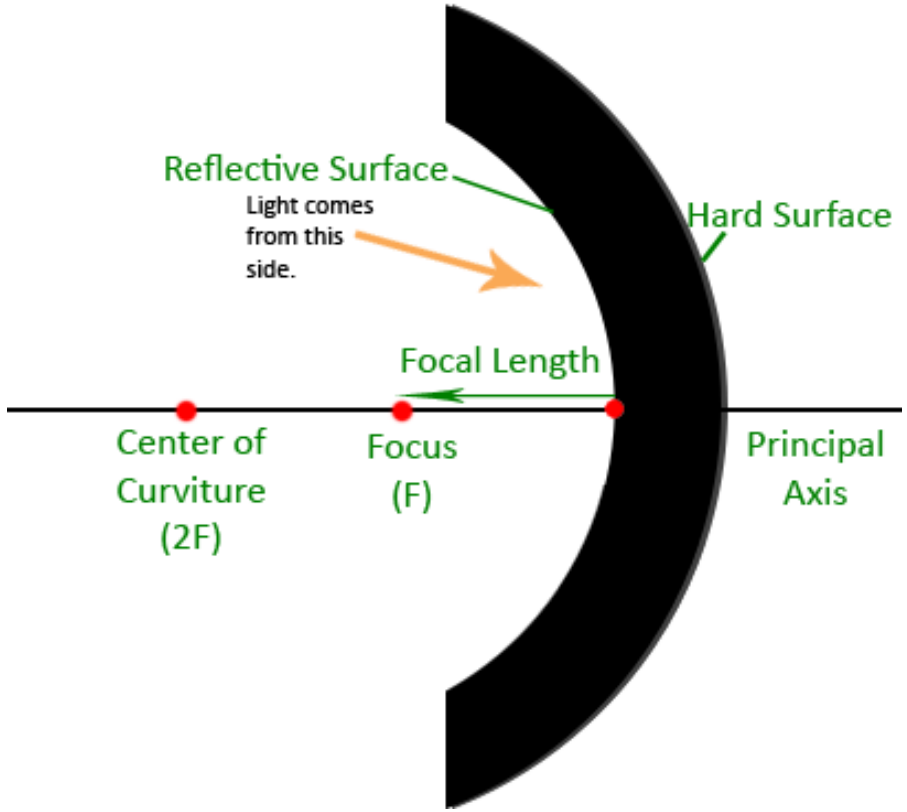
Parabolic Mirrors

Concave & Convex

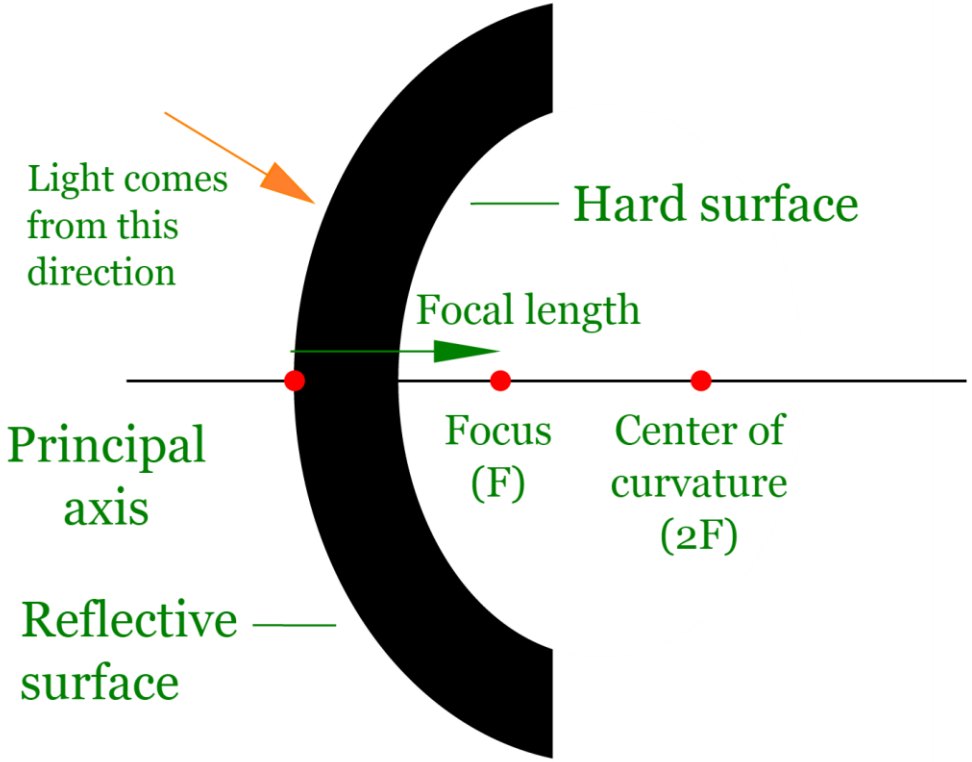
Two types of parabolic mirrors

Concave

- Think “cave”… you can sit inside of one

