Tishk International University

Faculty of Applied Science

Department of Anesthesia

Visual Acuity

Snellen Chart- Test

Fall Semester

Course Name : Biophysics

Stage : First

Prof. Dr. Fatiheea F Hassan

2026

There are four types of Ametropia: -

1- Myopia "**Nearsightedness**".

2- Hypermetropia **" Farsightedness "**.

3- Astigmatism "**A Symmetrical Focusing**"

4-Presbyopia "**Old Sight, or Lacking of Accommodation**".

1- Myopia.

1. The myopic individual has too long an eyeball or too much curvature of the cornea.

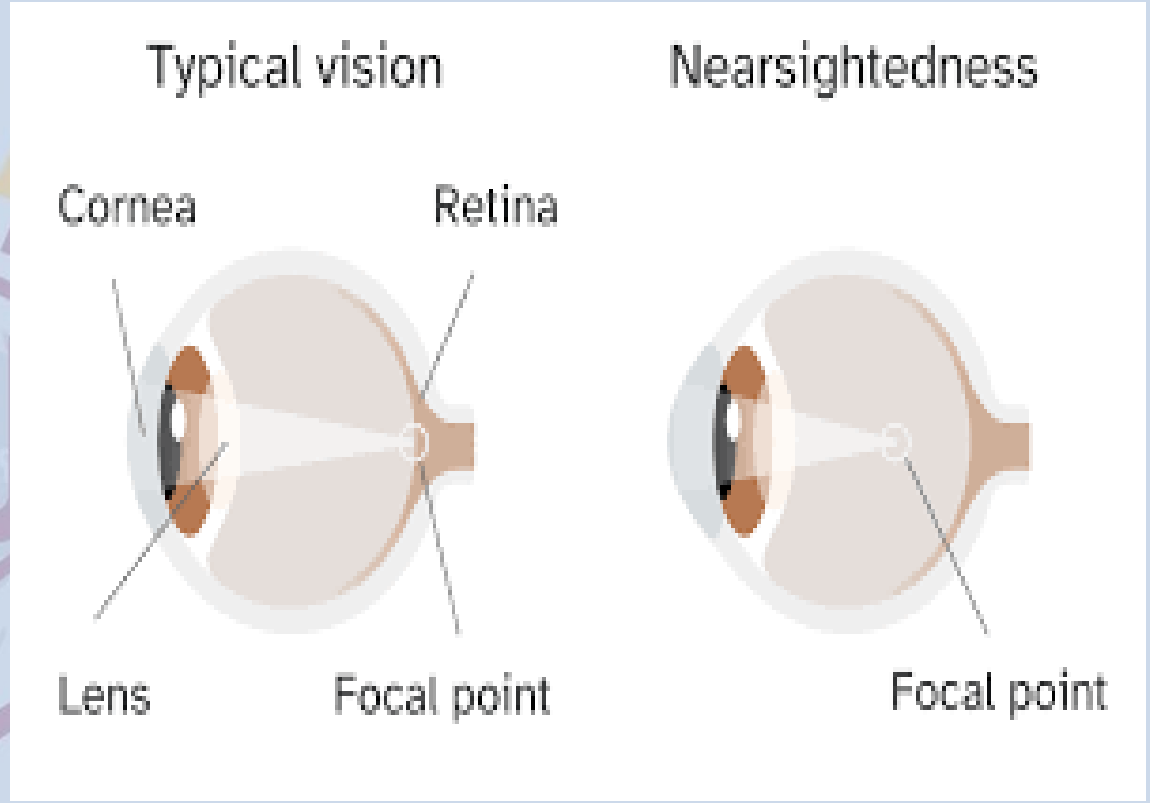
2. Distance object "**u=∞**" come to focus in front of the retina.

3. The rays diverge to cause a blurred image at the retina.

4. This is easily corrected with negative lens "**Concave lens**".

Myopia first occurs in school-age children. Because the eye continues to grow during childhood, it typically progresses until about age 20.

The eye don't get bigger in middle age. They only grow during childhood and your teens. But the shape of the eyes may change. If the eye get nearsightedness, or myopia, they may get longer.



