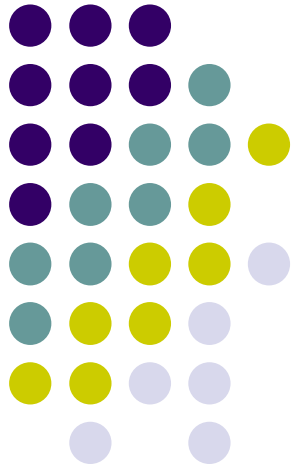
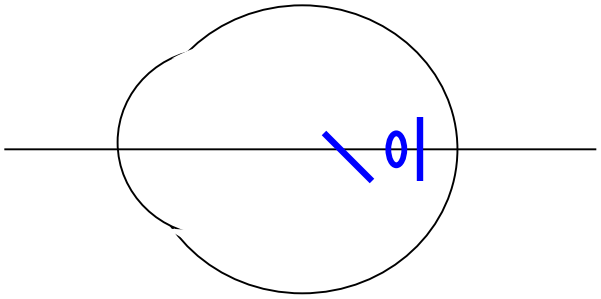
Astigmatic Refractive Error: Types of Astigmatism

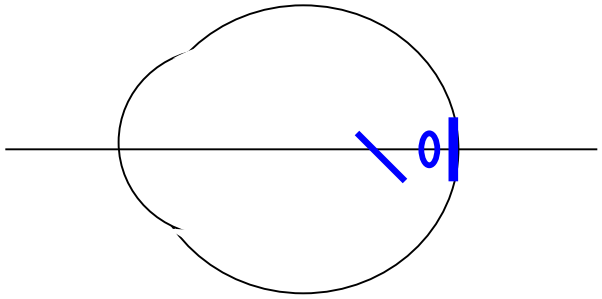
Basic Optics, Chapter 14



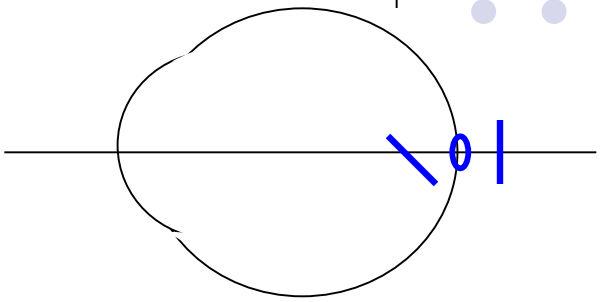
Types of Astigmatism



Compound Myopic

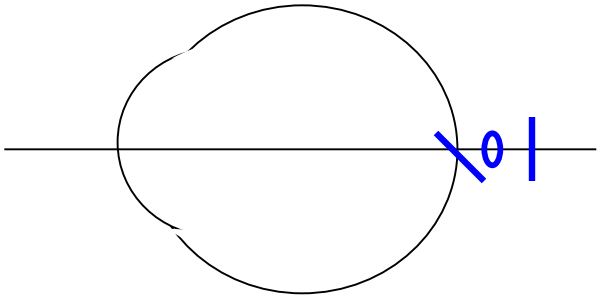


Simple Myopic

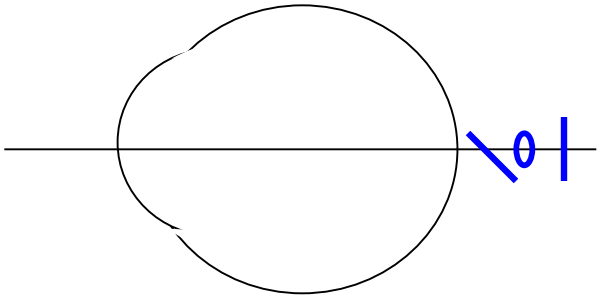


Mixed

Can you determine which type of astigmatism a patient has, just by evaluating their refraction? ***YES***



Simple Hyperopic



Compound Hyperopic

Types of Astigmatism

- To determine astigmatism type:

  1) Express the refraction in both plus- and minus-cylinder formats

Types of Astigmatism

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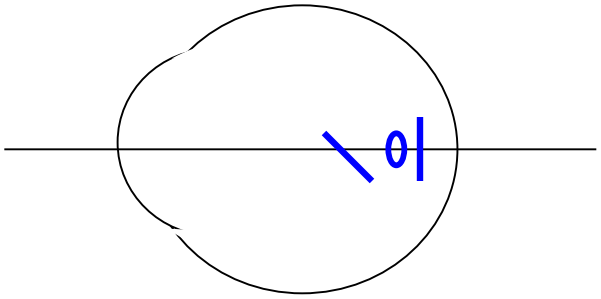
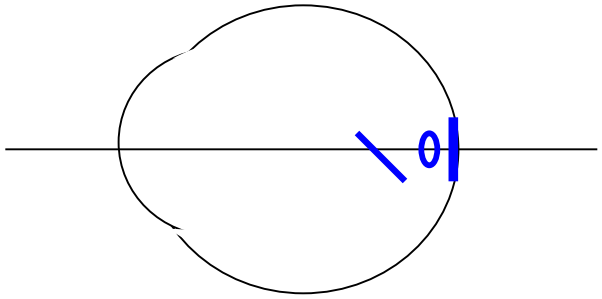
Sphere Signs	Type of Astigmatism
Minus/Minus	Compound Myopic
Minus/Plano	Simple Myopic
Plus/Minus	Mixed
Plus/Plano	Simple Hyperopic
Plus/Plus	Compound Hyperopic

