Mirror Equations

The Mirror Equation of Magnification

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

* f= focal length
    * Positive in a concave mirror, Negative in a convex mirror
* d^o = distance of object
    * Always positive (always in front of mirror)
* d^i = distance of image
    * Positive if the image is real
    * Negative if the image is virtual

* Determine the image distance for a 10.0 cm tall object placed 60 cm from a concave mirror having a focal length of 20.0 cm.

* A convex mirror has a focal length of -12.3 cm. An object is placed 56.8 cm from the mirror's surface. Determine the image distance.

Calculating Magnification

Magnification

* **Magnification:** The measure of how much larger or smaller an image is compared to an object.
  * Expressed as a ratio and has no units.
  * Two measurements within the equation has to be the same units.

Magnification

Magnification = $\frac{\text{image height}}{\text{object height}}$

$$M = \frac{h^i}{h^o}$$

Magnification

Magnification = $-\frac{\text{image distance}}{\text{object distance}}$

$$M = -\frac{d^i}{d^o}$$

Magnification

* If magnification is greater than 1, the image is larger than the object
* If magnification is smaller than 1, the image is smaller than the object.
* A negative magnification means the image is inverted and real.
* A positive magnification means the image is upright and virtual

* Determine the height of the image for a 10.0 cm tall object placed 60 cm from a concave mirror having a focal length of 20.0 cm.