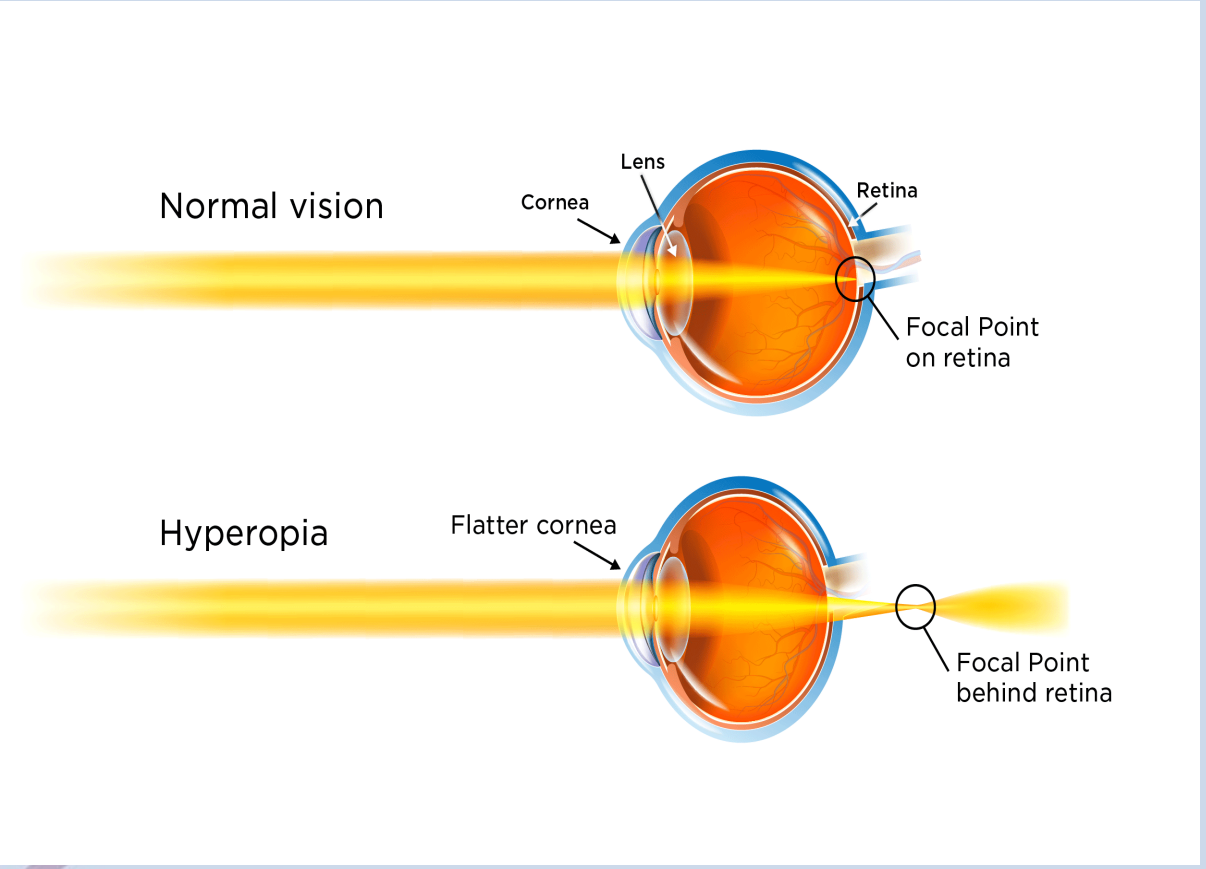
2- Hyperopic.

