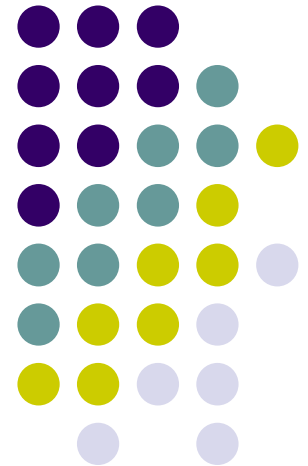
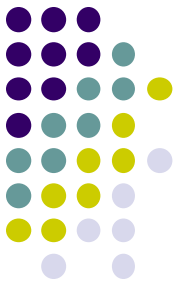


Optics Quiz 2

This quiz is intended to be taken after completion of Chapters 6-9



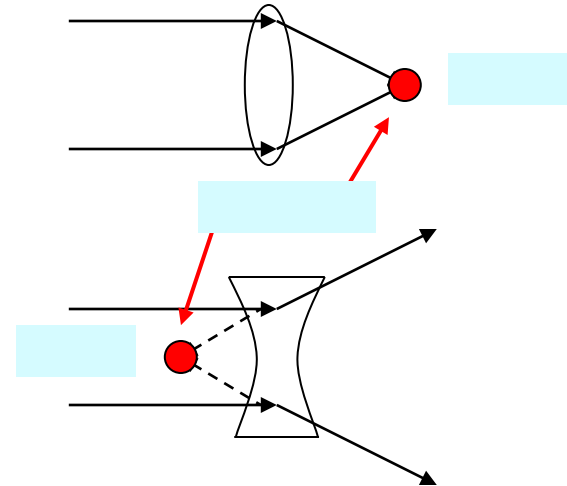
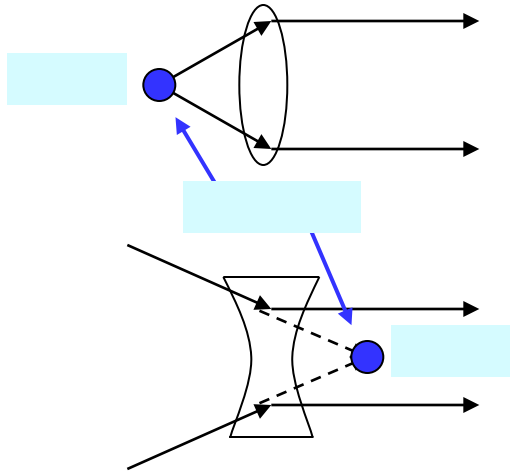
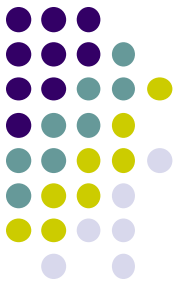
Note: Some questions herein may have appeared first in a copyrighted source. If you own the copyright to a question and would like an acknowledgement or to have the question removed, please contact me EyeDentistAAO@gmail.com



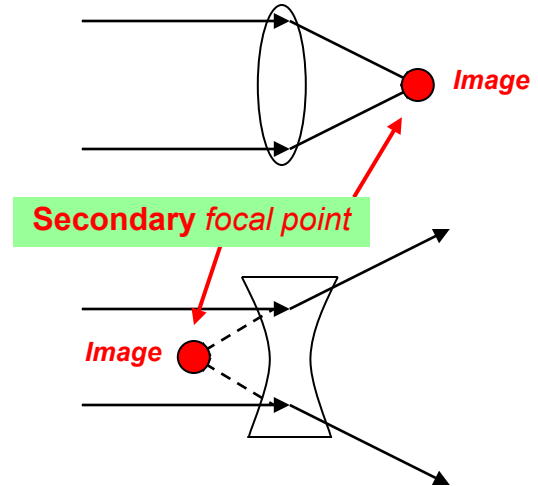
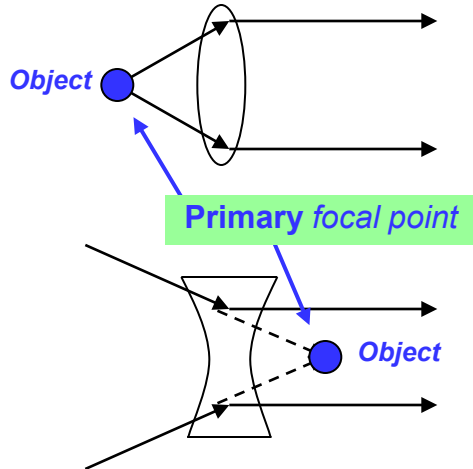
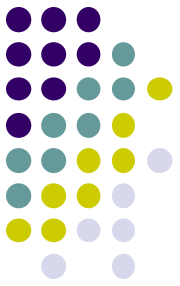
No, you can't use a calculator (and you don't need one anyway)

Note that some questions are callbacks from Quiz 1

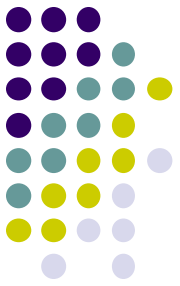
Fill in the blanks...



Fill in the blanks...



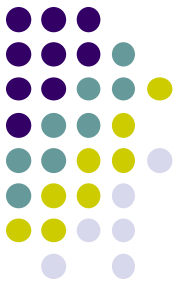
Define...



