

Glencoe Chapter 17:

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page 479+ - 54, 56, 57a, 61, 64, 67, 69, 71, 78, 79, 80

2. If the angle of incidence of a ray of light is 42° , what is each of the following?
 - a. the angle of reflection
 - b. the angle the incident ray makes with the mirror
 - c. the angle between the incident ray and the reflected ray

3. If a light ray reflects off a plane mirror at an angle of 35° to the normal, what was the angle of incidence of the ray?

13. An object is 36.0 cm in front of a concave mirror with a 16.0-cm focal length. Determine the image position.

14. A 3.0-cm-tall object is 20.0 cm from a 16.0-cm-radius concave mirror. Determine the image position and image height.

15. A concave mirror has a 7.0-cm focal length. A 2.4-cm-tall object is 16.0 cm from the mirror. Determine the image height.

16. An object is near a concave mirror of 10.0-cm focal length. The image is 3.0 cm tall, inverted, and 16.0 cm from the mirror. What are the object position and object height?

18. A convex mirror has a focal length of 13.0 cm. A lightbulb with a diameter of 6.0 cm is placed 60.0 cm from the mirror. What is the lightbulb's image position and diameter?

19. A convex mirror is needed to produce an image that is three-fourths the size of an object and located 24 cm behind the mirror. What focal length should be specified?

20. A 7.6-cm-diameter ball is located 22.0 cm from a convex mirror with a radius of curvature of 60.0 cm. What are the ball's image position and diameter?

21. A 1.8-m-tall girl stands 2.4 m from a store's security mirror. Her image appears to be 0.36 m tall. What is the focal length of the mirror?

54. A ray of light strikes a mirror at an angle of 53° to the normal.

a. What is the angle of reflection?

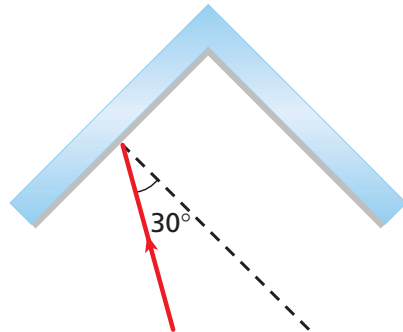
b. What is the angle between the incident ray and the reflected ray?

56. **Picture in a Mirror** Penny wishes to take a picture of her image in a plane mirror, as shown in **Figure 17-18**. If the camera is 1.2 m in front of the mirror, at what distance should the camera lens be focused?



■ Figure 17-18

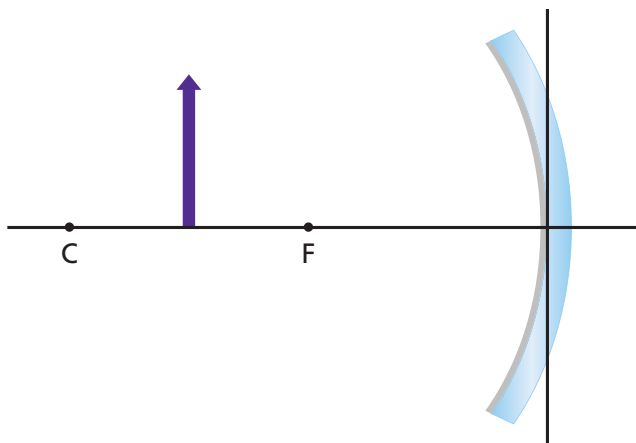
57. Two adjacent plane mirrors form a right angle, as shown in **Figure 17-19**. A light ray is incident upon one of the mirrors at an angle of 30° to the normal.
- What is the angle at which the light ray is reflected from the other mirror?
 - A retroreflector is a device that reflects incoming light rays back in a direction opposite to that of the incident rays. Draw a diagram showing the angle of incidence on the first mirror for which the mirror system acts as a retroreflector.



■ Figure 17-19

61. A concave mirror has a focal length of 10.0 cm. What is its radius of curvature?

64. Describe the image produced by the object in **Figure 17-21** as real or virtual, inverted or upright, and smaller or larger than the object.



■ Figure 17-21

67. How far does the image of a car appear behind a convex mirror, with a focal length of 6.0 m, when the car is 10.0 m from the mirror?

69. A dentist uses a small mirror with a radius of 40 mm to locate a cavity in a patient's tooth. If the mirror is concave and is held 16 mm from the tooth, what is the magnification of the image?

71 . A jeweler inspects a watch with a diameter of 3.0 cm by placing it 8.0 cm in front of a concave mirror of 12.0-cm focal length.

a. Where will the image of the watch appear?

b. What will be the diameter of the image?

78. What is the radius of curvature of a concave mirror that magnifies an object by a factor of +3.2 when the object is placed 20.0 cm from the mirror?

79. A convex mirror is needed to produce an image one-half the size of an object and located 36 cm behind the mirror. What focal length should the mirror have?

80. A convenience store uses a surveillance mirror to monitor the store's aisles. Each mirror has a radius of curvature of 3.8 m.

a. What is the image position of a customer who stands 6.5 m in front of the mirror?

b. What is the image height of a customer who is 1.7 m tall?