1. Has a near point further away than normal "**Behind the retina**".

2. The usual hyperopia is too short an eye ball.

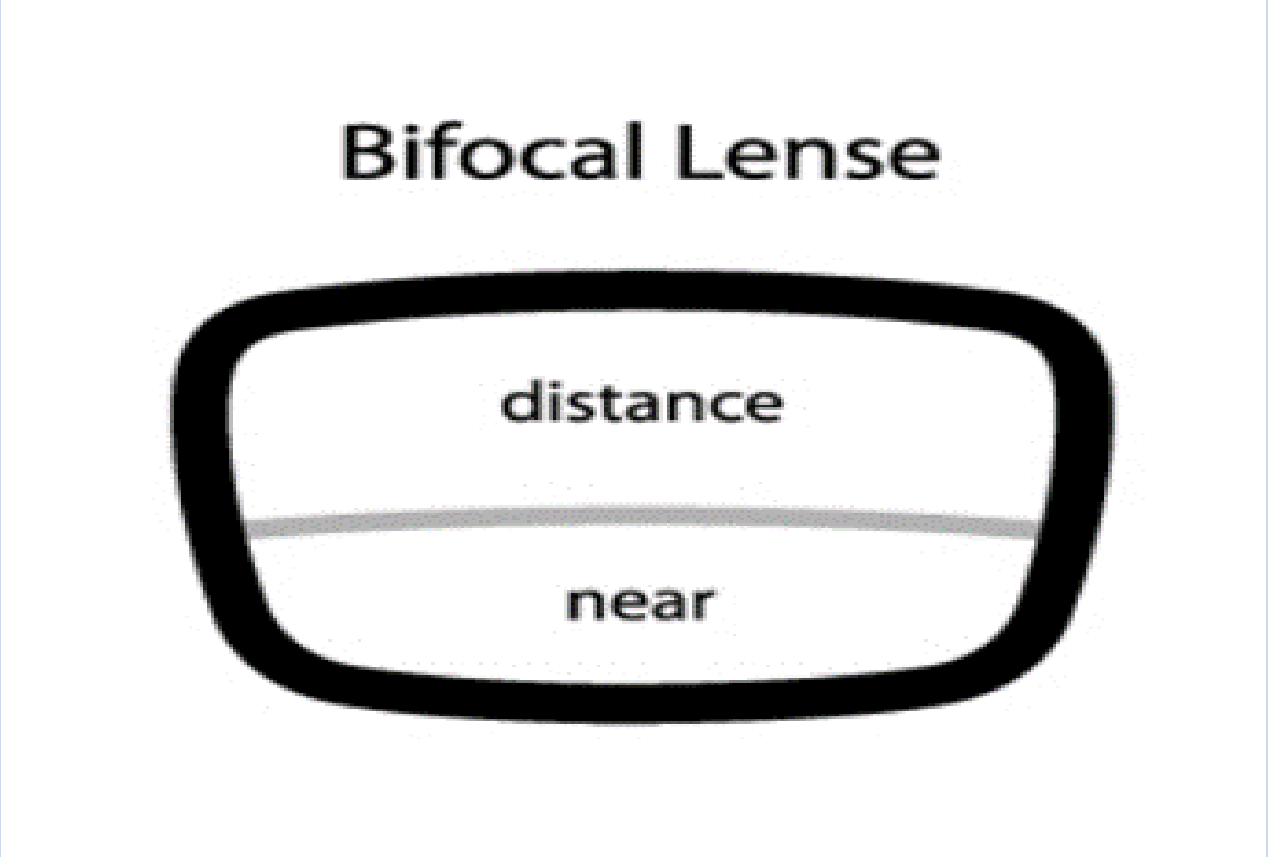
3. A positive lens is used to correct this condition.

Long sight can occur at any age but it tends to become more noticeable above the age of 35 or 40 years according to person's health. In rare cases, long sight is caused by other conditions such as diabetes, cancers around the eye and problems with the blood vessels in the retina.

