Halliday/Resnick/Walker
Fundamentals of Physics 8th edition

Classroom Response System Questions

Chapter 34 Images

Reading Quiz Questions
34.2.1. What are the two types of images?

a) real and imaginary

b) reflected and refracted

c) real and virtual

d) concave and convex

e) superior and sublime
34.2.1. What are the two types of images?

a) real and imaginary

b) reflected and refracted

c) real and virtual

d) concave and convex

e) superior and sublime
34.2.2. What type of image does an observer see when the light rays entering his/her eye do not actually emanate from the image?

a) intangible

b) real

c) diffuse

d) virtual

e) incongruent
34.2.2. What type of image does an observer see when the light rays entering his/her eye do not actually emanate from the image?

a) intangible
b) real
c) diffuse
d) virtual
e) incongruent
34.3.1. Which one of the following statements is \textit{not} a characteristic of a plane mirror?

a) The image is the same size as the object.

b) The image is always upright.

c) The image is real.

d) The image is reversed left to right compared to the object.

e) The image is the same distance behind the mirror as the object is in front of the mirror.
34.3.1. Which one of the following statements is *not* a characteristic of a plane mirror?

a) The image is the same size as the object.

b) The image is always upright.

c) The image is real.  

**d) The image is reversed left to right compared to the object.**

e) The image is the same distance behind the mirror as the object is in front of the mirror.
34.4.1. What term is used for the line that passes through the center of curvature of a spherical mirror and the mid-point of the mirror?

a) capitol axis

b) complimentary axis

c) demarcation line

d) reflection line

e) central axis
34.4.1. What term is used for the line that passes through the center of curvature of a spherical mirror and the mid-point of the mirror?

a) capitol axis

b) complimentary axis

c) demarcation line

d) reflection line

e) central axis
34.4.2. Which of the following expressions applies to a spherical mirror of radius $R$?

a) $f = \frac{1}{2} R$

b) $f = \frac{3}{4} R$

c) $f = R$

d) $f = \frac{3}{2} R$

e) $f = 2R$
34.4.2. Which of the following expressions applies to a spherical mirror of radius \( R \)?

a) \( f = \frac{1}{2} R \)

b) \( f = \frac{3}{4} R \)

c) \( f = R \)

d) \( f = \frac{3}{2} R \)

e) \( f = 2R \)
34.4.3. Complete the following sentence: The normal to the surface of a spherical mirror is

a) always parallel to the central axis.

b) a line drawn from the center of curvature to the surface of the mirror.

c) parallel to the surface of the mirror.

d) undefined for a spherical mirror.

e) always perpendicular to the central axis.
34.4.3. Complete the following sentence: The normal to the surface of a spherical mirror is

a) always parallel to the central axis.

b) a line drawn from the center of curvature to the surface of the mirror.

c) parallel to the surface of the mirror.

d) undefined for a spherical mirror.

e) always perpendicular to the central axis.
34.4.4. Which one of the following statements is true for a curved mirror?

a) A mirror that is more curved has a larger focal length than that for a less curved mirror.

b) A mirror that is more curved has the same focal length than that for a less curved mirror.

c) A mirror that is more curved has a smaller focal length than that for a less curved mirror.
34.4.4. Which one of the following statements is true for a curved mirror?

a) A mirror that is more curved has a larger focal length than that for a less curved mirror.

b) A mirror that is more curved has the same focal length than that for a less curved mirror.

c) A mirror that is more curved has a smaller focal length than that for a less curved mirror.
34.4.5. Which one of the following statements is true concerning a mirror that has a negative focal length?

a) Such a mirror is non-existent.

b) The mirror is convex.

c) The images produced by the mirror are all real images.

d) The mirror is concave.

e) The mirror is somewhat more curved than one with a positive focal length.
34.4.5. Which one of the following statements is true concerning a mirror that has a negative focal length?

a) Such a mirror is non-existent.

b) The mirror is convex.

c) The images produced by the mirror are all real images.

d) The mirror is concave.

e) The mirror is somewhat more curved than one with a positive focal length.
34.5.1. An object is placed in front of a concave spherical mirror. Consider the following rays that leave the top of the object and approach the mirror:

(A) a ray that passes through the center of curvature
(B) a ray that passes through the middle of the mirror where the principal axis intersects
(C) a ray that is directed parallel to the principal axis
(D) a ray that passes through the focal point

Which one of these rays, if any, is not used in locating images by drawing rays as described in the text?

a) A
b) B
c) C
d) D
e) All four rays are used.
34.5.1. An object is placed in front of a concave spherical mirror. Consider the following rays that leave the top of the object and approach the mirror:

(A) a ray that passes through the center of curvature
(B) a ray that passes through the middle of the mirror where the principal axis intersects
(C) a ray that is directed parallel to the principal axis
(D) a ray that passes through the focal point

