

# Physics Challenges for Teachers and Students

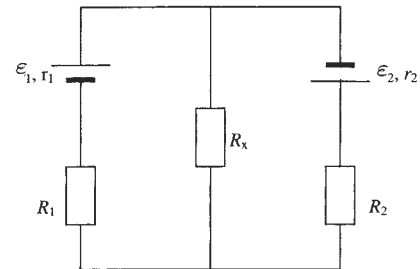
*A Worldwide Problem-Solving Contest*



## ► Out of the Loop (A3)

In the circuit shown, when ideal voltmeters are connected to each emf source, the readings of the voltmeters are the same. In the circuit, resistance  $R_x$  is unknown,  $\mathcal{E}_1 = 10\text{ V}$ ;  $\mathcal{E}_2 = 5\text{ V}$ ;  $r_1 = 2\ \Omega$ ;  $r_2 = 1\ \Omega$ ;  $R_1 = 8\ \Omega$ ;  $R_2 = 9\ \Omega$ . Find the current through  $R_x$ .

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### Submission Guidelines:

The deadline for submitting solutions to this problem is May 2, 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 A1. Please name each file as “problem code-first initial-last name.” For instance, “A1DVader” if your name is Darth Vader and you are sending the solution to problem A1;
- please state your name, hometown, and professional affiliation in each file.

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

### Please send correspondence to:

Boris Korsunsky  
[korsunbo@post.harvard.edu](mailto:korsunbo@post.harvard.edu)

The next *Challenge* problem will be posted online April 25.