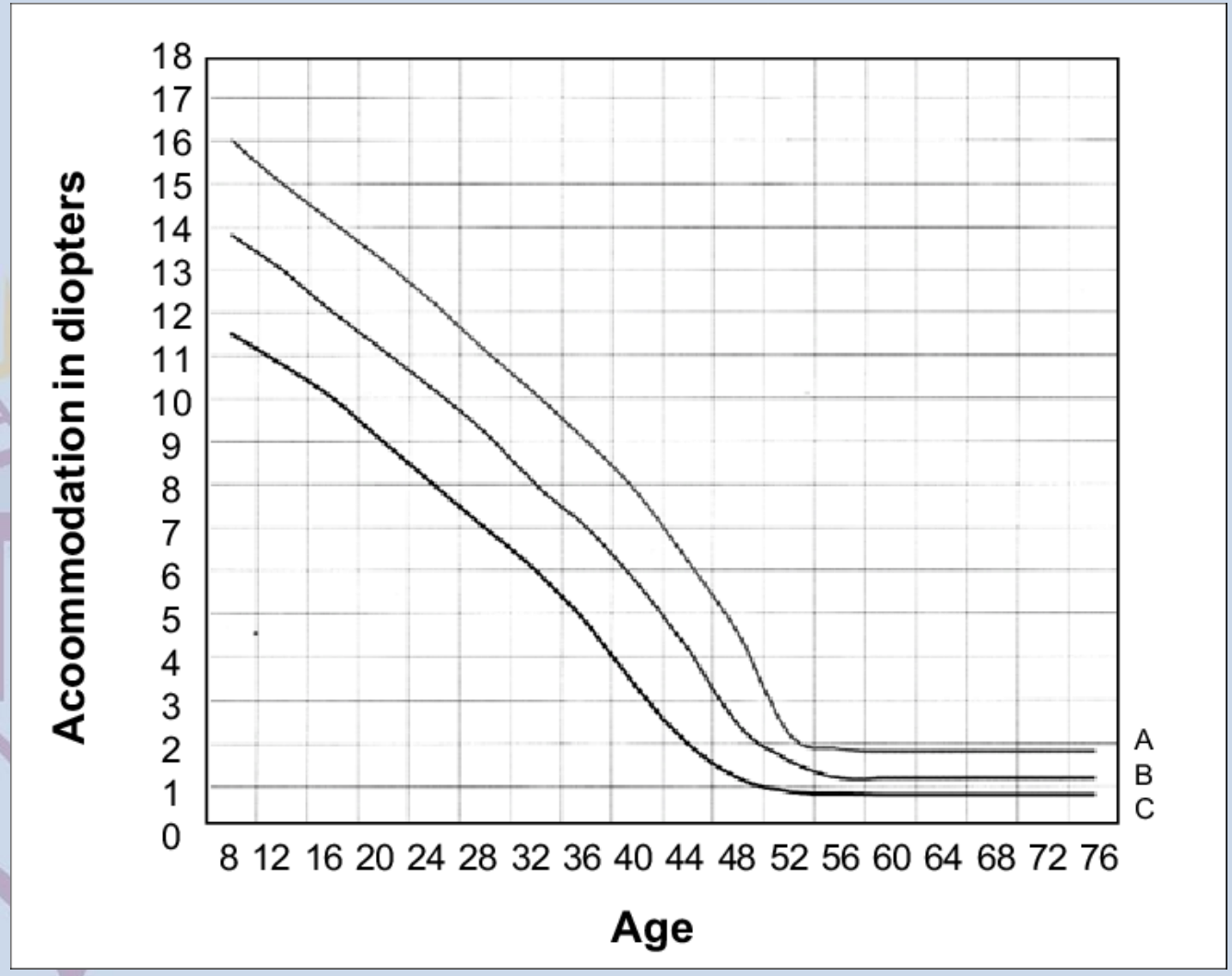


3- Old Sight.