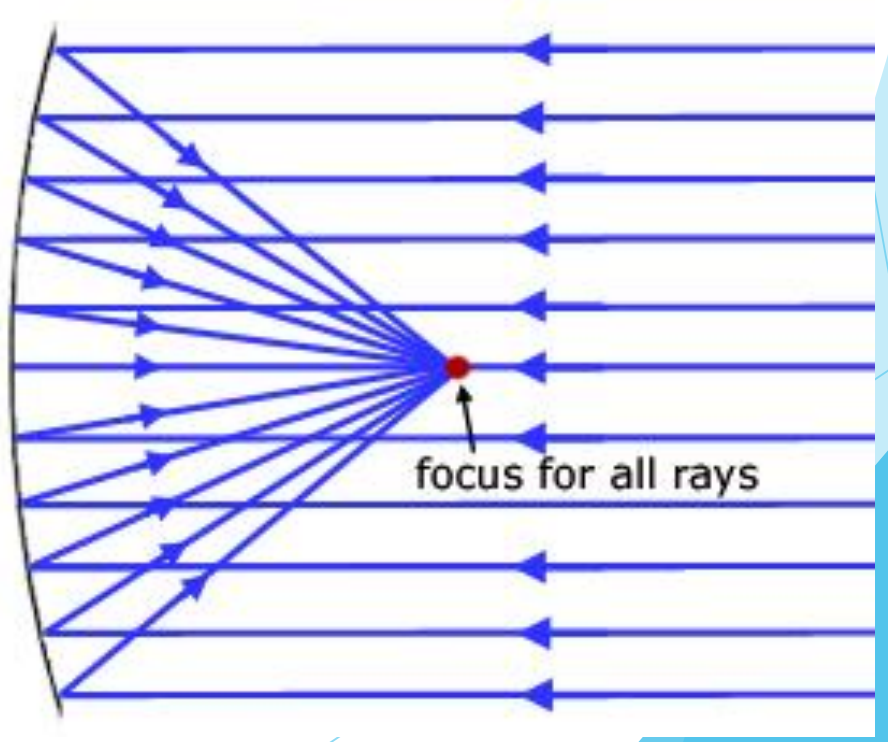


Convex



Focus

- The point where all light rays reflected off of a mirror converge
  - Focal Length: length from the reflecting surface of the mirror to the focus



