WS23

Physics 322
Eye corrections
Myopic eye
Imagine that the cornea of an eye had too much curvature. What impact would this have on the overall power of their eye? Explain.

Suppose that an eye were a little too elongated. Where would rays from a distant point source focus?

The furthest an object can be from a relaxed myopic eye is 2.7 m (far point). This is caused by a malformed cornea. What must the overall power of the eye be based on this information? What is the curvature of the cornea? What is the closest that this person could focus?

Consider: To correct this problem you need to place an optic between the person's eye and the object. A distant object needs to form an image at what location for the myopic eye to focus on it when relaxed? What kind of image will this be? Based on this information, what type of lens will it be?

Determine the focal length of the corrective lens by means of the thin lens equation and by means of refractive powers.

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Hyperopic eye

The hyperopic eye has the problem that the cornea has too little curvature. What impact does too little curvature have on the power of the eye? Where would rays from a distant point source focus?

An alternative is to imagine that the eyeball is compressed. What impact would that have?

Based on these two ideas, what would happen if a point object were placed at the normal near point (25cm from the eye)?

The nearest a person with a hyperopic eye can focus on an object is 75 cm. This is caused by a malformed cornea. What must the overall power of the eye be based on this information? What is the curvature of the cornea? How much accommodation must the person use in order to focus on a distant object?

Consider: To correct this problem you need to place an optic between the person's eye and the object. A distant object needs to form an image at what location for the myopic eye to focus on it when relaxed? What kind of image will this be? Based on this information, what type of lens will it be?

Determine the focal length of the corrective lens by means of the thin lens equation and by means of refractive powers.