Conjugate points:

Far point:

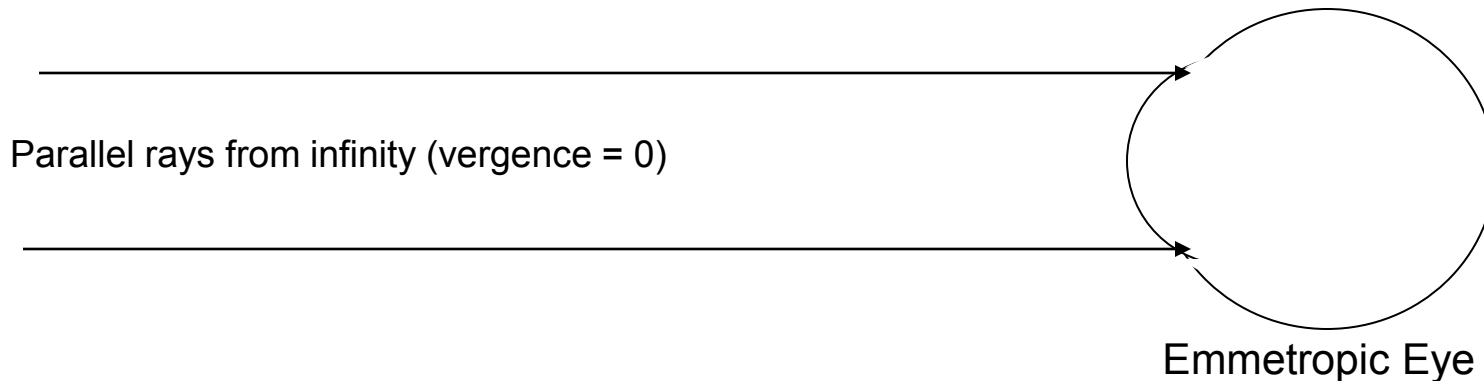
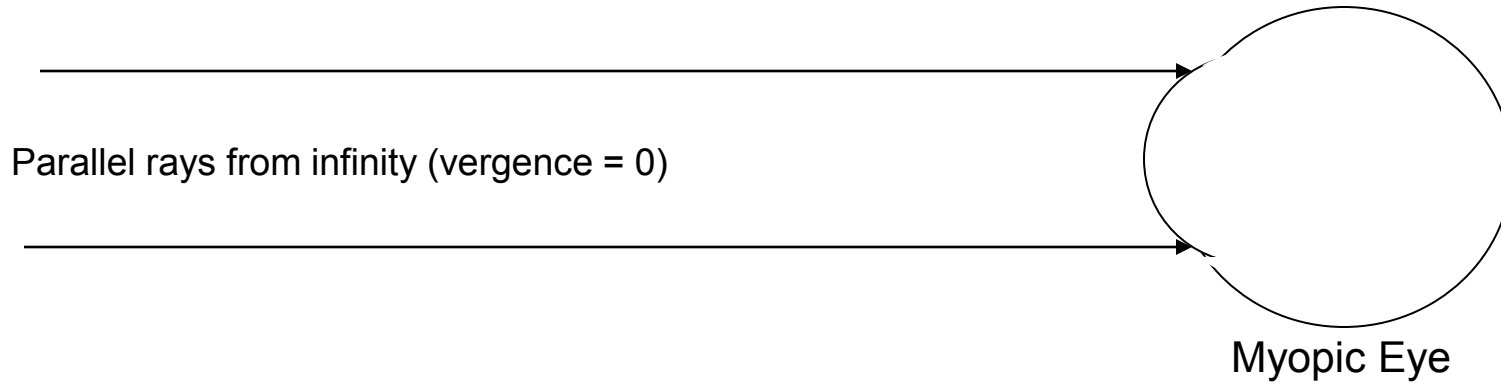
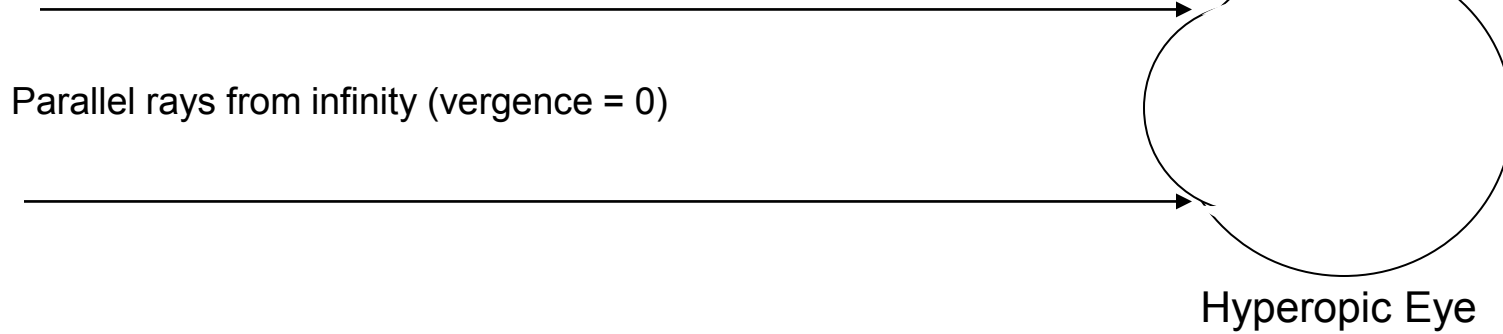
Define...



