OPTO 225 / OD 3

Ophthalmic Optics and Dispensing I

1st Lecture

Introduction / Nomenclature

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Sign convention rule:

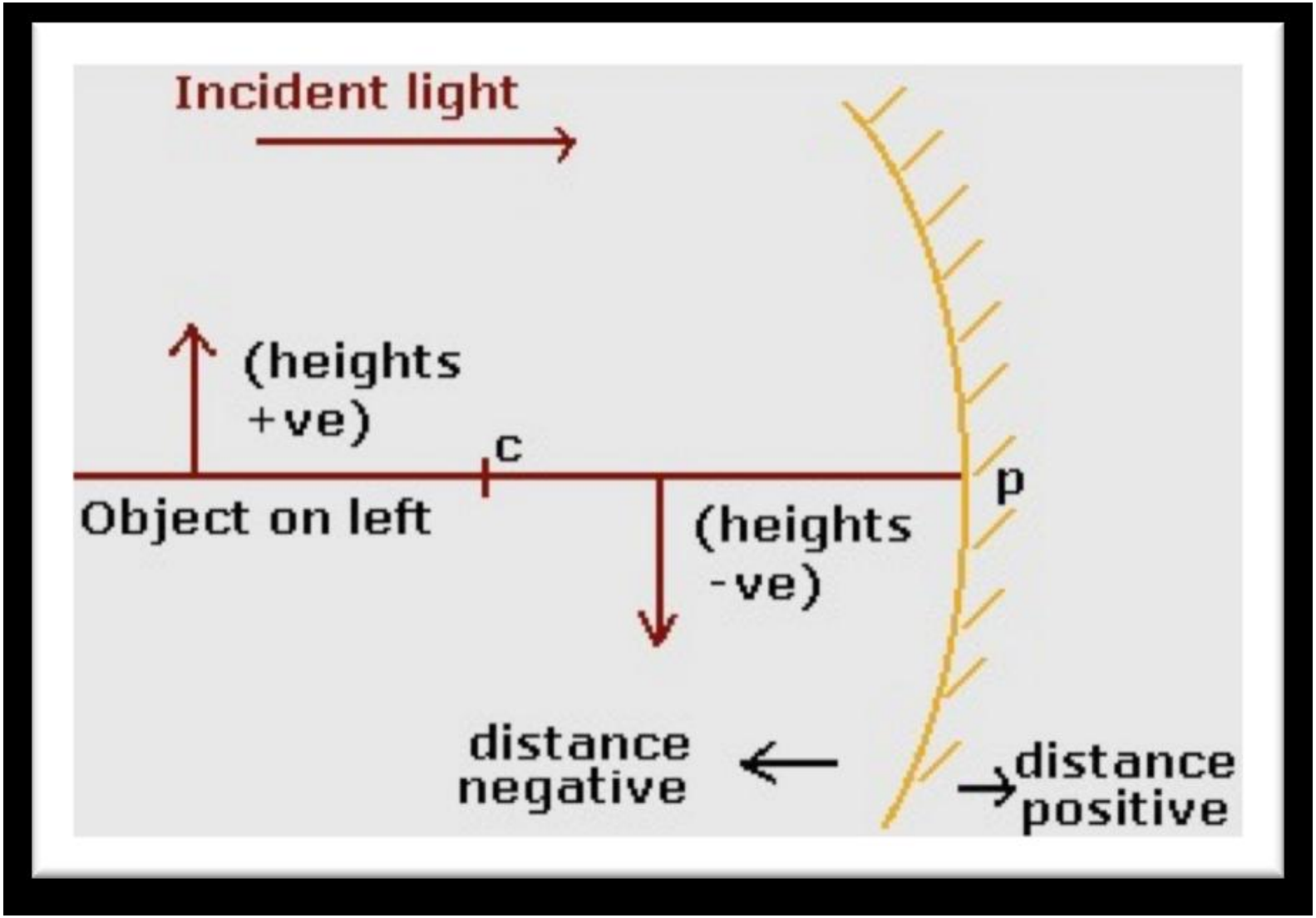
The sign convention rule that used in the optics field will be

1. Incident light will be consider as traveling from left to right.

All distance that measured in the optical system concerned the following:

a) If it is measured in the same direction of the incident light will be Positive (+).

b) It is measured in the opposite direction of the incident light, it will be consider as negative (-).


