Note #7 : Mirror and Magnification Equations

The characteristics of an image can be predicted using ray diagrams or by using equations.

Mirror Equation

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

Where :

f = focal length (positive if concave, negative if convex)

d_i = distance between the mirror and the image (measured along the principal axis from the vertex)
    d_i is positive if the image is real
    d_i is negative if the image is virtual (negative d_i means behind the mirror)

d_o= distance between the mirror and the object

Magnification Equation

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

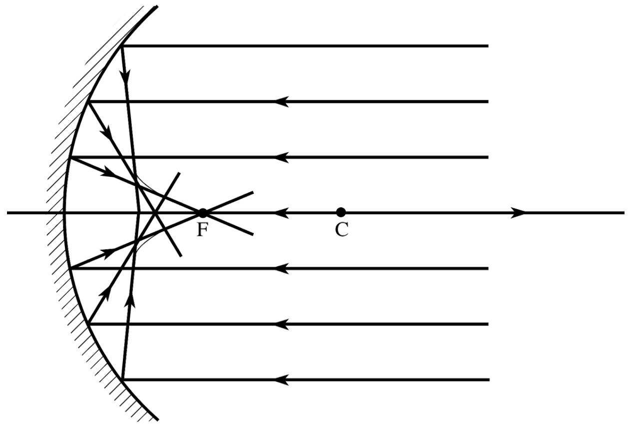
Where :

m = magnification
    If the magnitude of m > 1, the image is larger (it is magnified)
    If the magnitude m is between 0 and 1 then the image is smaller
    If m is negative then the image is inverted.

h_i = the height of the image
    h_i is positive if the image is upright
    h_i is negative if the image is inverted

h_o= the height of the object

Spherical Aberration
When light rays that are parallel to the principal axis hit a curved mirror near the edges, the reflected rays do not at the focal point. As a result the focal point becomes spread out over a larger area and the image becomes distorted (or blurry).



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