Types of Astigmatism



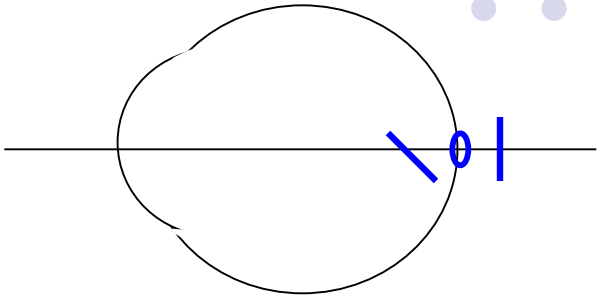
Compound Myopic

Minus/Minus



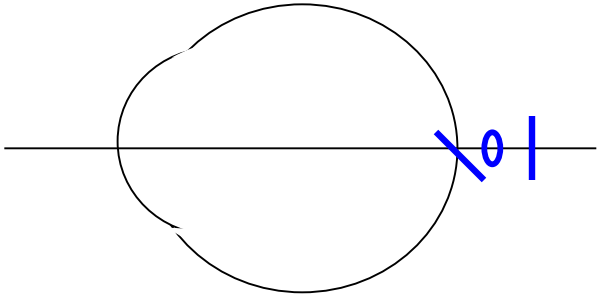
Simple Myopic

Minus/Plano



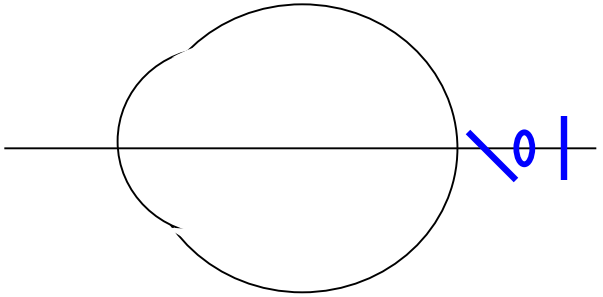
Mixed

Minus/Plus



Simple Hyperopic

Plano/Plus



Compound Hyperopic

Plus/Plus

Types of Astigmatism

- Examples: Determine the type of astigmatism present for each of the following refractions:

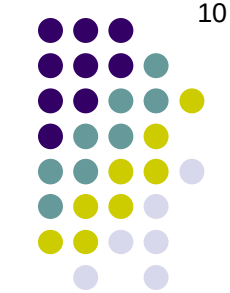
Types of Astigmatism

- *+3.0 -2.0 x 080*

Types of Astigmatism

- *+3.0 -2.0 x 080*
  - In plus cylinder: *+1.0 +2.0 x 170*

Types of Astigmatism



- *+3.0 -2.0 x 080*
  - In plus cylinder: *+1.0 +2.0 x 170*
  - The spherical component is *plus* in both plus- and minus-cylinder format, therefore, it indicates

Compound Hyperopia

Types of Astigmatism

- *+1.0 -4.0 x 080*

Types of Astigmatism

- *+1.0 -4.0 x 080*
  - In plus cylinder: *-3.0 +4.0 x 170*

Types of Astigmatism

- *+1.0 -4.0 x 080*
  - In plus cylinder: *-3.0 +4.0 x 170*
  - The spherical component is *plus* in minus-cylinder format but *minus* in plus-cylinder format, therefore, it indicates

Mixed Astigmatism

Types of Astigmatism

- *-5.0 +9.0 x 090*

Types of Astigmatism

- *-5.0 +9.0 x 090*
  - In minus cylinder: *+4.0 -9.0 x 180*

Types of Astigmatism

- *-5.0 +9.0 x 090*
  - In minus cylinder: *+4.0 -9.0 x 180*
  - The spherical component is *plus* in minus-cylinder format but *minus* in plus-cylinder format, therefore, it indicates

Mixed Astigmatism

Types of Astigmatism

- *-2.5 +1.5 x 128*

Types of Astigmatism

- *-2.5 +1.5 x 128*
  - In minus cylinder: *-1.0 -1.5 x 038*

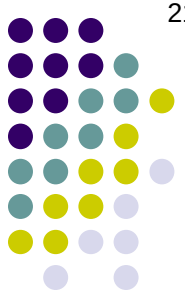
Types of Astigmatism

- *-2.5 +1.5 x 128*
  - In minus cylinder: *-1.0 -1.5 x 038*
  - The spherical component is *minus* in both minus- and plus-cylinder formats, therefore, it indicates

