

Physics Mirror Review

Use the word bank to complete the fill in the blank. Words may be used more than once or not at all.

Center of curvature  
Concave  
Converges  
Convex  
Curved  
Diffuse  
Diverges

Focal point  
Focal  
Incidence  
Incident  
Law of Reflection  
Plane  
Radius

Real  
Reflect  
Reflection  
Specular  
Straight  
Virtual

- The three types of mirrors are: Concave, convex and plane.
- The two types of spherical mirrors are: concave and convex.
- A concave mirror forms both real and virtual images.
- A concave mirror curves inward.
- A convex mirror curves outward.
- Point C is known as the center of curvature. Therefore, this point is always in front of the curved area of the mirror.
- The measurement of C is the same as the radius.
- The radius of curvature is twice the focal length.
- F is the focal point of the mirror.
- A plane mirror always forms an image that is the same size as the object.
- An image from a convex mirror will always appear smaller than the object.
- In a Fun House, a mirror that makes you look upside down would have to be a Concave mirror.
- A convex mirror is used for the side mirror on a car.
- Light rays will reflect when they hit a mirror.
- A concave mirror can produce an image that appears larger than the actual object.
- The light that approaches the mirror is known as the incident ray of light.
- The point in front of the mirror where the reflected rays meet is called the focal point.
- A concave mirror is also known as a converging mirror.
- A convex mirror is also known as a diverging mirror.
- The angle of incidence is always equal to the angle of reflection.
- The statement in number 20 is known as The law of reflection.
- A convex mirror is used for security purposes in stores.
- A virtual image cannot be obtained on a screen/paper.
- The brain interprets a light wave as traveling in a straight line.
- Only reflected rays may be extended behind the mirror.
- If light hits a rough surface, diffuse reflection occurs.
- If light hits a smooth surface, Specular reflection occurs.
- A virtual image is always upright.
- A plane mirror is used by interior decorators to create the illusion of depth.
- A convex mirror diverges light rays.

Short Answer

- Image type: convex: small/virtual plane: same size/virtual concave: real + virtual
- You are given three mirrors of equal size. How can you identify which is the plane, convex and concave mirror?  
Determine shape → plane (flat) concave (caved in) convex (pushed out)
  - List the four characteristics of an image formed by a plane mirror.  
L - Behind mirror O: upright S: same size T: virtual
  - Explain how to draw a ray diagram for a concave mirror when the object is placed at C and list the LOST characteristics.  
① Ray from top of object, parallel to mirror, reflect thru F  
② Ray from top of object, thru F, reflect parallel  
L: at C O: inverted S: same T: real
  - Explain how to draw a ray diagram for any convex mirror and the resulting LOST characteristics.  
Ray 1 - In parallel, reflect as though came from F  
Ray 2 - In thru F, stop at mirror, reflect parallel  
Ray 3 - In thru center of curvature, reflect parallel
  - Explain how to draw a ray diagram for a concave mirror when the object is in front of f and list the LOST characteristics.  
Ray 1 - In parallel, reflect thru F  
Ray 2 - Thru center of curvature  
Extend rays behind mirror  
L Behind mirror  
O upright  
S larger  
T virtual
  - An object is located at the focal point of a concave mirror. Describe the image.  
No image forms
  - Why is the distance of a virtual image always a negative value?  
Because image on back side of mirror
  - What does a negative magnification indicate?  
Image is upside down
  - Explain how to measure the angle of incidence.  
From incident ray to normal line
  - What items were used as mirrors before modern mirrors were created? Why did these items work?  
metals, glass  
Specular reflection  
Smooth surfaces
  - What is the purpose of the glass of a modern mirror? The silver backing?  
Silver backing causes reflection
  - If an object is located 10 cm in front of a plane mirror, the image is located 10 cm behind.
  - If the focal length of a spherical mirror is 6 cm the center of curvature is 12 cm.

