)} \tag{3}$$

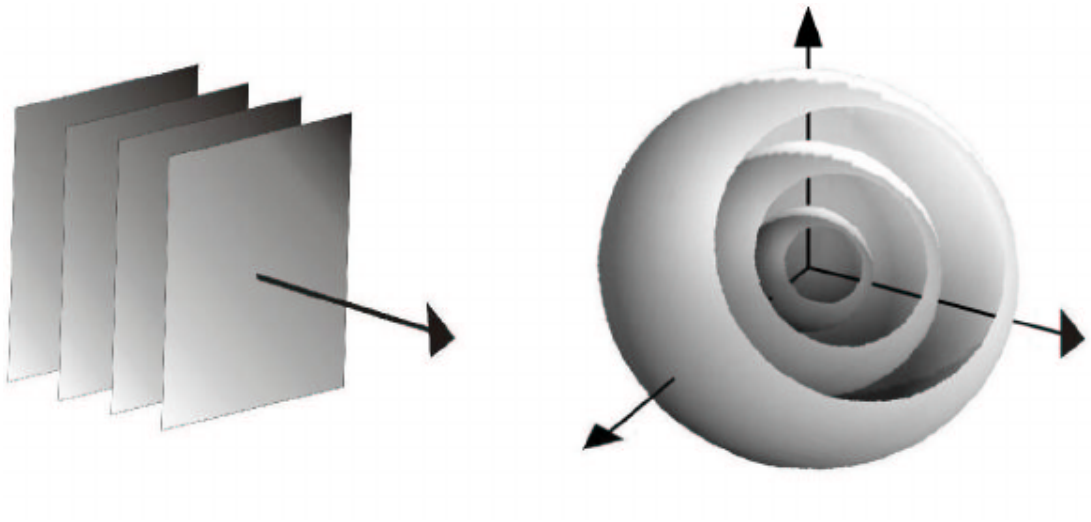
$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \quad \text{(Mirror Equation)} \tag{4}$$

$$m = -\frac{d_i}{d_o} = \frac{h_i}{h_o} \quad \text{(Magnification)} \tag{5}$$

$$n_1 sin(\theta_1) = n_2 sin(\theta_2) \quad \text{(Snell's Law)} \tag{6}$$

Key Concepts 1

-Light can be thought of as a ever expanding spherical waveform
-Virtual images vs real image
-Positive/negative signs on distances



Key Concepts 2

-Ray Diagrams for curved mirrors

1) To the center of the mirror and reflected off via law of reflection
2) Through the focal point and reflected parallel to optic axis
3) Travels parallel and reflects to the focal point
4) Travels through the center of curvature and reflected back or reflects back normal to the center of curvature.

