

# Physics Challenges for Teachers and Students

## ► The Road Rage

Two cars begin to move toward each other simultaneously along a straight road. Car 1 starts from point A at a speed  $v_1$ ; car 2 starts at point B at a speed  $v_2$ . The acceleration of car 1 is  $a_1$ ; it is directed toward A. The acceleration of car 2 is  $a_2$ ; it is directed toward B. In the process of motion, the cars meet twice; the time interval between the meetings is  $t$ . Find the distance between A and B.

DOI: 10.1119/1.1607811

## ► Riverdance

A child in a boat needs to cross the river. The speed of the current in the river is  $k$  times greater than the speed of the boat in still water. If a child crosses the river in such a way as to minimize the lateral displacement, it takes time  $t$  to cross. What is the minimum time required to cross the river? DOI: 10.1119/1.1607812

## ► The Flight of the Bumblebee

A rock is launched upward at  $45^\circ$ . A bumblebee follows the trajectory of the rock at a constant speed equal to the initial speed of the rock. What is the acceleration of the bumblebee at the top point of the trajectory? For the rock, neglect the air resistance.

DOI: 10.1119/1.1607813

## Note to contributors:

In order to facilitate the process more efficiently, please observe these submission guidelines:

- email solutions as Word files (note new email address);
- name the file “September03BSimpson” if — for instance — your name is Bart Simpson,

and you are sending the solutions to September 2003 Challenges;

– state your name, hometown, and professional affiliation in the file, not only in the email message.

- As we begin the third season of *Challenges*, we would like to recognize the most active contributors who sent the correct solutions to our March, April, and May problems.

*James J. Carr* (Webster, NY)

*David A. Cornell* (Principia College, Elsah, IL)

*John F. Goehl Jr.* (Barry University, Miami Shores, FL)

*Art Hovey* (Milford, CT)

*Robbie F. Kouri* (Our Lady of the Lake University, San Antonio, TX)

*Carl E. Mungan* (Naval Academy, Annapolis)

*Allan T. Mense* (University of Phoenix, Green Valley, AZ)

*Göran Norlén* (Lund, Sweden)

*Adam Plana* (Wheatley School, Old Westbury, NY)

*Joseph L. Powlette* (Moravian College, Bethlehem, PA)

*Reza Vafabakhsh*, student (IASBS, Zanjan, Iran)

*Clarke Wellborn* and his students at Brevard College (Brevard, NC)

We hope to hear from them — and from all others — this year! Solutions from past *Challenges* may be found on our website, <http://www.aapt.org/tpt>.

*Many thanks!*

Please send correspondence to:

*Boris Korsunsky*  
444 Wellesley St.  
Weston, MA 02493-2631  
[korsunbo@post.harvard.edu](mailto:korsunbo@post.harvard.edu)