1. It is due to the loss of accommodation with age.
2. The lens becomes less pliable.
3. It need Bifocal lens.



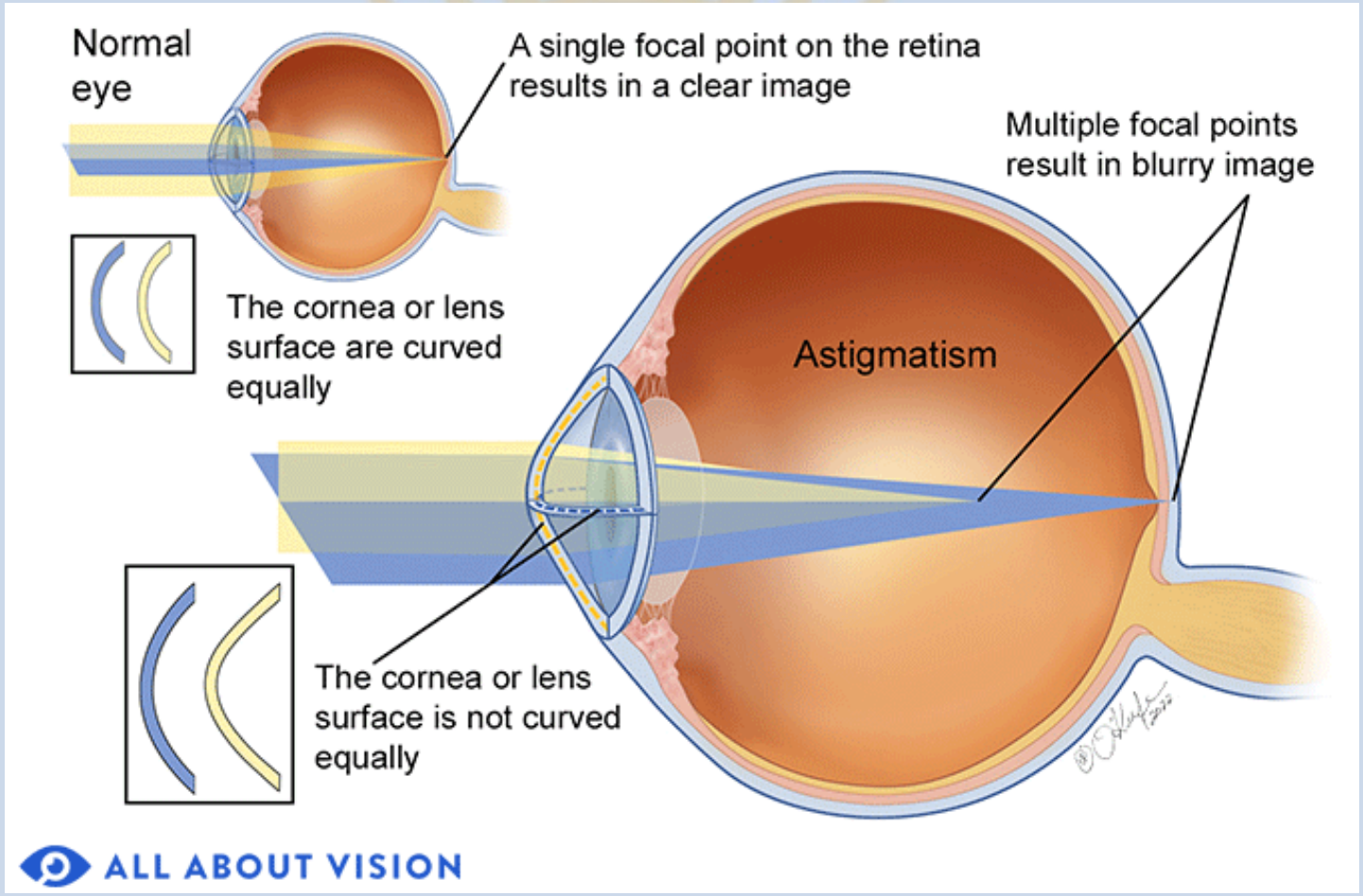
Presbyopia (Old Sight) is Beginning in the early to mid-40s, many adults may start to have problems seeing clearly at close distances, especially when reading and working on the computer. This is among the most common problems adults develop between ages 41 to 60 or more than this age. This normal change in the eyes' focusing ability, called presbyopia, will continue to progress over time.



It occurs due to age-related changes in the lens (decreased elasticity and increased hardness) and ciliary muscle (decreased strength and ability to move the lens)

4- Astigmatism.

When astigmatism is present, point objects do not form point images on the retina. This is due to the corneas having unequal curvature in different directions.