For convex mirror:  
L Behind mirror  
O upright  
S smaller  
T virtual

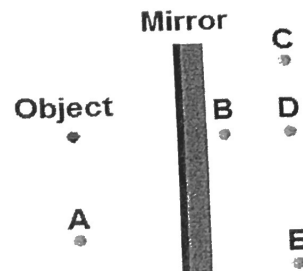
True or False

1. A convex mirror always creates virtual images. **T**
2. A plane mirror creates both real and virtual images. **F**
3. An object placed outside of the focal point of a concave mirror forms a real image. **T**
4. An image formed by a convex mirror is magnified. **F**
5. The normal line is drawn parallel to the surface of the mirror. **T**

Multiple Choice

1. In the diagram to the right, which letter represents the image of the object?

a. A      b. B      c. C      **d. D**      e. E

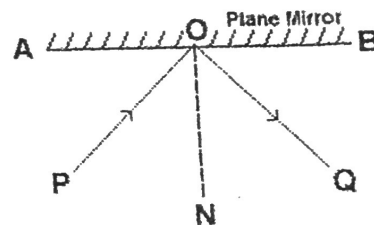
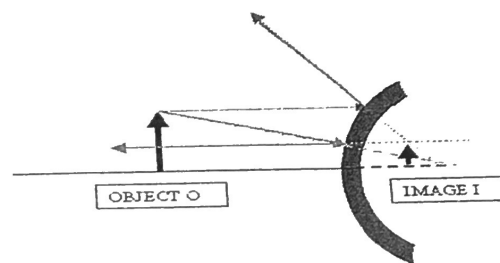


2. Which type of mirror is represented by the diagram at the right?

a. Plane      b. concave      **c. convex**      d. parabolic

3. How can you tell if you are looking into a concave mirror?

a. It curves outward and the images are upright  
 b. It is curved inward  
 c. You will appear inverted or upright depending on your location  
**d. Both b and c**



Use the diagram below for questions 4-7

4. The line OQ is the \_\_\_\_\_

a. Incident ray  
**b. Reflected ray**  
 c. Normal

5. The angle of incidence is given by the angle \_\_\_\_\_

a. AOP  
 b. QBO

c. NOQ  
**d. PON**

6. The angle of reflection is given by the angle \_\_\_\_\_

a. AOP  
 b. QBO

c. NOQ  
**d. PON**

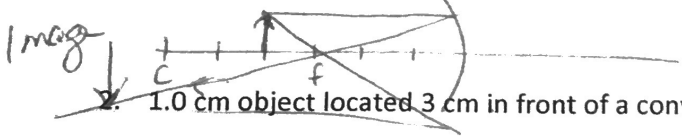
7. The line ON is the \_\_\_\_\_

a. Incident ray  
 b. Reflected ray  
**c. Normal**

## Drawing Ray Diagrams

Draw the following situations. List the LOST for each image.

1. 1.0 cm object located 4 cm in front of a converging mirror that has a radius of 6 cm.



[L] Beyond C [O] inverted  
[S] larger [T] real

2. 1.0 cm object located 3 cm in front of a convex mirror that has a focal length of 2 cm.

## Problems

1. A Star Wars action figure, 8.0 cm tall, is placed 30.0 cm in front of a concave mirror with a focal length of 10.0 cm.

- a. Where is the image located?  
b. How tall is the image?  
c. What are the characteristics of the image?

$$\frac{1}{10} = \frac{1}{30} + \frac{1}{d_i} \quad d_i = 15 \text{ cm}$$

$$\frac{h_i}{8} = -\frac{-15}{30} \quad h_i = -4 \text{ cm}$$

L B/t  
C + F O inverted S smaller T real

2. The same Star Wars action figure, 8.0 cm tall, is placed 6.0 cm in front of a convex mirror with a focal length of 12.0 cm.

- a. Where is the image located?  
b. What is the magnification?  
c. What are the image characteristics?

$$\frac{1}{-12} = \frac{1}{6} + \frac{1}{d_i} \quad d_i = -4 \text{ cm}$$

$$m = \frac{h_i}{h_o} = \frac{-d_i}{d_o} \quad m = \frac{4 \text{ cm}}{6 \text{ cm}} = .67$$

L Behind mirror O upright S smaller T virtual

3. A 4.00-cm tall light bulb is placed a distance of 45.7 cm from a concave mirror having a focal length of 15.2 cm. Determine the image distance and the image size.

$$\frac{1}{15.2} = \frac{1}{45.7} + \frac{1}{d_i} \quad d_i = 22.7 \text{ cm}$$

$$\frac{h_i}{4} = \frac{-22.7}{45.7} \quad h_i = -2.0 \text{ cm}$$

4. Light is incident on a flat surface, making an angle of  $10^\circ$  with that surface. What is the angle of reflection?

