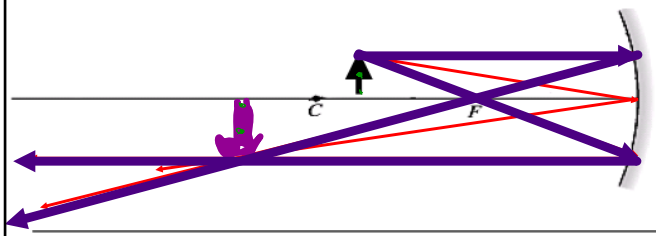


Image Properties
Case 3:

candle between f&2f:

real, inverted, larger

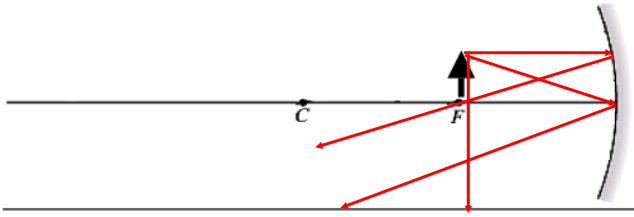


Image Properties
Case 4:

candle at f:

no image

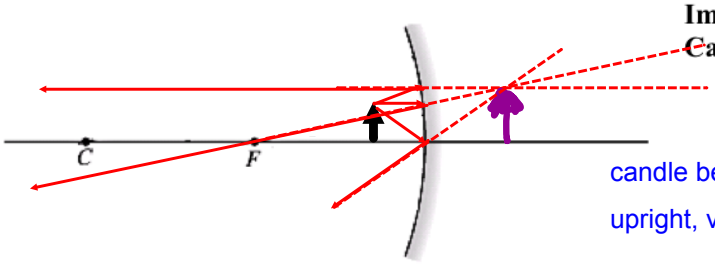


Image Properties
Case 5:

candle between mirror&f:

upright, virtual, enlarged

Application:

Convex Mirror

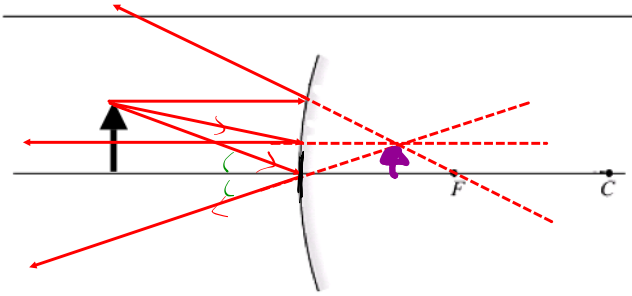


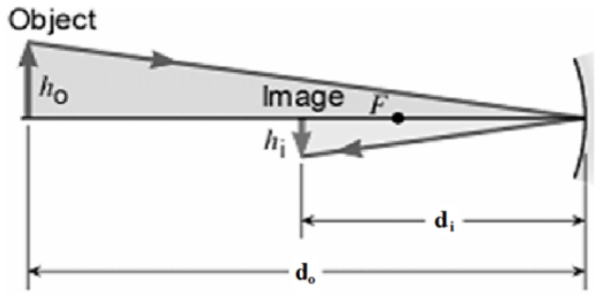
image smaller, upright, virtual

Application:

1. Under what circumstances will a mirror form a real image? converging mirror, outside f
2. Under what circumstances will a mirror form a virtual image? converging mirror, inside f

diverging mirror, flat mirror

Calculating Locations and Sizes of Images



d_o (or u) = obj distance

d_i (or v) = image distance

h_o = obj height

h_i = image height

Sign Convention real = +

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

Linear Magnification $M = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$

1. A 2.0-cm-high object is placed 7.10 cm from a concave mirror whose radius of curvature is 10.20 cm. $f = 5.10\ cm$

a) Locate the image by means of a ray diagram.

b) Calculate the location of the image.

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

$d_i = \left(\frac{1}{f} - \frac{1}{d_o}\right)^{-1} = \left(\frac{1}{5.1\,cm} - \frac{1}{7.1\,cm}\right)^{-1}$

$= 18.1\ cm$

c) Calculate the magnification of the mirror.

$M = \frac{h_i}{h_o} = \frac{-d_i}{d_o} = \frac{-18.1\,cm}{7.1\,cm} = 2.55$

d) Calculate the size of the image.

e) Describe the image.

$M = h_i / h_o$

$h_i = -2.55 \times 2\,cm$

$= -5.1\ cm$

2. An object is placed 6.00 cm in front of a concave mirror that has a 10.0-cm focal length. $f = +10\ cm$

a) Determine the location of the image.

b) The object is 1.2 cm high. Find the height of the image.

3. A convex mirror is used to reflect light from an object placed 66 centimeters in front of the mirror. The focal point is 46 centimeters from the mirror. Find the location of the image. $-46\ cm$