

Chapter 19 Optics

Section 19.1 Mirrors**(pages 570–573)**

This section describes the law of reflection and explains how images are formed by plane, concave, and convex mirrors. Uses of mirrors are also described.

Reading Strategy (page 570)

Comparing and Contrasting After reading this section, compare mirror types by completing the table. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Mirror Types		
Mirror	Shape of Surface	Image (virtual, real, or both)
Plane	Flat	Virtual
Concave		
Convex		

The Law of Reflection (pages 570–571)

- A ray diagram shows how rays _____ when they strike mirrors and pass through lenses.
- Is the following sentence true or false? On a ray diagram, the angle of incidence is the angle that a reflected ray makes with a line drawn perpendicular to the surface of a mirror. _____
- Circle the letter of the sentence that best answers the following question. What does a ray diagram of the law of reflection show?
 - The angle of incidence is greater than the angle of reflection.
 - The angle of reflection is greater than the angle of incidence.
 - The angle of incidence is equal to the angle of reflection.
 - The angle of incidence increases as the angle of reflection decreases.

Plane Mirrors (page 571)

- A mirror with a flat surface is known as a(n) _____.
- Circle the letter of each sentence that is true about plane mirrors.
 - Plane mirrors always produce virtual images.
 - Plane mirrors produce right-left reversed images of objects.
 - Light rays reflect from a mirror at an angle that is twice as large as the angle of incidence.
 - Your image appears to be the same distance behind a mirror as you are in front of it.

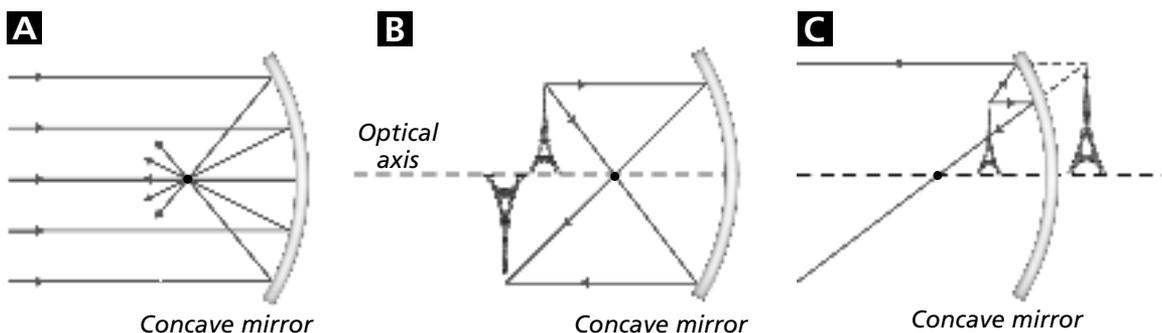
Chapter 19 Optics

6. What type of image is a copy of an object formed at the location from which the light rays appear to come?
- a. reversed image
 - b. virtual image
 - c. real image
 - d. reflected image

Concave and Convex Mirrors (pages 572–573)

7. Circle the letter of the object that is most like the shape of a concave mirror.
- a. the inside of a shallow bowl
 - b. the bottom of a bucket
 - c. the outside surface of a ball
 - d. a glass window pane
8. What is the focal point? _____
9. Is the following sentence true or false? A real image is a copy of an object formed at the point where light rays actually meet.

For questions 10 through 12, refer to the diagrams below.



10. Label the focal point on each diagram.
11. In B and C, label the object and image locations and identify the image as real or virtual. (*Hint: The object is always right-side up and in front of the reflecting surface of the mirror.*)
12. What determines whether a concave mirror produces a real image or a virtual image?
- a. the size of the object
 - b. the shape of the object
 - c. the position of the object relative to the focal point
 - d. the location of the optical axis
13. A curved mirror whose outside surface is the reflecting surface is called a(n) _____ mirror.
14. Why do convex mirrors always form virtual images? _____
15. Is the following sentence true or false? The image formed by a convex lens is always upright and smaller than the object.