*Note: I Uses PC237\_summary a for topics 1 to 3 and use PC237\_summary b for the rest.*

**Nature of light**

Photon Energy:

Where:

* E represents Photon Energy
* h is the plank Constant
* v is the frequency of the photon

Relations between wavelength, frequency, and speed:

|  |  |
| --- | --- |
| In air |  |
| In media |  |

Where:

* In Air:
  + c = speed of light
  + = wavelength
  + = frequency
* In Media
  + = ?
  + c = speed of light
  + n = ?
  + = wavelength
  + 0 = ?

**Geometrical Optics**

Law of reflection:

Where:

* = angle of incidence
* = angle of reflection

Snell’s Law

Where:

* = first medium’s index of refraction (incoming light ray)
* = second medium’s index of refraction (outgoing light ray)
* = angle at which the incoming ray of light enters the first medium
* = angle at which the outgoing ray of light exits the second medium

Fermat’s Principle

Where:

* OPL = Optical Path Length
* c = speed of light?
* t = time in transit

Total internal reflection

If the following condition is true:

Then you can use this equation:

Where:

* = Critical angle
* = first medium’s index of refraction
* = first medium’s index of refraction

Refraction through Plane Surfaces

If the following condition is true:

The following can be assumed for this case:

Therefore:

Where:

* s = source?
* s’ = apparent source?
* = first medium’s index of refraction
* = first medium’s index of refraction

Reflection at a spherical surface

|  |  |
| --- | --- |
| Mirror equation |  |
| Lateral magnification |  |

Where:

* Mirror Equation
  + s = ?
  + s’ = ?
  + f = focal point
* Lateral Magnification
  + = initial height?
  + = final height?
  + s = ?
  + s’ = ?

Conversion Table

Refraction at a spherical surface

|  |  |
| --- | --- |
| Refraction equation |  |
| Speical Case (R → ∞) |  |
| Lateral Magnification |  |

Where:

* Refraction Equation
  + s = source?
  + s’ = apparent source?
  + = first medium’s index of refraction
  + = first medium’s index of refraction
  + R = ?
* Special Case
  + s = source?
  + s’ = apparent source?
  + = first medium’s index of refraction
  + = first medium’s index of refraction
* Lateral Magnification
  + = initial height?
  + = final height?
  + s = ?
  + s’ = ?
  + = first medium’s index of refraction
  + = first medium’s index of refraction