Incident light
(heights
+ve)
C
P
Object on left
(heights
-ve)
distance
negative
distance
positive

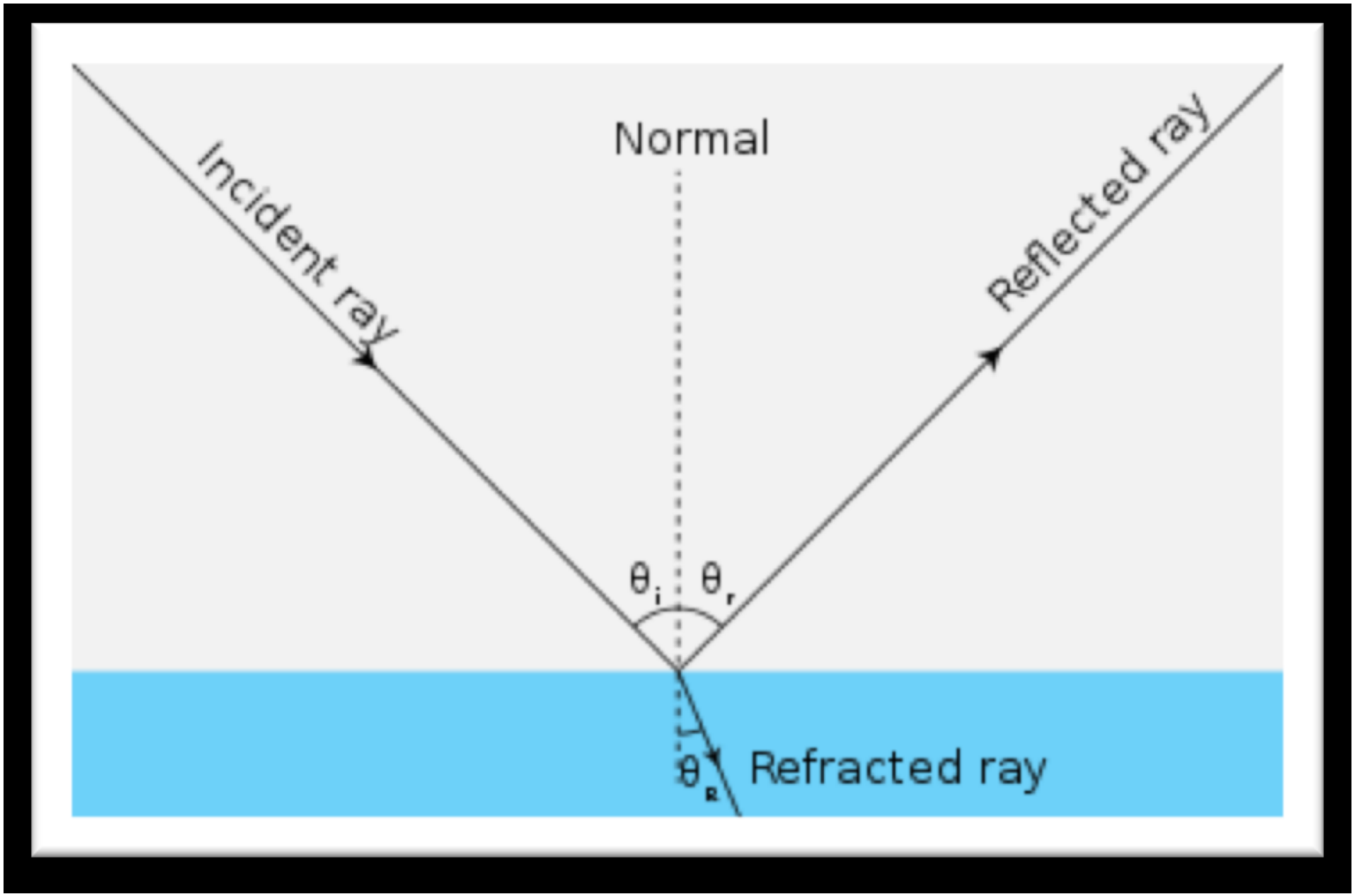
Sign convention rule: (cont)

