

HOMEWORK #5

- *This homework is due by the beginning of class on November 12. It covers material in chapter 23.*
- *You will need a calculator and lots of scrap paper.*
- *Answers are to be recorded on a scantron that you will turn in. You may keep the questions (i.e., these sheets).*
- *You may (should) use your book. You may even work with other students. However, you should not copy the answers of other students. Since the exams are multiple choice, the homeworks are also exam prep, and so you need to be able to work these problems yourself. If you do not apply yourself to the homework and do your own work, you are not likely to perform well on the exams.*

1. Which of the following best describes the image from a plane mirror?
 - a. virtual and magnification greater than one
 - b. real and magnification less than one
 - c. virtual and magnification equal to one
 - d. real and magnification equal to one
2. If a virtual image is formed along the principal axis 10 cm from a concave mirror with the focal length 15 cm, what is the object distance from the mirror?
 - a. 30 cm
 - b. 10 cm
 - c. 12 cm
 - d. 6.0 cm
3. A convex mirror with focal length of -20 cm forms an image 12 cm behind the surface. Where is the object located as measured from the surface?
 - a. 7.5 cm
 - b. 15 cm
 - c. 22 cm
 - d. 30 cm
4. Parallel rays of light that hit a concave mirror will come together:
 - a. at the center of curvature.
 - b. at the focal point.
 - c. at a point half way to the focal point.
 - d. at infinity.

5. An object 2 cm high is placed 10 cm in front of a mirror. What type of mirror and what radius of curvature is needed for an image that is upright and 4 cm tall?
- Concave, $R = 20$ cm
 - Concave, $R = 40$ cm
 - Convex, $R = -10$ cm
 - Convex, $R = -20$ cm
6. An object of length 3.00 cm is inside a plastic block with index of refraction 1.40. If the object is viewed from directly above, what is the length of its image?
- 3.00 cm
 - 4.20 cm
 - 2.13 cm
 - 0.467 cm
7. Which of the following best describes the image for a thin concave lens that forms whenever the magnitude of the object distance is less than that of the lens' focal length?
- inverted, enlarged and real
 - upright, enlarged and virtual
 - upright, diminished and virtual
 - inverted, diminished and real
8. An object is placed at a distance of 30 cm from a thin convex lens along its axis. The lens has a focal length of 10 cm. What are the values, respectively, of the image distance and magnification?
- 60 cm and 2.0
 - 15 cm and 2.0
 - 60 cm and -0.50
 - 15 cm and -0.50
9. Two thin lenses with 10.0-cm focal lengths are mounted at opposite ends of a 30.0-cm long tube. An object is located 45.0 cm from one end of the tube. How far from the opposite end is the final image?
- 12.8 cm
 - 24.0 cm
 - 25.6 cm
 - 33.6 cm
10. Which of the following effects is the result of the fact that the index of refraction of glass will vary with wavelength?
- spherical aberration
 - mirages
 - chromatic aberration
 - light scattering