Task:

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

- image distance is negative for 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:
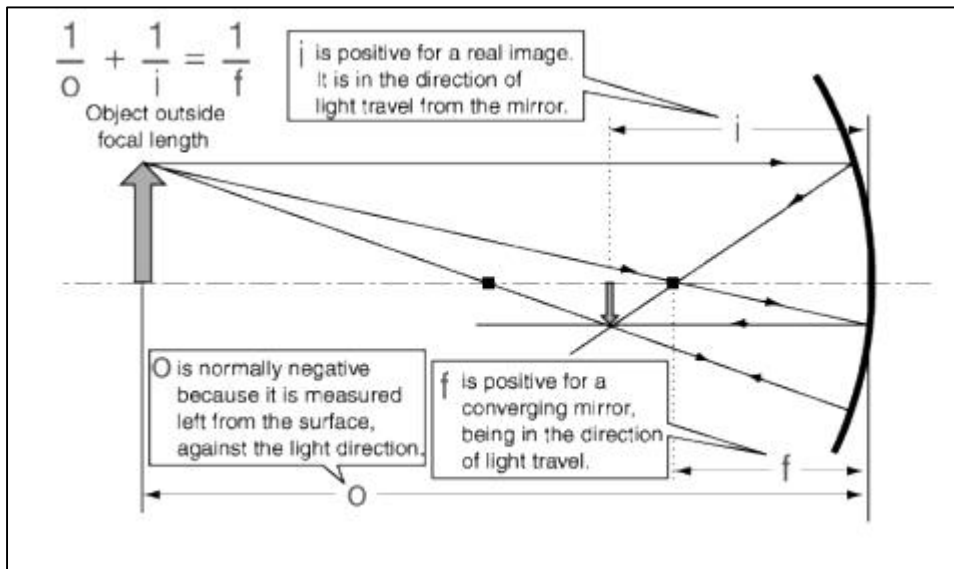
f is + if the mirror is a concave mirror
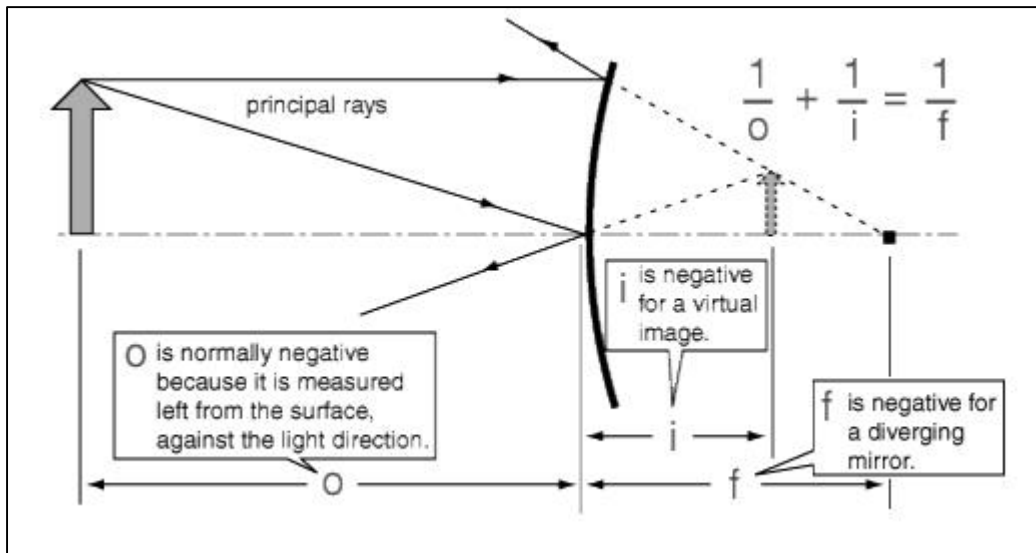
f is - if the mirror is a convex mirror

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

- **image distance is negative for real image**

NOT true (because, i is + if the image is a real image)

- **object distance is positive**

NOT true (o is negative because it is measured left from the surface, against the light direction)

- **image distance is negative for virtual image**

True

- **focal length is negative for convex mirrors**

True (f is negative for a diverging mirror)

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