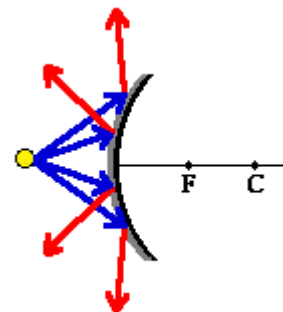


## Tutorial: Drawing Ray Diagrams for convex mirrors

A convex mirror is sometimes referred to as diverging mirror due to the fact that incident light will reflect off the mirror surface and diverge. The figure shows four rays originating from one point and incident on a convex mirror. They will each reflect according to the law of reflection. After reflection, the light rays diverge.

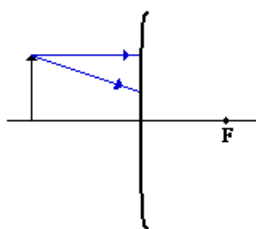
For this reason the rays will never intersect in on the object side of the mirror. Thus a convex mirror will never produce a real image.

For a convex mirror the focal point  $F$  is located behind the mirror, as is the center point  $C$ .

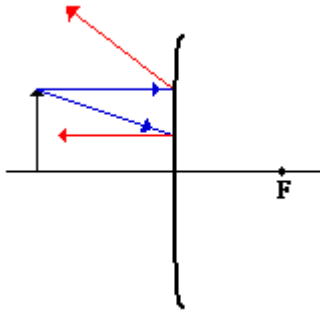


### Drawing ray diagrams for a convex mirror:

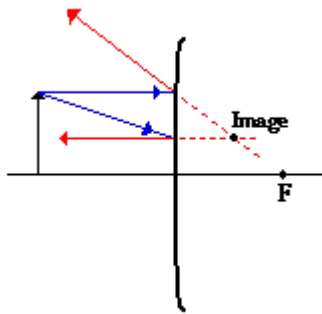
1. Pick a point on top of the object and draw two incident rays traveling towards the mirror.
  - a. Draw one ray so that it travels towards the focal point on the other side of the mirror. Stop the ray at the mirror surface.
  - b. Draw a second ray that travels parallel to the principal axis. Stop the ray at the mirror surface.
  - c. Place arrowhead on the rays to indicate the direction of travel.



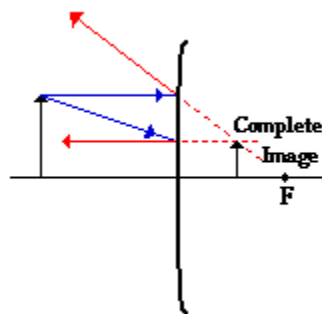
2. Once the incident rays strike the mirror, reflect them according to the ray rules for convex mirrors.
  - a. The ray that traveled towards the focal point will reflect off the mirror and travel parallel to the principal axis.
  - b. The ray that traveled parallel to the principal axis will reflect off the mirror and will travel in a direction such that its extension passes through the focal point.
  - c. Place arrowheads on the reflected rays to indicate the direction of travel.
  - d. The two rays should diverge upon reflection.



3. Locate and mark the image of the top of the object.  
 The image point of the top of the object is the point where the two rays intersect. Since the two reflected rays are diverging, they must be extended behind the mirror in order to intersect. The point of intersection is the image point of the top of the object.



4. Repeat the process for the bottom of the object. If the bottom of the object is located on the principal axis of the mirror, then the image point will also be on the principal axis and will be the same distance from the mirror as the top of the object.



5. The diagram shows that the image is
- Located behind the convex mirror
  - A virtual image
  - An upright image
  - Smaller than the object

To practice construct the image for the following setup with a convex mirror:

