

# Physics Challenges for Teachers and Students

*A Worldwide Problem-Solving Contest*



## ► Hocus Focus (M4)

A thin glass lens is formed by two convex surfaces that have equal radii of curvature. When the lens is in the air, the distance between its foci is  $2f_1$ . When the same lens is immersed in water, that distance changes to  $2f_2$ . What is the distance  $d$  between the foci of the lens when the lens is placed on the boundary between the water and the air? The index of refraction of air is 1.00; that of water is 1.33.

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*This problem concludes our contest. Many thanks to all who participated!*

### Submission Guidelines:

The deadline for submitting solutions to this problem is June 6, 2005.

- only email submissions will be considered;
- email your solutions to Boris Korsunsky at [korsunbo@post.harvard.edu](mailto:korsunbo@post.harvard.edu);
- please email the solutions as Word files;
- please email *each solution* as a separate file;
- note that each problem, in addition to a very clever title, has a code such as M1. Please name each file as “problem code-first initial-last name.” For instance, “M1DVader” if your name is Darth Vader and you are sending the solution to problem M1;
- please state your name, hometown, and professional affiliation in each file.

We look forward to your (and your students’) participation.

### Please send correspondence to:

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