

Mirror Images

1. Explain the relationship between the location of the image and whether the image is real or virtual.
2. Explain the relationship between real/virtual images and upright/inverted images. Include sketches in your explanation.
3. A 6-cm tall object placed 25.0 cm from a converging mirror having a focal length of 10.0 cm.
 - a. Sketch the ray diagram for this situation.
 - b. Calculate the position and height of the image.
 - c. Classify the image as real or virtual, upright or inverted.
4. A 6-cm tall object placed 10.0 cm from a converging mirror having a focal length of 10.0 cm. Sketch the ray diagram for this situation.
 - a. Sketch the ray diagram for this situation.
 - b. Calculate the position and height of the image.
 - c. Classify the image as real or virtual, upright or inverted.
5. A 6-cm tall object placed 5.0 cm from a converging mirror having a focal length of 10.0 cm. Sketch the ray diagram for this situation.
 - a. Sketch the ray diagram for this situation.
 - b. Calculate the position and height of the image.
 - c. Classify the image as real or virtual, upright or inverted.
6. An inverted image is magnified by 1.5 when the object is placed 15 cm in front of a converging mirror. Determine the image distance and the focal length of the mirror. Sketch the ray diagram for this situation.

7. An inverted image is larger by a factor of 3 when placed in front of a converging mirror with a focal length of 20.0 cm.
 - a. Determine the object and image distances for this situation.
 - b. Draw the diagram.

8. A spherical mirror has an effective focal length given by $f = \frac{r}{2}$.
 - a. Explain the limitations on considering this the focal length of the mirror.
 - b. Describe the source of spherical aberration.
 - c. Describe the visual impact of spherical aberration.
 - d. Describe some techniques to minimize the spherical aberration of a particular mirror.

9. An external rearview car mirror is convex with a radius of 16.0 m.
 - a. Determine the location of the image and its magnification for an object 10.0 m from the mirror.
 - b. Explain why it makes sense to use this type of mirror on a car.