Which one of these rays, if any, is not used in locating images by drawing rays as described in the text?

a) A
b) B
c) C
d) D
e) All four rays are used.
34.5.2. Which of the following parameters is not needed to use the mirror equation to solve for an unknown parameter?

a) the image distance

b) focal length of the mirror

c) the shape of the mirror

d) the height of the object

e) the object distance
34.5.2. Which of the following parameters is not needed to use the mirror equation to solve for an unknown parameter?

a) the image distance

b) focal length of the mirror

c) the shape of the mirror

d) the height of the object

e) the object distance
34.5.3. In which of the following cases is the image virtual?

a) It is on the same side of the mirror as the object.

b) The image is virtual if you can only see it when projected onto a surface.

c) The lateral magnification is negative.

d) The distance from the mirror to the image is greater than the distance from the mirror to the object.

e) None of the cases above produce a virtual image.
34.5.3. In which of the following cases is the image virtual?

a) It is on the same side of the mirror as the object.

b) The image is virtual if you can only see it when projected onto a surface.

c) The lateral magnification is negative.

d) The distance from the mirror to the image is greater than the distance from the mirror to the object.

e) None of the cases above produce a virtual image.
34.5.4. In which of the following cases is the image real?

a) It is on the opposite side of the mirror from the object.

b) The image is real if you can project it onto a surface.

c) The lateral magnification is positive.

d) The image is upright (not inverted relative to the object).

e) None of the cases above produce a real image.
34.5.4. In which of the following cases is the image real?

a) It is on the opposite side of the mirror from the object.

b) The image is real if you can project it onto a surface.

c) The lateral magnification is positive.

d) The image is upright (not inverted relative to the object).

e) None of the cases above produce a real image.
34.5.5. For a certain situation involving an object and a spherical mirror, the resulting lateral magnification is negative. Which of the following properties necessarily may be attributed to the image?

a) real

b) virtual

c) oriented in the same direction as the object

d) oriented in the opposite direction as the object

e) No image can be produced when the lateral magnification is negative.
34.5.5. For a certain situation involving an object and a spherical mirror, the resulting lateral magnification is negative. Which of the following properties necessarily may be attributed to the image?

a) real

b) virtual

c) oriented in the same direction as the object

d) oriented in the opposite direction as the object

e) No image can be produced when the lateral magnification is negative.
34.6.1. Which one of the following statements is true concerning the radius of curvature of a concave lens?

a) The radius of curvature for such a lens is positive.

b) The radius of curvature for such a lens is infinite.

c) The radius of curvature for such a lens is zero.

d) The radius of curvature for such a lens is impossible to determine.

e) The radius of curvature for such a lens is negative.
34.6.1. Which one of the following statements is true concerning the radius of curvature of a concave lens?

a) The radius of curvature for such a lens is positive.

b) The radius of curvature for such a lens is infinite.

c) The radius of curvature for such a lens is zero.

d) The radius of curvature for such a lens is impossible to determine.

e) The radius of curvature for such a lens is negative.
34.7.1. A ray of light leaves an object and passes through the focal point on the same side of a converging lens. The ray is then incident on the lens. Which one of the following statements correctly describes the subsequent path of the light after it leaves the lens?

a) The ray passes through the focal point on the opposite side of the lens.

b) The ray travels parallel to the central axis.

c) The ray travels along the central axis.

d) The ray passes through the lens undeflected as if the lens were not present.

e) The ray is reflected back on itself through the same focal point.
34.7.1. A ray of light leaves an object and passes through the focal point on the same side of a converging lens. The ray is then incident on the lens. Which one of the following statements correctly describes the subsequent path of the light after it leaves the lens?

a) The ray passes through the focal point on the opposite side of the lens.

b) The ray travels parallel to the central axis.

c) The ray travels along the central axis.

d) The ray passes through the lens undeflected as if the lens were not present.

e) The ray is reflected back on itself through the same focal point.
34.7.2. Light rays parallel to the central axis approach a converging lens. Where do the rays converge?

a) at the center of the lens

b) at infinity

c) at the focal point

d) at a point located two focal lengths from the lens
34.7.2. Light rays parallel to the central axis approach a converging lens. Where do the rays converge?

a) at the center of the lens

b) at infinity

c) at the focal point

d) at a point located two focal lengths from the lens
34.7.3. Which one of the following statements concerning diverging lenses is true?

a) The image formed by a diverging lens is larger than the object.

b) The image formed by a diverging lens is inverted relative to the object.

c) A diverging lens can be used as a magnifying glass.

d) A diverging lens always forms a virtual image of a real object.

e) Diverging lenses are used in cameras.
34.7.3. Which one of the following statements concerning diverging lenses is true?