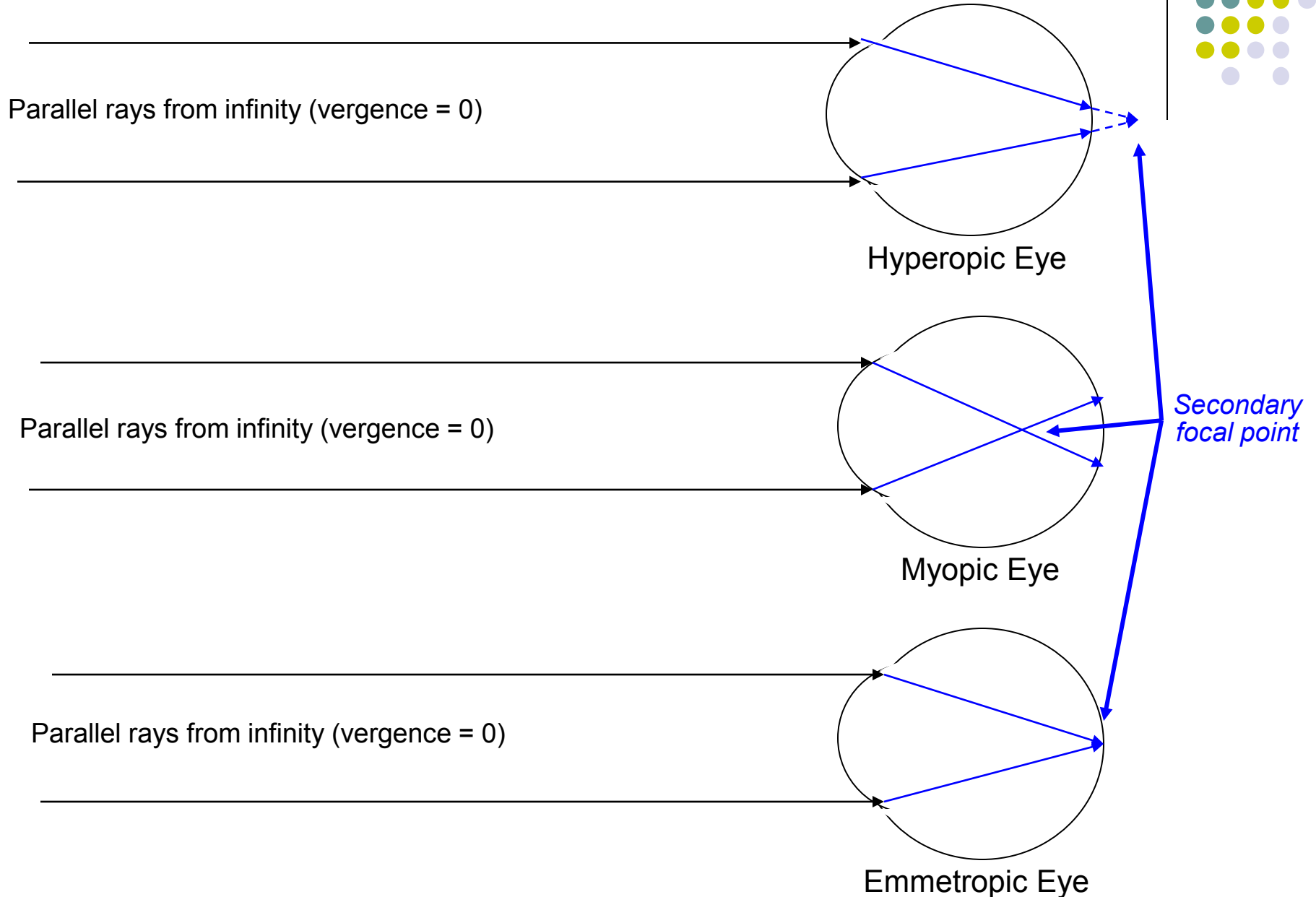
Conjugate points: Two points that are *object* and *image* of one another

Far point: The point in visual space conjugate with the retina when the eye is not accommodating

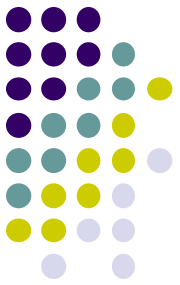
Indicate where the parallel rays will meet for each refractive status by extending the rays. *What is the name for this location?*



Indicate where the parallel rays will meet for each refractive status by extending the rays. *What is the name for this location? **Secondary focal point***

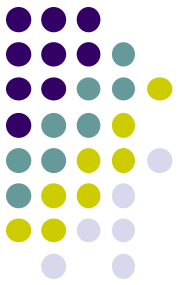


Fill in the blanks



So we could summarize refraction thusly: *Place a lens in front of an eye so that the*
of the lens coincides with the of the eye.

