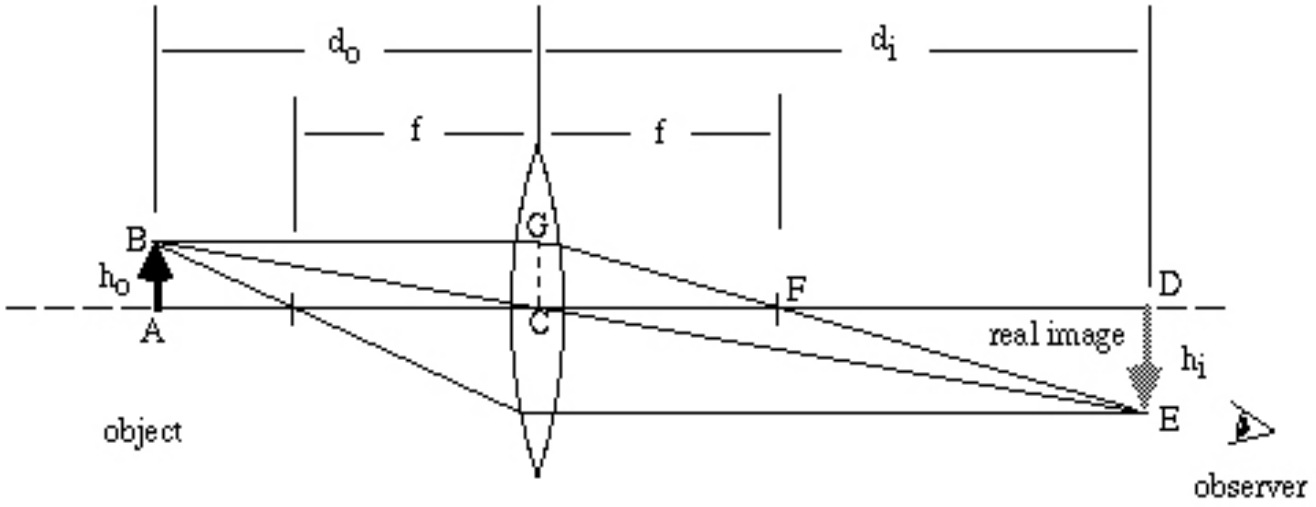
There are two ways to determine the characteristics of images formed by lenses:

- Ray diagrams
- Algebraic equation

LENS TERMINOLOGY



Where:
d_o = distance from the object to the optical centre
d_i = distance from the image to the optical centre
h_o = height of the object
h_i = height of the image
f = focal length of the lens; distance from the optical centre to the principal focus (F)

The Thin Lens Equation	Magnification Equation
$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$	$$M = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$$
• Image distances (d_i) are positive for real images (opposite side of lens) • Image distances are negative for virtual images (same side of lens) • Focal length (f) is positive for converging lenses and negative for diverging lenses.	• Magnification is positive for an upright image. • Magnification is negative for an inverted image.

Example 1
A converging lens has a focal length of 17 cm. A candle is located 48 cm from the lens. What type of image will be formed, and where will it be located?

Example 2
An object 8.5 cm high is placed 28 cm from a converging lens. The focal length of the lens is 12 cm. Calculate the image distance and the image height.

Example 3
A diverging lens has a focal length of 29 cm. A virtual image of a marble is located 13 cm in front of the lens. Where is the marble located?

Example 4
A small toy building block is placed 7.2 cm in front of a lens. An upright, virtual image of magnification 3.2 is noticed. Where is the image located?