2. Vertical distance above the optical axis is positive and the one below is negative.

3. The angle between the ray and the optical axis is measured from the ray to the optical axis.

4. Angles of incidence, reflection, and refraction are measured from the normal to the ray.

5. Angle measured in the counterclockwise is positive and the one in clockwise is negative.

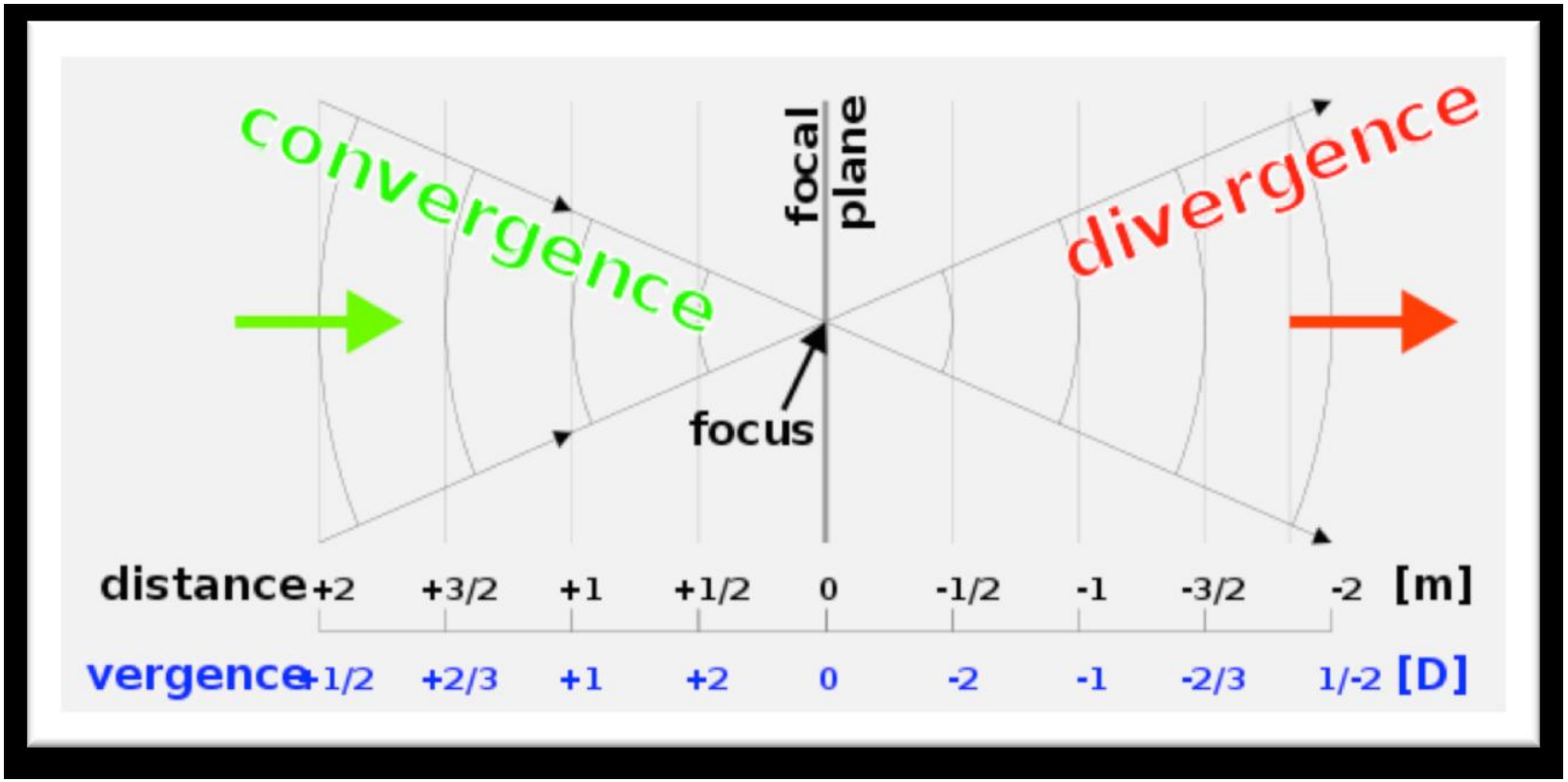

Normal
Incident ray
Reflected ray
θ_i
θ_r
θ_R
Refracted ray

Sign convention rule: (cont)

6. An arrowhead on a line or curve fixing the limit of the distance or angle being measured indicates the direction in which that distance or angle is being measured.

7. Vergence is the spread of light rays at a specific distance from the focal point.

8. Light moving towards the focus is consider as a converging (+)
9. Light moving away from the focus is consider as a diverging (-)



10. The measuring unit of vergence is the Diopter. The vergence of a particular ray system is the reciprocal of the distance from the wave front to the center of curvature (focus), in meter

Nomenclature (naming System):

Ray

It is an imaginary line extending from the focus to the wave front. It represents the direction of propagation of the wave front.

Pencil of light

It is a bundle of rays emanating from a point source after passing through a limiting aperture (pinhole effect).

Beam of light

It is a collection of pencils arising from an extended (infinite-sized) source or from a source of finite size.

Object

It is a physical source of light, or no light, existing in object space and it is divided to:

a) Real object is from which the light rays diverge or are reflected from

b) Virtual object is one towards which light is converging before interruption by the surface of an optical system.

Image

It is the projection of an object in image space. It is formed by light traveling from an object, in image space, after an optical system has acted on the light.

It is divided to two different types:

a) Real image and b) virtual image.

Real image

It is formed by the actual convergence of rays reflected or refracted by an optical system. A real image can by catch on a screen it the screen placed in the image space (the focus).

Virtual Image

It is formed by the light divergence from point in the optical system. The virtual image can't catch on the real screen until it changed to a real image.

Object space

It is related to all the space in which light has traveled before being interrupted by the optical system.

Image Space

This is the space within which light travels after being acted upon by an optical system.

Done ☺