Fill in the blanks



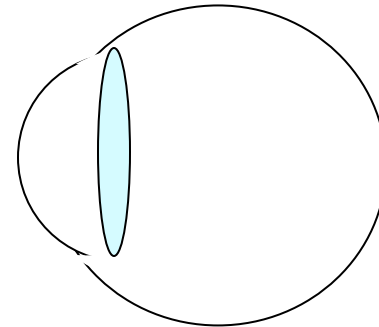
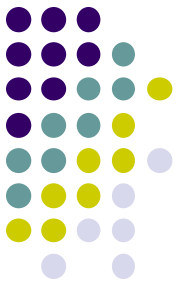
So we could summarize refraction thusly: *Place a lens in front of an eye so that the secondary focal point of the lens coincides with the far point of the eye.*

A pt is a +5 hyperope. He is capable of a total of 10D of accommodation.

- a) Draw the appropriate error lens*
- b) Indicate the location of his far point (draw and label it)*

Absent corrective lenses or surgery:

- c) Where is his near point relative to the corneal plane?*
- d) His range of clear vision is from where to where?*

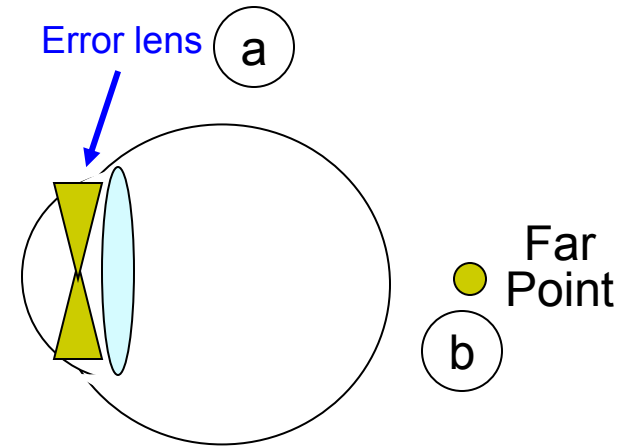
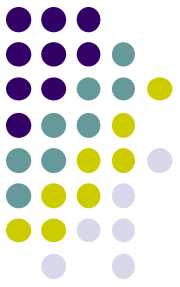


A pt is a +5 hyperope. He is capable of a total of 10D of accommodation.

- a) Draw the appropriate error lens
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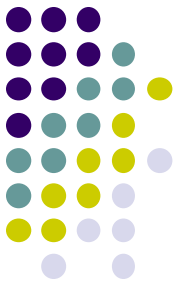


A pt is a +5 hyperope. He is capable of a total of 10D of accommodation.

- a) Draw the appropriate error lens
- b) Indicate the location of his far point (draw and label it)

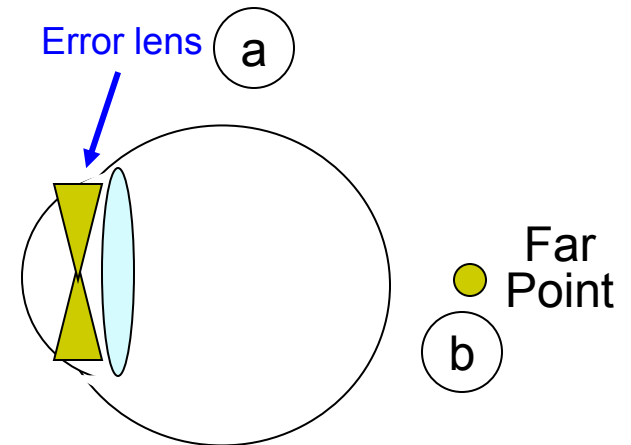
Absent corrective lenses or surgery:

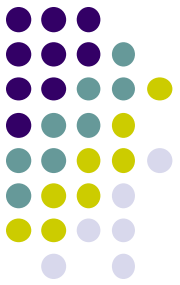
- c) Where is his near point relative to the corneal plane?
- d) His range of clear vision is from where to where?



c) The pt must use 5 of his 10 total diopters of accommodation to see clearly at infinity. This leaves 5D for near. Therefore, his near point is $1/5 = 0.2 \text{ m} = 20 \text{ cm}$ anterior to the corneal plane.

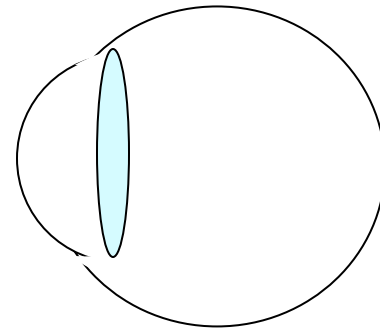
d) His range of clear vision is from 20 cm to infinity.

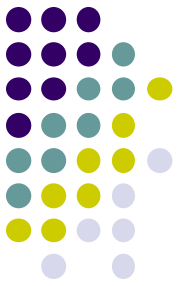




A pt comes to you seeking a contact lens Rx. She currently wears high-fashion specs with a vertex distance of 20 mm. She doesn't have time to be refracted, DAH-leen; Can't you just use her glasses prescription? You lensometer the specs and determine an Rx of -5.5 OU.

- a) Draw the appropriate error lens
- b) Draw her spectacle lens, and indicate the vertex distance
- c) Indicate (draw and label) the location of the secondary focal point of the spectacle lens
- d) Indicate (draw and label) the location of her far point
- e) Which is greater, and by how much—the distance from the cornea to the far point, or the distance from the spectacle lens to its secondary focal point?
- f) Which lenses will be more **plus**—her specs or contact lenses?





