

Question #99

This week we will try another three images of Otto. If you have not yet done the first set, click to go to [Question 97](#), the first of the Otto exercises. Shown in the drawing below is the face of Otto, the object for the optics exercises to follow. By clicking your mouse [here](#) you may view or print out the array of possible image faces that Otto might create when he positions himself at the appropriate place relative to the optical component under consideration. Again your job is to determine the characteristics of the image and answer questions about it. You may use any available technique, such as ray tracing, calculation, experience, looking it up in a textbook, or even building your own experiment.



You are to determine the following image characteristics:

- 1. the orientation and the relative size and shape of the image, by selecting from among the 28 examples given in the page linked above.
- 2. the location from where you must look to see the image.

Other details that you might want to ascertain include:

- 1. the location of the image.
- 2. the magnification.
- 3. whether the image is real or virtual.

The three optical elements for this week are:

- 1. **A spherical concave lens:** Otto will stand at a distance of one focal length from a spherical concave lens, so that an observer *at the lens* would see Otto's face as in the photograph above.
- 2. **A spherical concave mirror, at a distance of $f/2$:** Otto will stand at a distance of half the focal length of the mirror in front of the mirror, so that an observer at the mirror would see Otto's face as in the photograph above.
- 3. **A vertically focusing cylindrical convex lens, at a distance of $2f$:** Otto will stand at a distance of twice the focal distance from a vertically focussing cylindrical lens, that is oriented like a horizontal log in front of Otto. He again faces the lens so that an observer at the lens would see Otto's face as in the photograph above.

Our answers will include the information above as well as a photograph of the image with the object for comparison.

Click here for [Answer #99](#) after January 14, 2002.

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For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](#) by e-mail or using phone number or regular mail address given on the [Lecture-Demonstration Home Page](#).