

## DEFECTS OF VISION AND THEIR CORRECTION

There are mainly three common refractive defects of vision.

These are (i) myopia or near-sightedness,

(ii) Hypermetropia or far - sightedness, and

(iii) Presbyopia.

### (a) Myopia

Myopia is also known as near-sightedness.

A person with myopia can see nearby objects clearly but cannot see distant objects distinctly.

A person with this defect has the far point nearer than infinity.

Such a person may see clearly up to a distance of a few metres.

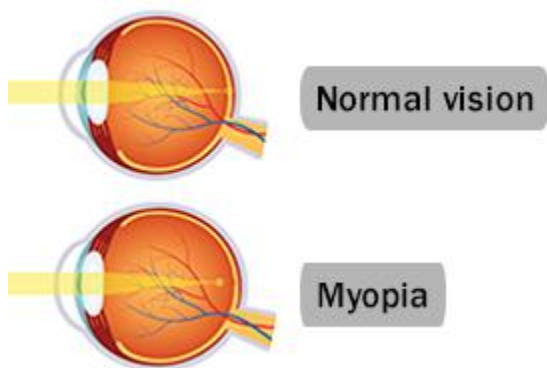
In a myopic eye, the image of a distant object is formed in front of the retina and not at the retina itself.

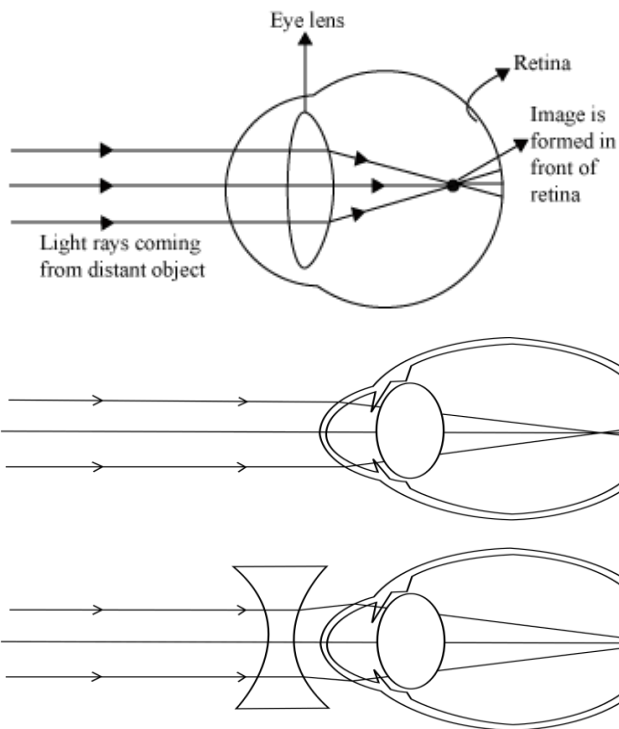
This defect may arise due to

- (i) excessive curvature of the eye lens, or
- (ii) (ii) elongation of the eyeball.

This defect can be corrected by using a concave lens of suitable power.

A concave lens of suitable power will bring the image back on to the retina and thus the defect is corrected.





## (b) **Hypermetropia**

Hypermetropia is also known as far -sightedness.