A pt comes to you seeking a contact lens Rx. She currently wears high-fashion specs with a vertex distance of 20 mm. She doesn't have time to be refracted, DAH-leen; Can't you just use her glasses prescription? You lensometer the specs and determine an Rx of -5.5 OU.

a) Draw the appropriate error lens

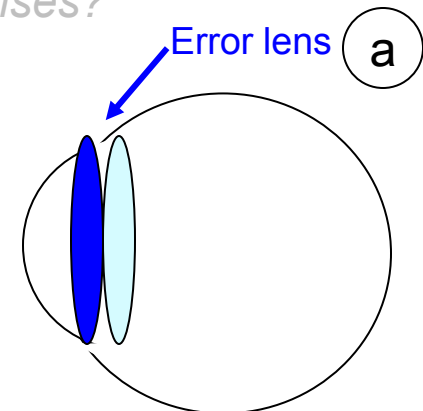
b) Draw her spectacle lens, and indicate the vertex distance

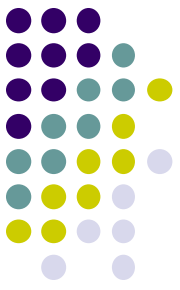
c) Indicate (draw and label) the location of the secondary focal point of the spectacle lens

d) Indicate (draw and label) the location of her far point

e) Which is greater, and by how much—the distance from the cornea to the far point, or the distance from the spectacle lens to its secondary focal point?

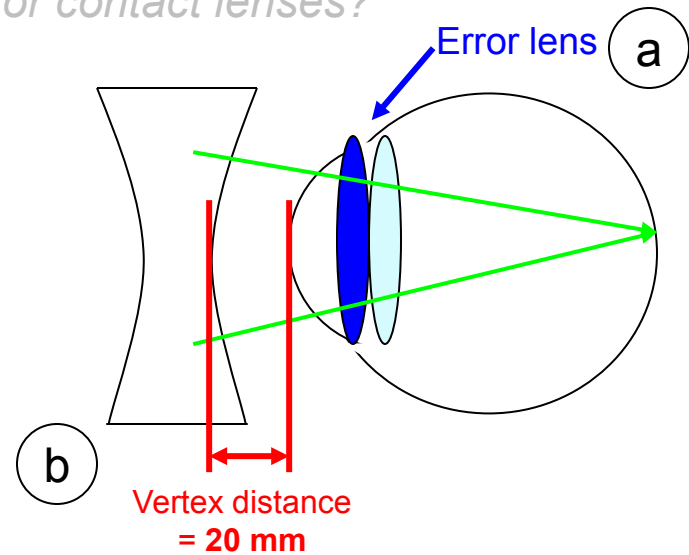
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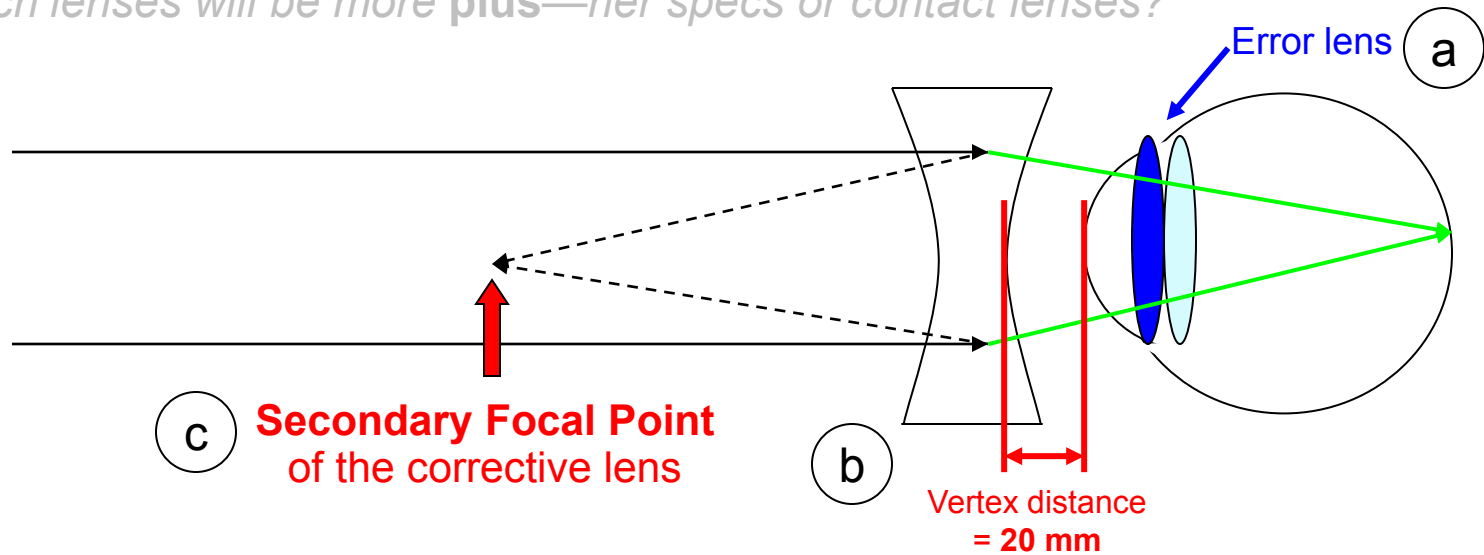
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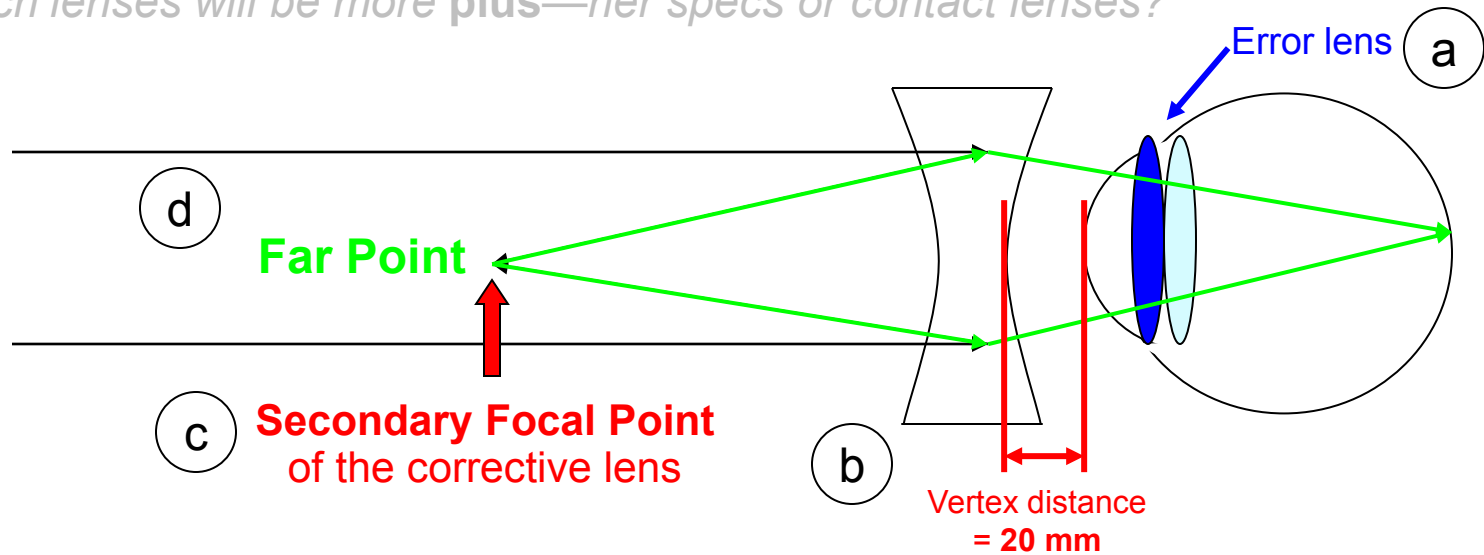
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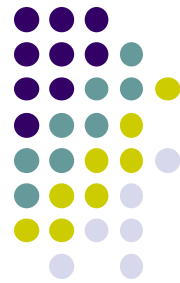


