



### HW-9

▲ A spherical convex mirror has a radius of curvature with a magnitude of 40.0 cm. Determine the position of the virtual image and the magnification for object distances of (a) 30.0 cm and (b) 60.0 cm. (c) Are the images upright or inverted?

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A concave mirror has a radius of curvature of 60.0 cm. Calculate the image position and magnification of an object placed in front of the mirror at distances of (a) 90.0 cm and (b) 20.0 cm. (c) Draw ray diagrams to obtain the image characteristics in each case.

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A dentist uses a mirror to examine a tooth. The tooth is 1.00 cm in front of the mirror, and the image is formed 10.0 cm behind the mirror. Determine (a) the mirror's radius of curvature and (b) the magnification of the image.

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A converging lens has a focal length of 20.0 cm. Locate the image for object distances of (a) 40.0 cm, (b) 20.0 cm, and (c) 10.0 cm. For each case, state whether the image is real or virtual and upright or inverted. Find the magnification in each case.



An object located 32.0 cm in front of a lens forms an image on a screen 8.00 cm behind the lens. (a) Find the focal length of the lens. (b) Determine the magnification. (c) Is the lens converging or diverging?

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An object is located 20.0 cm to the left of a diverging lens having a focal length  $f = -32.0$  cm. Determine (a) the location and (b) the magnification of the image. (c) Construct a ray diagram for this arrangement.

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A lens that has a focal length of 5.00 cm is used as a magnifying glass. (a) To obtain maximum magnification, where should the object be placed? (b) What is the magnification?

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A glowing 5.0 cm tall object is placed 4.5 cm from a concave lens (diverging lens). The lens has a focal length of 4.5 cm.

- a) What is the distance of the image from the lens?
  - b) What is the size of the image?
  - c) What are the characteristics of the image?
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A glowing 6.0 cm tall object is placed 9.0 cm from a convex lens (converging lens). The lens has a focal length of 8.0 cm.

- a) What is the distance of the image from the lens?
  - b) What is the size of the image?
  - c) What are the characteristics of the image?
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A glowing object is 7.0 cm from a convex lens. If a real image is produced that is 2.0 times larger than the object, what is the focal length of the lens?



**1. If an object is outside the focal point on a concave mirror, the image will be**

- a. Virtual and inverted.
- b. Real and inverted.
- c. Virtual and upright.
- d. None of the above.

**2. A 20 cm tall object has a 40 cm tall virtual image. What is the magnification?**

- a. 0.5
- b. 2
- c. 3
- d. 4

**3. Which type of mirror produces an image that is always erect, always the same height as the object, and always virtual?**

- a. Concave.
- b. Convex.
- c. Plane.
- d. None of the above.

**4. The law that describes the relationship between the angle of incidence and the angle of reflection is called**

- a. The law of reflection.
- b. The law of refraction.
- c. A virtual image.
- d. None of the above.

**5. If your face is 62 cm in front of a plane mirror, where is the image of your face located?**

- a. 62 cm in front of the mirror
- b. 62 cm in back of the mirror
- c. 62 cm below the mirror
- d. 31 cm in front of the mirror

**6. A concave mirror has a radius of curvature of 1.6 m. The focal length is**

- a. 0.80 m.
- b. 3.2 m.
- c. 32 cm.
- d. none of the above.

**7. Images created by convex mirrors are always**

- a. Smaller than the object.
- b. The same size as the object.
- c. Larger than the object.
- d. None of the above.