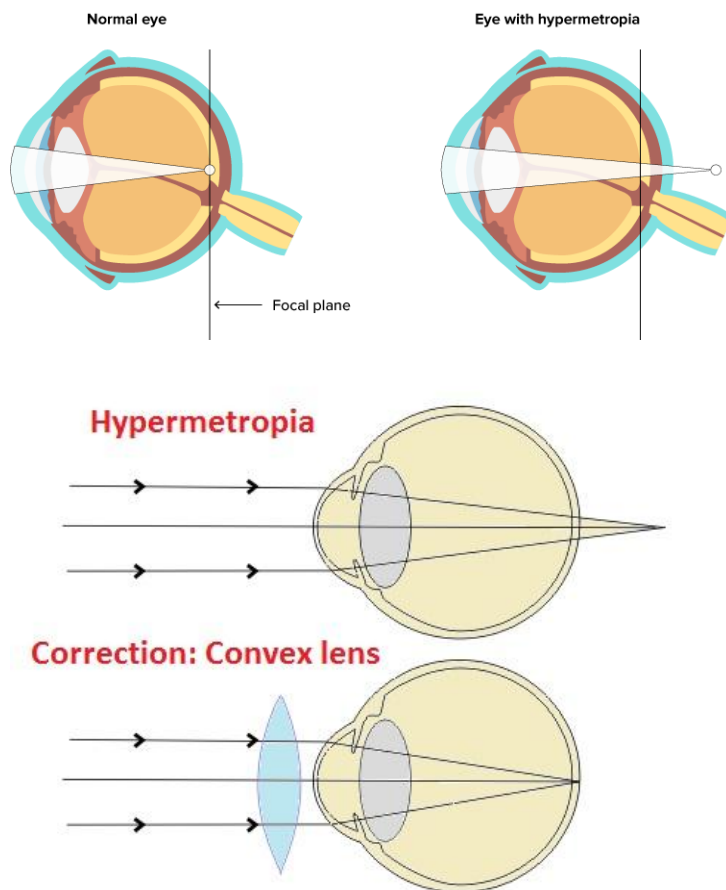
A person with hypermetropia can see distant objects clearly but cannot see nearby objects distinctly

This defect arises either because

- (i) the focal length of the eye lens is too long, or
- (ii) the eyeball has become too small.

This defect can be corrected by using a convex lens of appropriate power.

Eye-glasses with converging lenses provide the additional focussing power required for forming the image on the retina.



### (c) **Presbyopia**

The power of accommodation of the eye usually decreases with ageing

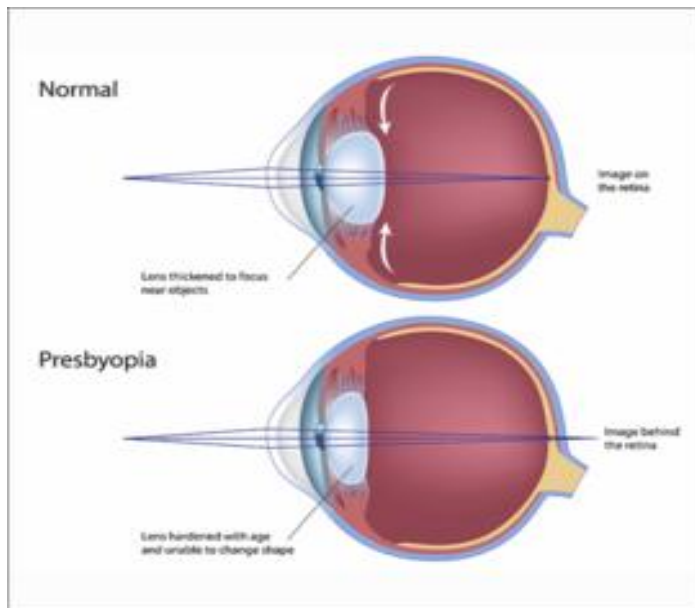
They find it difficult to see nearby objects comfortably and distinctly without corrective eye-glasses. This defect is called Presbyopia.

It arises due to the gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.

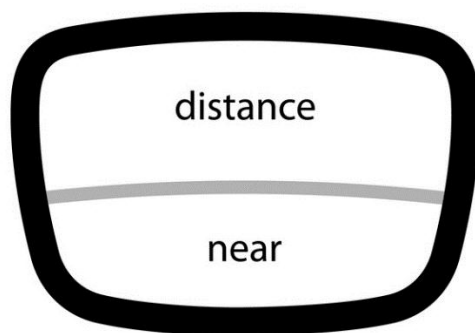
Sometimes, a person may suffer from both myopia and hypermetropia. Such people often require bifocal lenses.

A common type of bi-focal lenses consists of both concave and convex lenses. The upper portion consists of a concave lens.

It facilitates distant vision. The lower part is a convex lens. It facilitates near vision.