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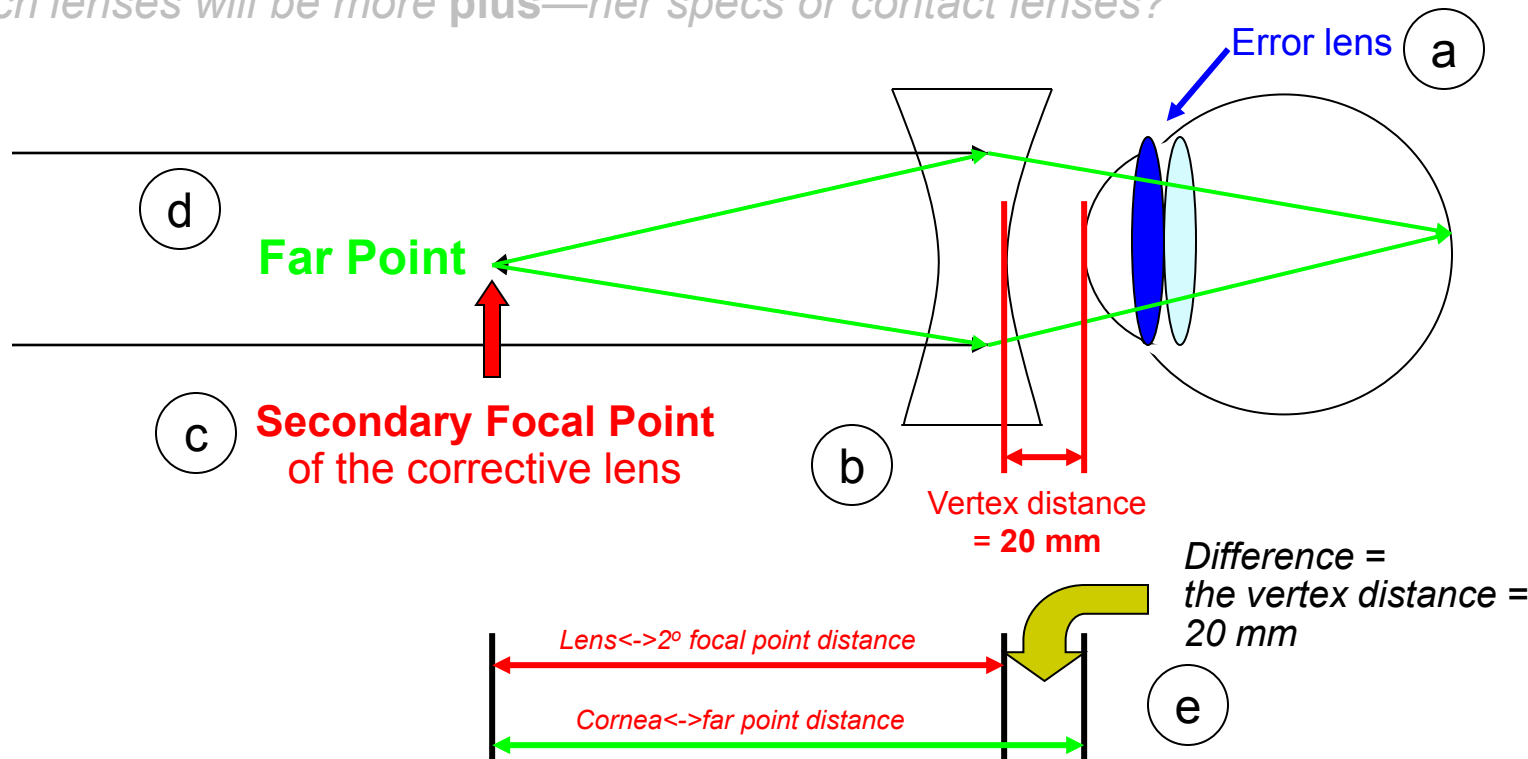
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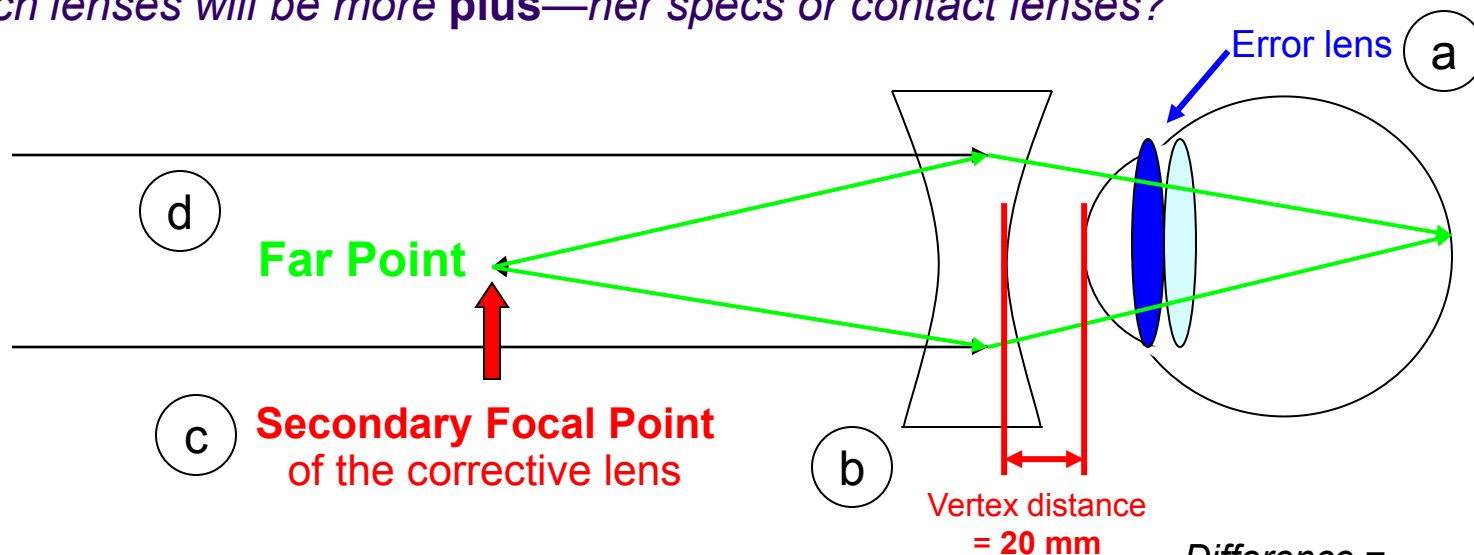
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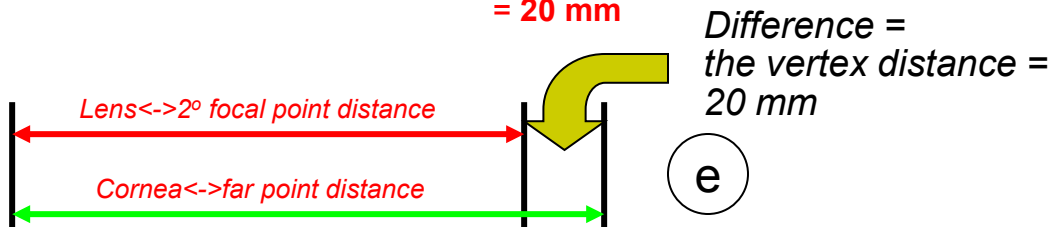
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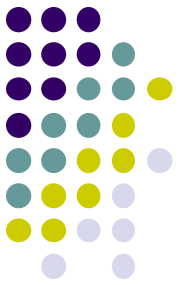