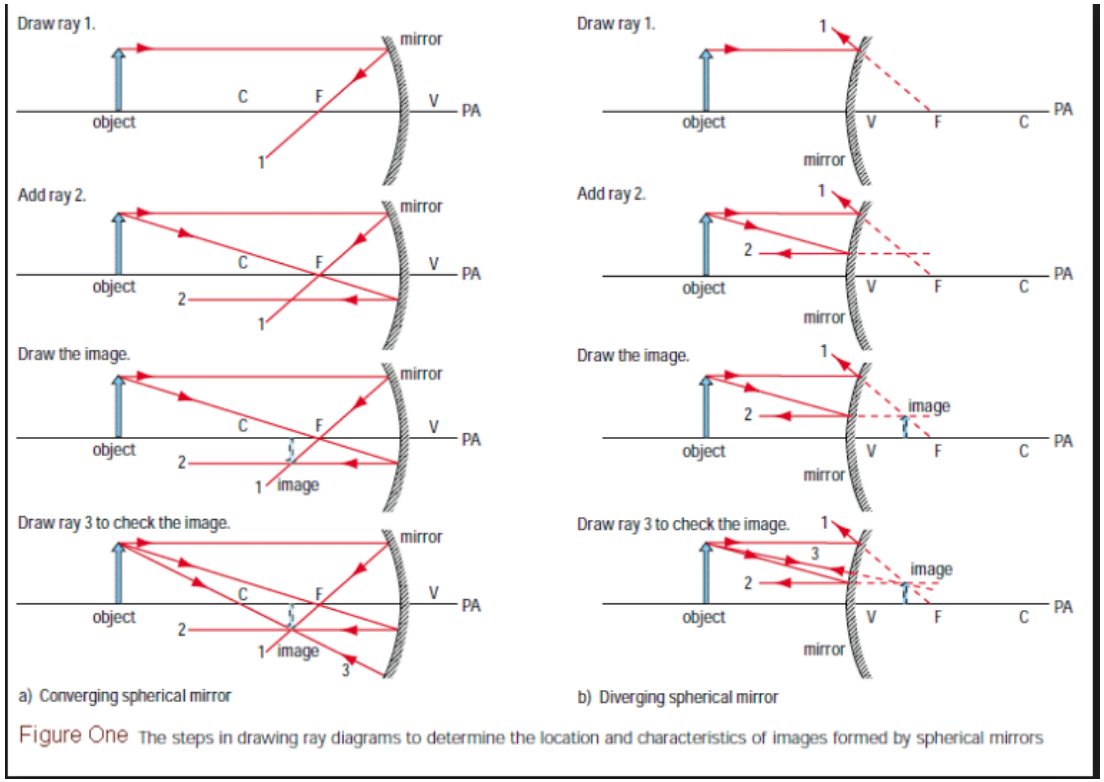


Figure One The steps in drawing ray diagrams to determine the location and characteristics of images formed by spherical mirrors

Question #1 & 2

Well that's just light...man

A light **Ray** is:
a) Parallel to other light rays
b) Parallel to the velocity of the wave
c) Perpendicular to the velocity of the wave
d) Parallel to the wave fronts

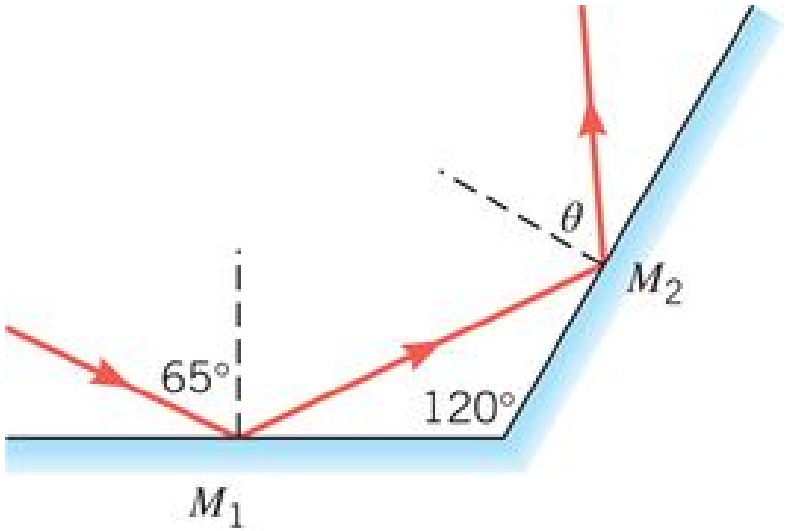
Mirrors

A friend is standing 2m in front of a plane mirror. You are standing 3m directly behind your friend. What is the distance between you and the image of your friend?

Question #3

Reflection

If two plane mirrors are separated by 120°. If a ray strikes mirror M_1 at 65°angle of incidence, at what angle θ does it leave mirror M_2?



Question #4

Concave rays

For each of the following parts, draw at least 3 rays:
1) Draw a ray diagram for a concave mirror where the object is inside the focal point.
2) Draw a ray diagram for a convex mirror where the object to the left of the mirror.
3) Draw a ray diagram for a concave mirror where the object is on the focal point.

Question # 5

Who's who?

Suppose that you hold up a small convex mirror in front of your face. which answer describes the image of your face?

a) Virtual, inverted
b) Virtual, upright
c) Virtual, enlarged
d) Real, inverted
e) Real, reduced in size


PEAK
ANTIFREEZE & COOLANT

Question #6

Focus

A small statue has a height of 3.5cm and is placed in front of a concave mirror. The image of the statue is inverted, 1.5cm tall and located 13cm in front of the mirror. Find the focal length of the mirror.

Question #7

Engineer a mirror

A concave makeup mirror is designed so the virtual image it produces is twice the size of the object when the distance between the object and the mirror is 14 cm. What is the radius of curvature of the mirror?