Chapter 28

Reflection and Refraction

Light takes the path from one point to another that is

a. quickest.
b. shortest.
c. closest to a straight line.
d. None of these.

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a. quickest.
b. shortest.
c. closest to a straight line.
d. None of these.

Comment: Light takes the path of least time, which, said another way, is the quickest.

When light meets a polished reflecting surface

a. all of it reflects.
b. it partly reflects.
c. most is absorbed.
d. it refracts, not reflects.

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b. it partly reflects.
c. most is absorbed.
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Comment: Fortune and fame await the discoverer of a surface that reflects all incident light!

Your reflected image in a plane mirror is as far behind the mirror as

a. half your height.
b. half your distance from the mirror.
c. your distance from the mirror.
d. twice your distance from the mirror.

Your reflected image in a plane mirror is as far behind the mirror as

a. half your height.
b. half your distance from the mirror.
c. your distance from the mirror.
d. twice your distance from the mirror.

To see your full-height image in a wall mirror, the minimum height of the mirror should be

a. at least one-quarter your height.
b. half your height.
c. the same as your height.
d. dependent on your distance in front of the mirror.

To see your full-height image in a wall mirror, the minimum height of the mirror should be

a. at least one-quarter your height.
b. half your height.
c. the same as your height.
d. dependent on your distance in front of the mirror.

The image of yourself in a mirror is actually reversed

a. left to right.
b. up to down.
c. front to back.
d. All of the above.

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a. left to right.
b. up to down.
c. front to back.
d. All of the above.

Whether a particular surface acts as a polished reflector or a diffuse reflector depends on the

a. color of reflected light.
b. brightness of reflected light.
c. wavelength of light.
d. angle of incoming light.

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Refracted light that bends away from the normal is light that has

a. slowed down.
b. speeded up.
c. bounced.
d. diffracted.

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Atmospheric refraction occurs with changes in

a. wind speed.
b. air temperature.
c. Either of these.
d. None of these.

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a. wind speed.
b. air temperature.
c. Either of these.
d. None of these.

Comment: Interestingly, sound refraction *does* depend on wind speeds.

The fastest light inside clear glass is

a. red.
b. green.
c. blue.
d. no color in particular, for light of all colors travels at the same speed.

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When light incident on a prism separates into a spectrum, we call the process

a. reflection.
b. interference.
c. diffraction.
d. None of these.

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b. interference.
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d. None of these.

Explanation: The process is called *dispersion*. See this illustrated in Figure 28.29.

A rainbow is the result of light in raindrops that undergoes

a. reflection.
b. interference.
c. diffraction.
d. None of these.

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a. reflection.
b. interference.
c. diffraction.
d. None of these.

If you viewed a full-circle rainbow from a helicopter, at its center you'd likely see

a. the shadow of the helicopter.
b. a reduced image of the Sun.
c. a secondary rainbow.
d. traces of moonlight.

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a. the shadow of the helicopter.
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The critical angle in total internal reflection occurs when incident light on a surface is

a. refracted at 90° to the normal.
b. reflected at 90° to the normal.
c. at maximum diffraction.
d. totally absorbed.

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a. refracted at 90° to the normal.
b. reflected at 90° to the normal.
c. at maximum diffraction.
d. totally absorbed.

Explanation: When the light refracts at right angles to the normal, none crosses the surface and maximum light is reflected back into the medium. (This question is a curve buster for many students.)

When the pinhole in a pinhole camera is made larger, the image is

a. clearer.
b. brighter.
c. Both.
d. None of the above.

When the pinhole in a pinhole camera is made larger, the image is

a. clearer.
b. brighter.
c. Both.
d. None of the above.

A real image can be cast on a screen by a

a. converging lens.
b. diverging lens.
c. Either of these.
d. None of these.

A real image can be cast on a screen by a

a. converging lens.
b. diverging lens.
c. Either of these.
d. None of these.

Explanation: A diverging lens can only produce a virtual image, one that cannot be cast on a screen.

A converging lens can form a

a. real image.
b. virtual image.
c. Either of these.
d. None of these.

A converging lens can form a

a. real image.
b. virtual image.
c. Either of these.
d. None of these.

Explanation: Figure 28.48 shows a converging lens forming a virtual image, while Figure 28.49 shows a converging lens forming a real image.

The amount of light entering a camera or your eye is regulated by

a. a photosensitive surface or retina.
b. a diaphragm.
c. an eyepiece.
d. a pair of lenses.

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The glasses of a nearsighted person are usually thicker at the

a. middle.
b. edges.
c. Either of these.
d. None of these.

The glasses of a nearsighted person are usually thicker at the

a. middle.
b. edges.
c. Either of these.
d. None of these.

Eyeglasses correct for light distortions called

a. spherical aberrations.
b. chromatic aberrations.
c. Either of these.
d. None of these.

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a. spherical aberrations.
b. chromatic aberrations.
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