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- Which lenses will be more plus—her specs or contact lenses?



f The contact lenses





You refract an elderly pt and his spouse, and indicate to your tech to write Rxs for both spectacles and contact lenses for each of them. (They lost all of their spectacles and contact lenses in an accident.) The husband calls a few hours later, saying the tech forgot to indicate which Rxs are for him and which are for his wife; further, she forgot to indicate which are for spectacles and which are for contact lenses. You ask him to read the Rxs to you over the phone; he laughs and says 'I wish I could!' and you hear him call out to his wife. She gets on the phone and reads the four Rxs:

+5.0 OU

-5.0 OU

+4.5 OU

-5.5 OU

Based on this information, determine 1) which Rxs are for the wife and which are for the husband; and 2) which are for specs and which are for contact lenses.



You refract an elderly pt and his spouse, and indicate to your tech to write Rxs for both spectacles and contact lenses for each of them. (They lost all of their spectacles and contact lenses in an accident.) The husband calls a few hours later, saying the tech forgot to indicate which Rxs are for him and which are for his wife; further, she forgot to indicate which are for spectacles and which are for contact lenses. You ask him to read the Rxs to you over the phone; he laughs and says 'I wish I could!' and you hear him call out to his wife. She gets on the phone and reads the four Rxs:

*+5.0 OU **HUSBAND***

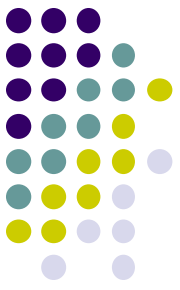
*-5.0 OU **WIFE***

*+4.5 OU **HUSBAND***

*-5.5 OU **WIFE***

Based on this information, determine 1) which Rxs are for the wife and which are for the husband; and 2) which are for specs and which are for contact lenses.

- 1) The wife **must** be the myope, because she could read (the Rxs) without correction.



You refract an elderly pt and his spouse, and indicate to your tech to write Rx's for both spectacles and contact lenses for each of them. (They lost all of their spectacles and contact lenses in an accident.) The husband calls a few hours later, saying the tech forgot to indicate which Rx's are for him and which are for his wife; further, she forgot to indicate which are for spectacles and which are for contact lenses. You ask him to read the Rx's to you over the phone; he laughs and says 'I wish I could!' and you hear him call out to his wife. She gets on the phone and reads the four Rx's:

+5.0 OU **HUSBAND (CLs)**

-5.0 OU **WIFE**

+4.5 OU **HUSBAND (specs)**

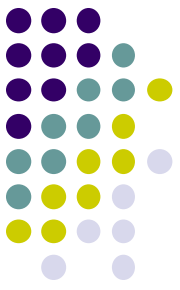
-5.5 OU **WIFE**

Based on this information, determine 1) which Rx's are for the wife and which are for the husband; and 2) which are for specs and which are for contact lenses.

1) The wife **must** be the myope, because she could read (the Rx's) without correction.

2) As for determining which Rx's are for specs and which are for contact lenses: This is a *VERTEX DISTANCE* problem. Remember, *the shorter the vertex distance of a correction, the more plus is needed to put the image on the retina*, so an individual's CL Rx is always more plus than their specs Rx.* This is easy to recognize in hyperopic corrections—the number will be higher for the CLs. This is how we know the husband's specs must be +4.5 and his CLs +5.0.

*Because the impact of vertex distance is trivial in low-power prescriptions, Rx's for low-power specs and CLs may be identical.



You refract an elderly pt and his spouse, and indicate to your tech to write Rx's for both spectacles and contact lenses for each of them. (They lost all of their spectacles and contact lenses in an accident.) The husband calls a few hours later, saying the tech forgot to indicate which Rx's are for him and which are for his wife; further, she forgot to indicate which are for spectacles and which are for contact lenses. You ask him to read the Rx's to you over the phone; he laughs and says 'I wish I could!' and you hear him call out to his wife. She gets on the phone and reads the four Rx's:

+5.0 OU HUSBAND (CLs)

-5.0 OU WIFE (CLs)

+4.5 OU HUSBAND (specs)

-5.5 OU WIFE (specs)

Based on this information, determine 1) which Rx's are for the wife and which are for the husband; and 2) which are for specs and which are for contact lenses.

- 1) The wife **must** be the myope, because she could read (the Rx's) without correction.
- 2) As for determining which Rx's are for specs and which are for contact lenses: This is a *VERTEX DISTANCE* problem. Remember, *the shorter the vertex distance of a correction, the more plus is needed to put the image on the retina*, so an individual's CL Rx is always more plus than their specs Rx.* This is easy to recognize in hyperopic corrections—the number will be higher for the CLs. This is how we know the husband's specs must be +4.5 and his CLs +5.0. However, in a myopic correction the number (which represents the amount of *minus* power) in a CL Rx will be **lower**. The key is to recognize that when you make an Rx less minus, you are making it **more plus**. Thus, the wife's specs are -5.5, and her CLs are the more-plus -5.0.