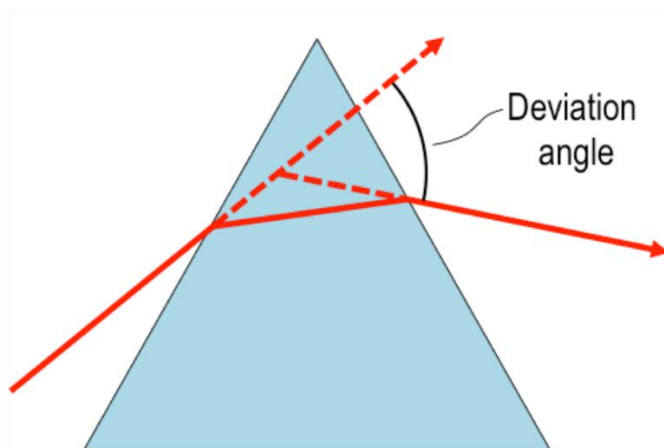
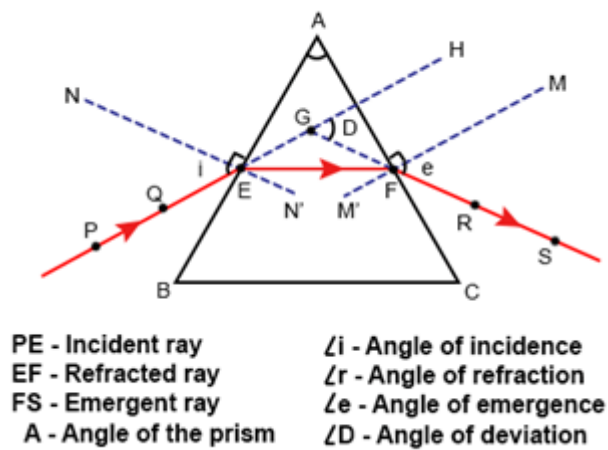
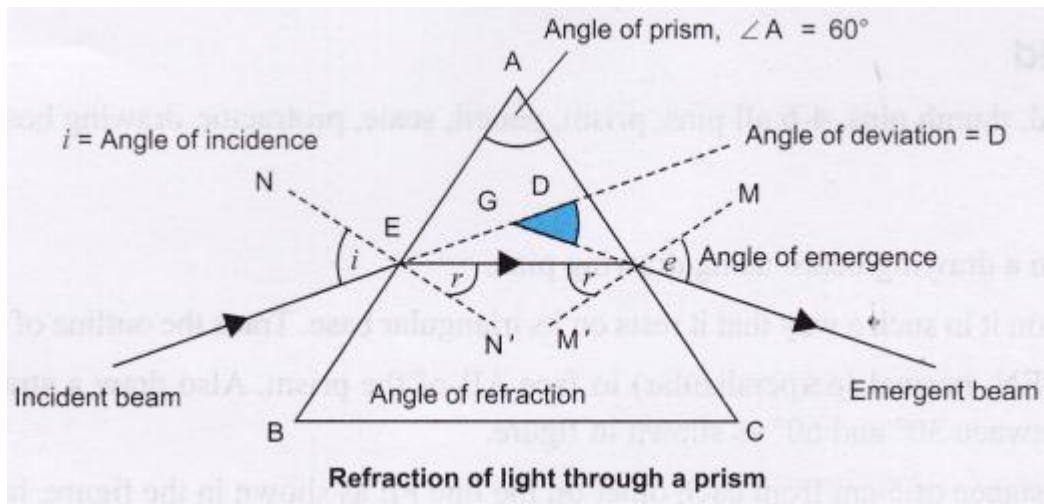


## Bifocal Lens



## REFRACTION OF LIGHT THROUGH A PRISM

Consider a triangular glass prism. It has two triangular bases and three rectangular lateral surfaces. These surfaces are inclined to each other. The angle between its two lateral faces is called the angle of the prism.



Deviation of a ray on passing through a prism depends on the angle of prism, nature of the material of prism and angle of incidence of the ray on one face of the prism.

$$\angle A + \angle D = \angle i + \angle e$$