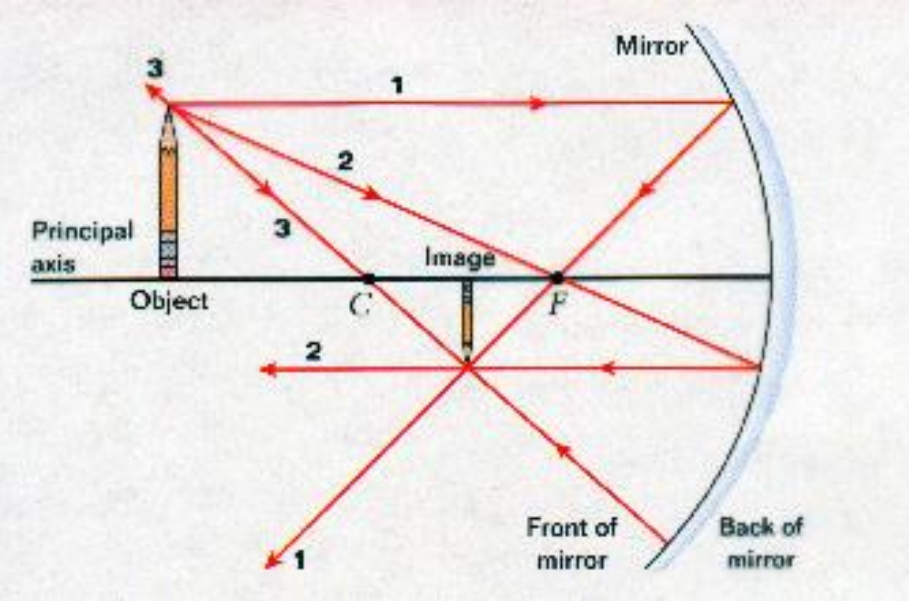
Mirror Equation

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

f = focal length

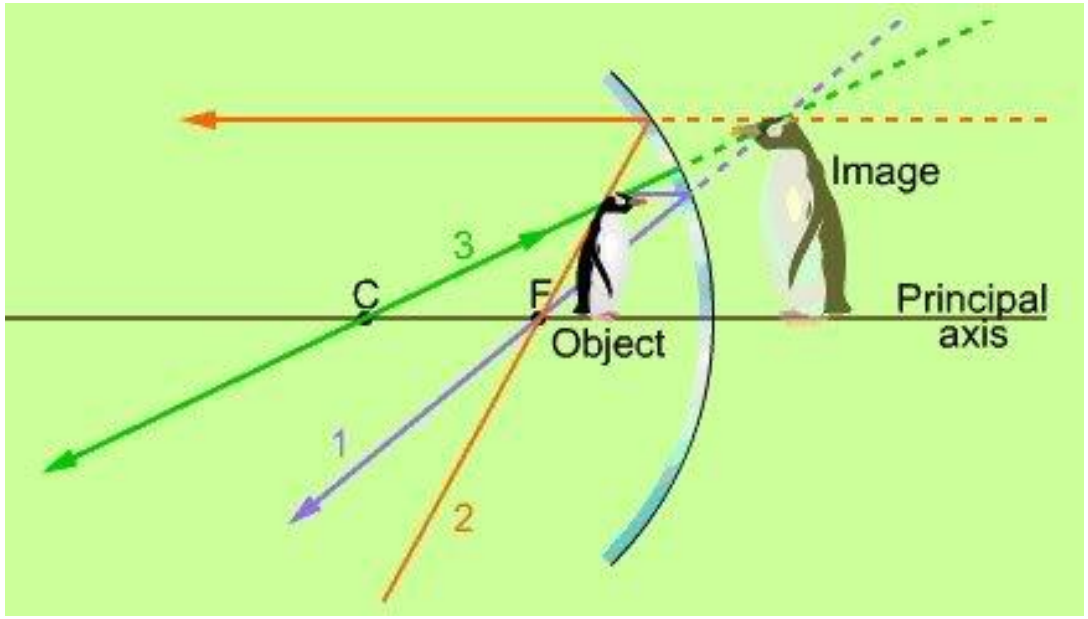
d_o = object dist.