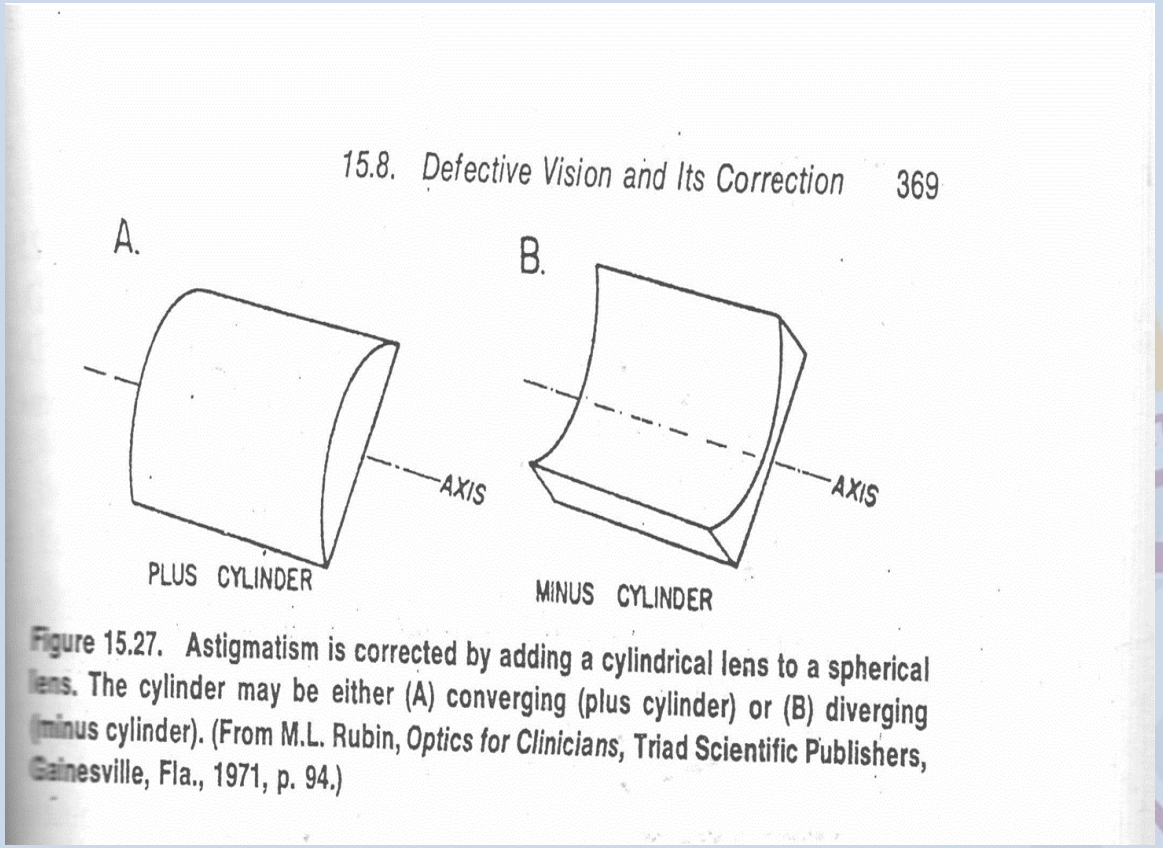