a) The image formed by a diverging lens is larger than the object.

b) The image formed by a diverging lens is inverted relative to the object.

c) A diverging lens can be used as a magnifying glass.

d) A diverging lens always forms a virtual image of a real object.

e) Diverging lenses are used in cameras.
34.7.4. Which one of the following statements concerning converging lenses is false?

a) A ray that passes through the center of the lens will not be significantly deflected by the lens.

b) An object cannot be placed in front of the lens such that a virtual image results.

c) An object can be placed in front of the lens such that a real image results.

d) A paraxial ray that is parallel to the principal axis as it approaches the converging lens will pass through the focal point on the opposite side of the lens.

e) A converging lens is used in a slide or film projector.
34.7.4. Which one of the following statements concerning converging lenses is false?

a) A ray that passes through the center of the lens will not be significantly deflected by the lens.

b) An object cannot be placed in front of the lens such that a virtual image results.

c) An object can be placed in front of the lens such that a real image results.

d) A paraxial ray that is parallel to the principal axis as it approaches the converging lens will pass through the focal point on the opposite side of the lens.

e) A converging lens is used in a slide or film projector.
34.7.5. A lens produces a virtual image that is upright relative to the object. What can one infer about this situation?

a) The magnification is greater than one.

b) The magnification is less than one.

c) The lens must be a converging lens.

d) The lens must be a diverging lens.

e) The magnification has a positive value.
34.7.5. A lens produces a virtual image that is upright relative to the object. What can one infer about this situation?

a) The magnification is greater than one.

b) The magnification is less than one.

c) The lens must be a converging lens.

d) The lens must be a diverging lens.

e) The magnification has a positive value.
34.7.6. Which one of the following is not a parameter used in either the thin-lens equation or the magnification equation?

a) index of refraction of the lens material

b) shape of the lens

c) lens focal length

d) object distance

e) image distance
34.7.6. Which one of the following is not a parameter used in either the thin-lens equation or the magnification equation?

a) index of refraction of the lens material
b) shape of the lens
c) lens focal length
d) object distance
e) image distance
34.7.7. Complete the following statement: When using two lenses in combination,

a) the lenses must both be identical.

b) as in a microscope, the lens closest to the eye is the objective.

c) the image of the first lens becomes the object for the second lens.

d) both lenses must be converging lenses.
34.7.7. Complete the following statement: When using two lenses in combination,

a) the lenses must both be identical.

b) as in a microscope, the lens closest to the eye is the objective.

c) the image of the first lens becomes the object for the second lens.

d) both lenses must be converging lenses.
34.7.8. In which one of the following cases is a lens considered thin?

a) The thickest part of the lens is small compared to the object distance.

b) The thickest part of the lens is small compared to the image distance.

c) The thickest part of the lens is small compared to the radii of curvature.

d) Choices (a) and (c) are correct, but not choice (c).

e) Choices (a), (b), and (c) are all correct.
34.7.8. In which one of the following cases is a lens considered thin?

a) The thickest part of the lens is small compared to the object distance.

b) The thickest part of the lens is small compared to the image distance.

c) The thickest part of the lens is small compared to the radii of curvature.

d) Choices (a) and (c) are correct, but not choice (c).

e) Choices (a), (b), and (c) are all correct.
34.8.1. Which one of the following statements concerning a compound microscope is false?

a) The distance between the lenses must be greater than the sum of the focal lengths of the lenses.

b) The objective lens is closest to the object being examined under the microscope.

c) The compound microscope utilizes two converging lenses.

d) The final image is large and very close to the eyepiece.

e) The angular magnification is greatest when the focal lengths are as small as possible.
34.8.1. Which one of the following statements concerning a compound microscope is false?

a) The distance between the lenses must be greater than the sum of the focal lengths of the lenses.

b) The objective lens is closest to the object being examined under the microscope.

c) The compound microscope utilizes two converging lenses.

d) The final image is large and very close to the eyepiece.

e) The angular magnification is greatest when the focal lengths are as small as possible.
34.8.2. Which one of the following statements concerning an astronomical telescope is false?

a) The eyepiece is also known as the viewfinder.

b) The image produced by the first lens is real and inverted.

c) The eyepiece acts like a magnifying lens.

d) For large angular magnifications, the objective lens should have a long focal length and the eyepiece should have a relatively short focal length.

e) Light entering the telescope from a distant object comes in as nearly parallel rays.
34.8.2. Which one of the following statements concerning an astronomical telescope is false?

a) The eyepiece is also known as the viewfinder.

b) The image produced by the first lens is real and inverted.

c) The eyepiece acts like a magnifying lens.

d) For large angular magnifications, the objective lens should have a long focal length and the eyepiece should have a relatively short focal length.

e) Light entering the telescope from a distant object comes in as nearly parallel rays.