d_i = image distance



Real vs. Virtual

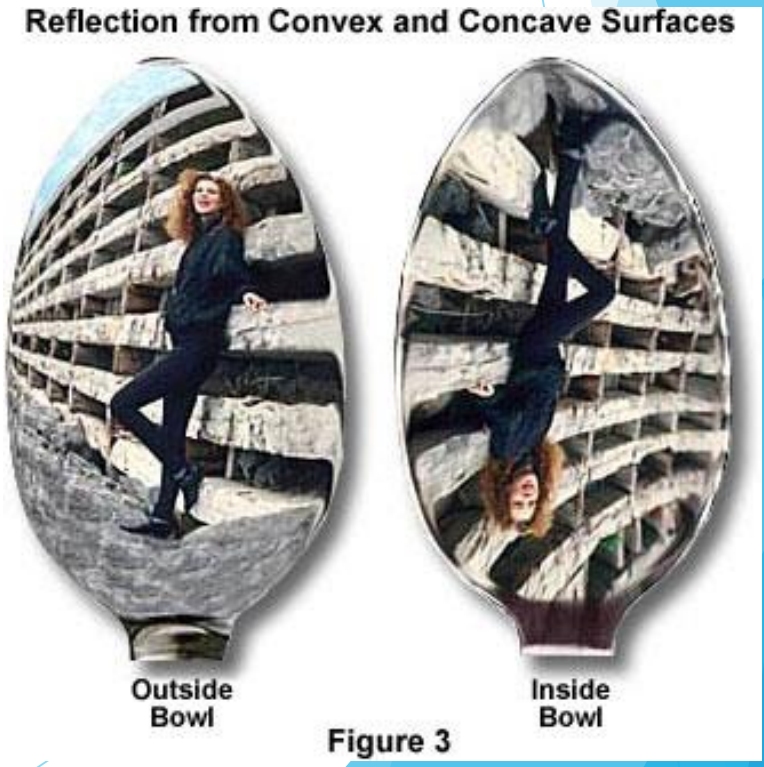
- Anything “in front” of the mirror (where the light is coming from) is considered **real** and has a positive value
- Anything “behind” the mirror (where light never reaches) is considered **virtual** and has a negative value



Other features

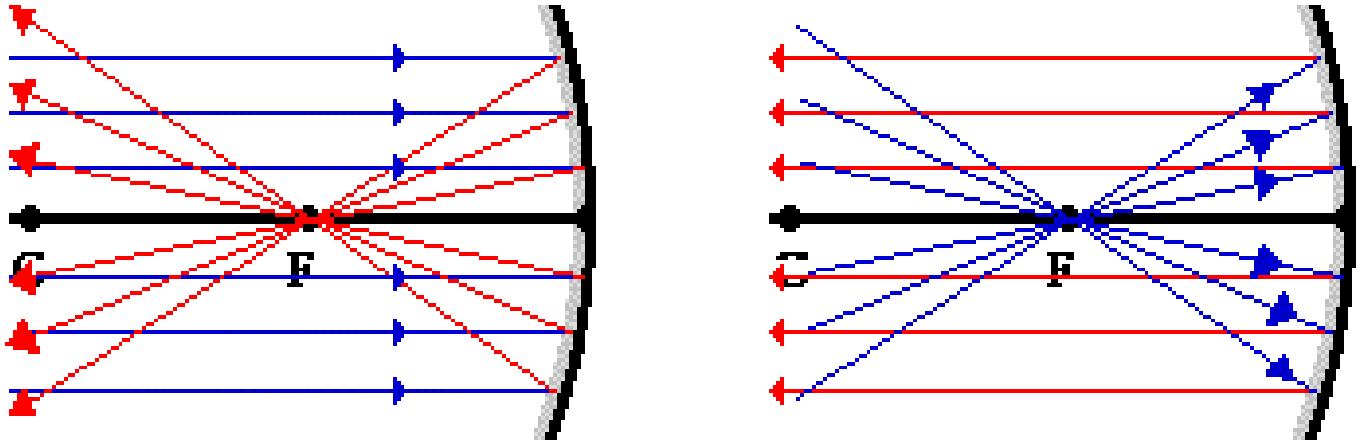
- A magnification >1 means:
  - Image is larger than object
- A magnification <1 means:
  - Image is smaller than object

- Parabolic mirrors can create
  - Upright images
  - Inverted (upside-down) images



Rules of Reflection (Concave Mirrors)

- Incident light rays traveling parallel to the principal axis always reflect through the focal point.



- Incident light rays that travel through the focal point always reflect parallel to the principal axis.

Ray Diagram

- Based on rules of reflection
- Both rays must start from the object