Answer on Question#40653, Physics, Optics

Which of the following is NOT true of experiments involving curved mirrors?

image distance is negative for real image

object distance is positive

image distance is negative for virtual image

focal length is negative for convex mirrors

Solution:

A curved mirror is a mirror with a curved reflective surface, which may be either convex (bulging outward) or concave (bulging inward). Most curved mirrors have surfaces that are shaped like part of a sphere, but other shapes are sometimes used in optical devices.

The equation for image formation by rays near the optic axis (paraxial rays) of a mirror has the same form as the thin lens equation:

$$\frac{1}{o} + \frac{1}{i} = \frac{1}{f}$$

where o = object distance, i = image distance, f = focal length.
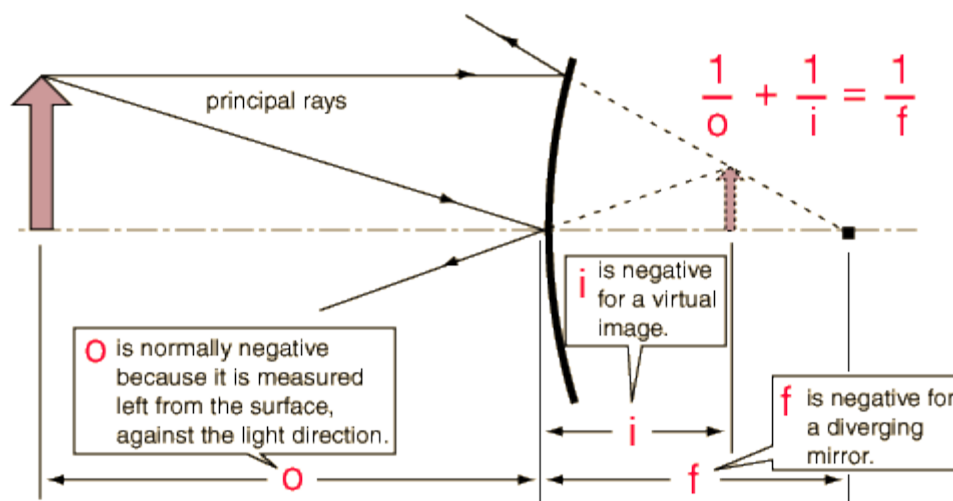
The sign conventions for the given quantities in the mirror equation are as follows:

f is + if the mirror is a concave mirror

f is - if the mirror is a convex mirror

i is + if the image is a real image and located on the object's side of the mirror.

i is - if the image is a virtual image and located behind the mirror.

If the object is outside the focal length, a **concave mirror** will form a real, inverted image.
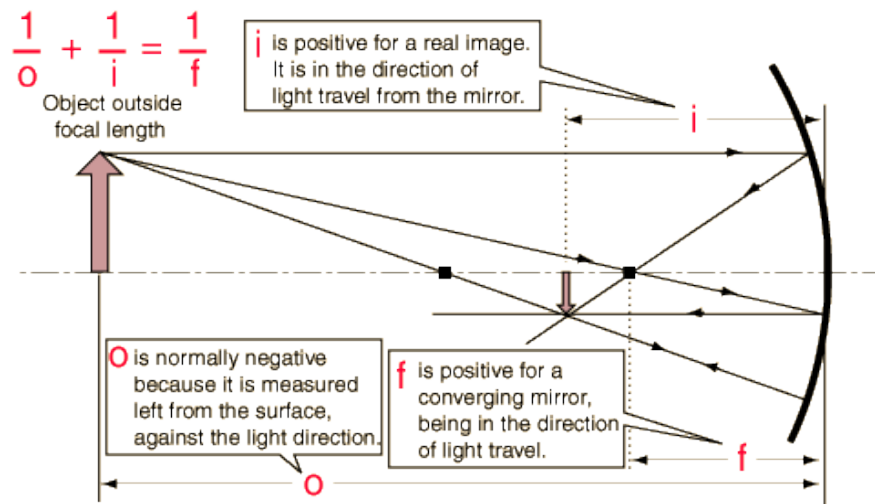
A **convex mirror** forms a virtual image.

principal rays

$$\frac{1}{O} + \frac{1}{i} = \frac{1}{f}$$

i is negative for a virtual image.

O is normally negative because it is measured left from the surface, against the light direction.

f is negative for a diverging mirror.

O

i

f

Answer.

1) *image distance is negative for real image*
NOT true (because, i is + if the image is a real image)

2) *object distance is positive*
NOT true (o is negative because it is measured left from the surface, against the light direction)

3) *image distance is negative for virtual image*
True

4) *focal length is negative for convex mirrors*
True (f is negative for a diverging mirror)