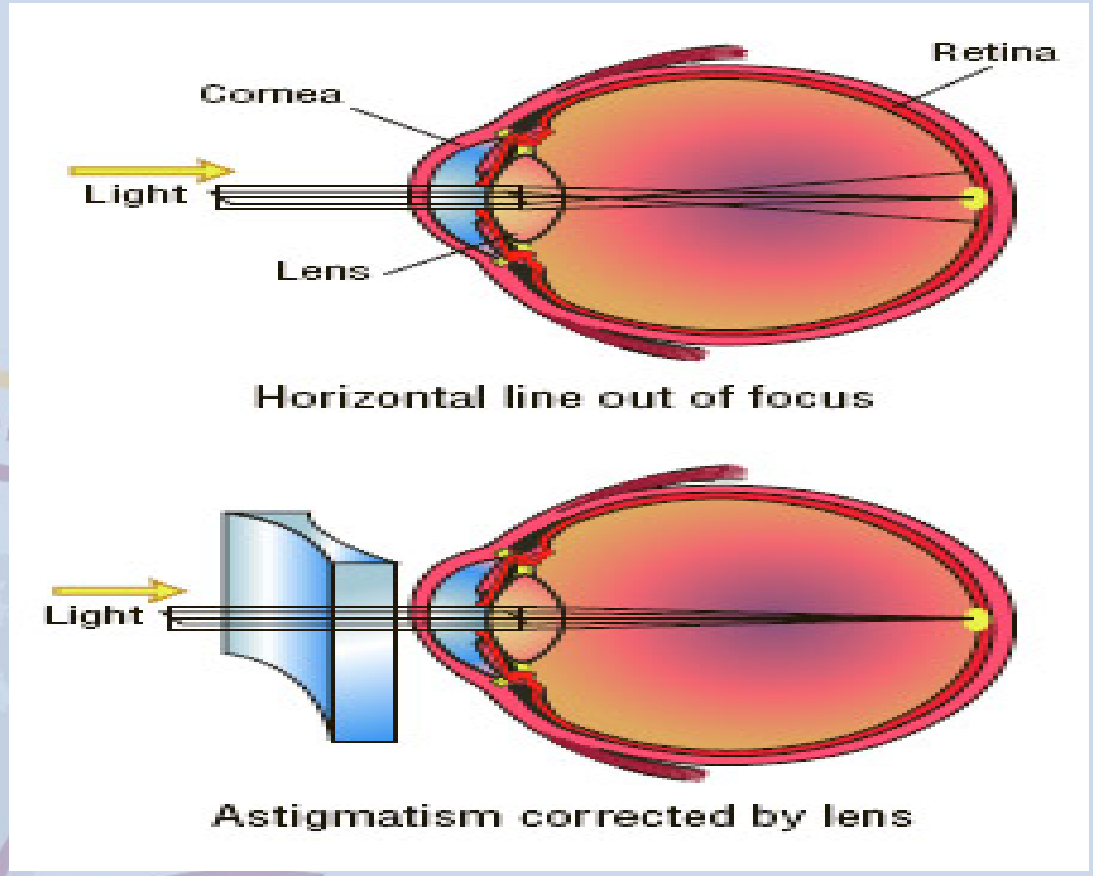


Figure 15.27. Astigmatism is corrected by adding a cylindrical lens to a spherical lens. The cylinder may be either (A) converging (plus cylinder) or (B) diverging (minus cylinder). (From M.L. Rubin, *Optics for Clinicians*, Triad Scientific Publishers, Gainesville, Fla., 1971, p. 94.)



The Snellen chart is very useful for detecting near-sightedness. However, it's profoundly lacking in other areas. Besides not being very useful for detecting farsightedness, the Snellen chart often does not detect astigmatism

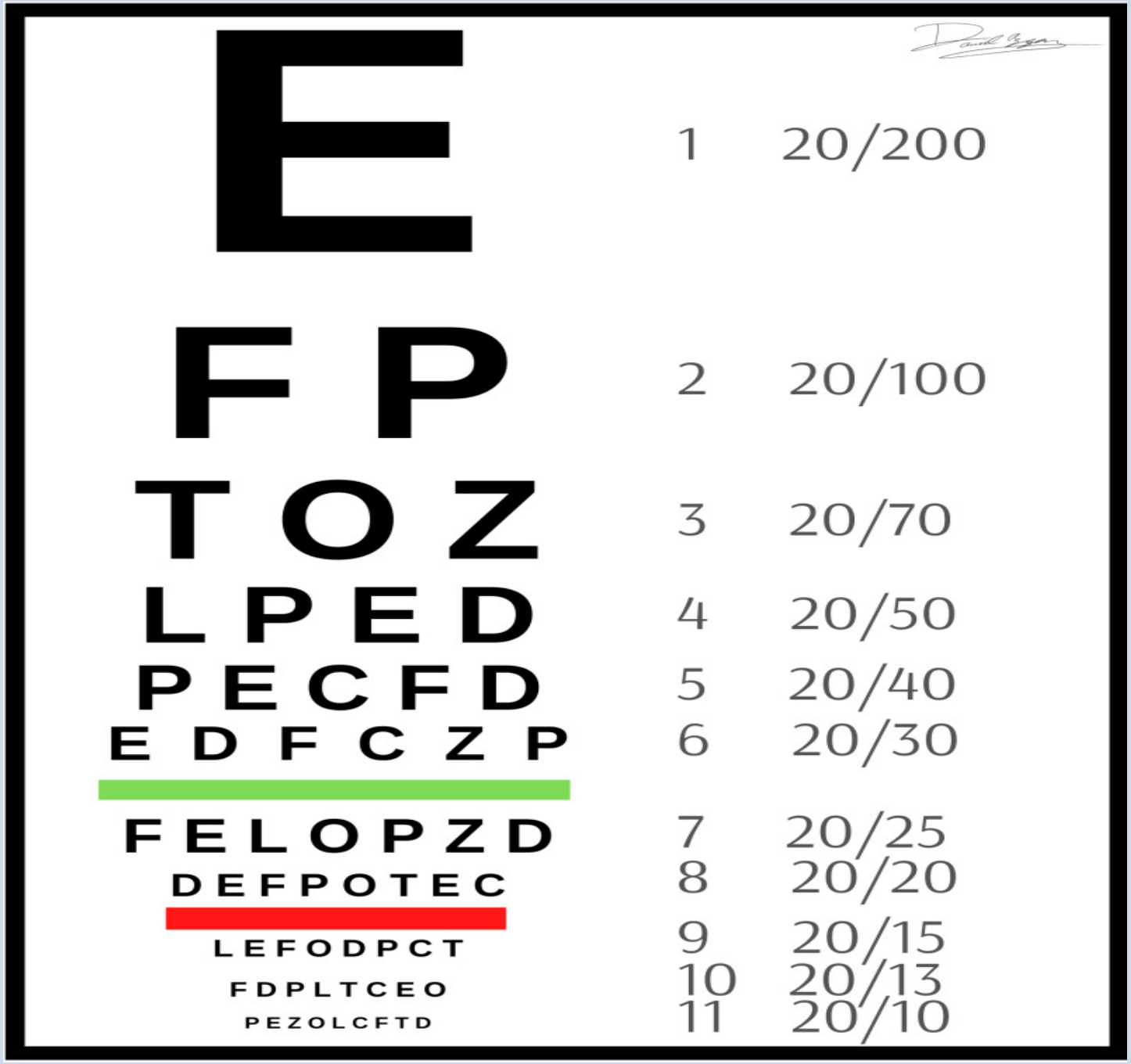
A keratometer is the instrument for astigmatism, it is the primary instrument used to measure the curvature of the cornea. By focusing a circle of light on the cornea and measuring its reflection, it is possible to determine the exact curvature of that area of the cornea's surface.

Visual Acuity-Test

Snellen Chart:

a- Normal eyes test = 20/20 ft or 6/6 m.
That's mean; good vision can read detail from 20ft or 6m.

b- If eye test = 20/40 ft, 6/12 m.
That's mean; you can just read from 20ft the line that a person with good vision can read from 40ft.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F P
T O Z
L P E D
P E C F D
E D F C Z P
F E L O P Z D
D E F P O T E C
L E F O D P C T
F D P L T C E O
P E Z O L C F T D
1 20/200
2 20/100
3 20/70
4 20/50
5 20/40
6 20/30
7 20/25
8 20/20
9 20/15
10 20/13
11 20/10

Example:
If the smallest line a person can read is "6/12" ("20/40"), meaning that this person needs to approach to a distance of 6 meters (20 ft) to read letters that a person with normal acuity could read at 12 meters (39) ft

Your report should includes the following:-

Name of the experiment:- Visual Acuity (Snellen Chart- Test)

Date of the experiment:- 13-5-2026

Name of the students

Group

Results and Measurements

Name	The Right Eye (O.D)	The Left Eye (O.S)	type of eye defect	correction

Discussion

1- at which age Myopia is Happened, and why?

2- at which age Hyperopia is Happened, and why?

3- at which age Old Sight is Happened, and why?

Thank you