Compound Myopia

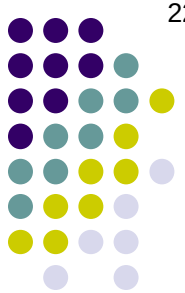
Classification of Astigmatism

Classification of Astigmatism



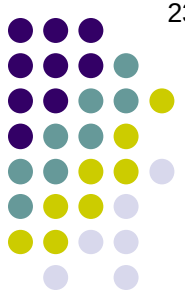
- *With-the-Rule* and *Against-the-Rule*
  - Old terms, still in use
  - Useful because they facilitate communication between ophthalmologists and other ophthalmic professionals (optometrists, opticians)

Classification of Astigmatism



- *With-the-Rule* and *Against-the-Rule* cont
  - Why might our ‘communications’ need facilitating?

Classification of Astigmatism



- *With-the-Rule* and *Against-the-Rule* cont
  - Why might our ‘communications’ need facilitating?
    - The way we work is a potential source of confusion
      - Ophthalmologists usually refract in ***plus*** cylinder
        - Easier (for the refractionist)
      - Optometrists often refract in ***minus*** cylinder
      - Opticians ‘think’ in ***minus*** cylinder
        - Glasses are ground in minus cylinder

Classification of Astigmatism

- *With-the-Rule* and *Against-the-Rule* cont
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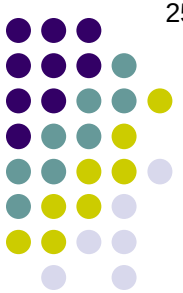
Consider: If an ophthalmologist says to an optom ‘this patient has a lot of cyl at 180^{o},’ the MD is thinking in plus cyl, but the OD is thinking in minus--each has the *opposite* impression from her counterpart! But if the MD says ‘this patient has a lot of with-the-rule astigmatism,’ both will be on the same page.

Classification of Astigmatism



- *With-the-Rule* Astigmatism
  - So named because it is the more common type

Classification of Astigmatism

- *With-the-Rule* Astigmatism
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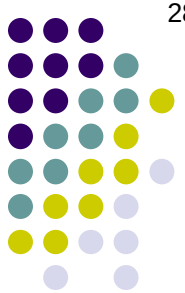
  - Cornea is shaped like a football lying on the ground (assuming astigmatism is corneal)

Classification of Astigmatism

- *With-the-Rule* Astigmatism
  - So named because it is the more common type
  - Cornea is shaped like a football lying on the ground (assuming astigmatism is corneal)
    - More plus power at ~090 meridian (axis 180)
    - Corrected with:
      - plus cylinder power at the 180 meridian (axis 090), ***or***
      - minus cylinder power at the 090 meridian (axis 180)

Doesn't have to be at ***exactly*** 090/axis 180; +/- up to 20^{o} still counts

Classification of Astigmatism



- *Against-the-Rule* Astigmatism
  - So named because it is the less common type

Classification of Astigmatism

- *Against-the-Rule* Astigmatism
  - So named because it is the less common type
  - Cornea is shaped like a football standing on a tee (again, assuming astigmatism is corneal)

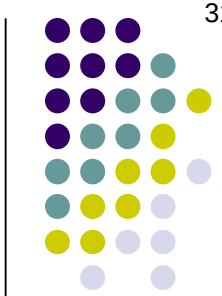
Classification of Astigmatism

- *Against-the-Rule* Astigmatism
  - So named because it is the less common type
  - Cornea is shaped like a football standing on a tee (again, assuming astigmatism is corneal)
    - More plus power at ~180 meridian (axis 090)
    - Corrected with:
      - plus cylinder power at the 090 meridian (axis 180), ***or***
      - minus cylinder power at the 180 meridian (axis 090)

Ditto

T

Classification of Astigmatism



- Comparing astigmatism types
  - In young people, *with-the-rule is far more common than against-the-rule*

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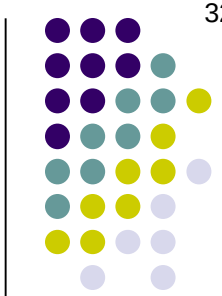
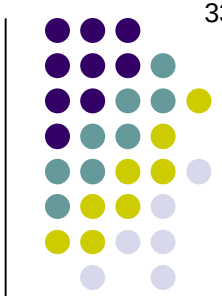


- Comparing astigmatism types
  - In young people, *with-the-rule is far more common than against-the-rule*
    - *Tight Eyelids* hypothesis
      - Young eyelids are tight→pressure on the upper and lower cornea→vertical meridia steepened→with-the-rule astigmatism
    - Some refractive surgeons will not operate on a young person with corneal against-the-rule astigmatism
      - Consider it to be prima facie evidence of corneal ectasia

Classification of Astigmatism



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    - Some refractive surgeons will not operate on a young person with corneal against-the-rule astigmatism
      - Consider it to be prima facie evidence of corneal ectasia
  - In the elderly, *against-the-rule is more common*