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Physics Challenge for Teachers and Students

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Physics Challenge for Teachers and Students

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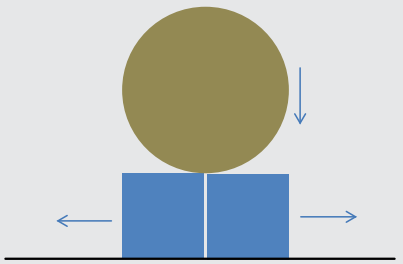
Squaring the circle: Now in 3D!

Two identical cubes have mass m and side r each. The cubes rest very close to each other on a large horizontal table as shown. A uniform sphere of mass m and radius r is gently placed on top of the cubes as shown. Once the sphere is released, it begins to push the cubes apart and slide downward. The acceleration due to gravity is g. Find the speed v of the sphere at the moment it hits the table. Express your answer in terms of the given quantities and a numeric coefficient with at least three significant figures. Neglect friction between all surfaces.



We received a large number of solutions (not all of them correct) to our September *Challenge*, **C'est la *v***. It was gratifying to see quite a few new participants, including many high school students from all over the world. (It was slightly less gratifying to see many of the high school students fail to follow the submission guidelines. Ah well...) We are pleased to recognize the following contributors:

Robert Barr, student (Neuqua Valley High School, Naperville, IL)

Philip Blanco (Grossmont College, El Cajon, CA)

Phil Cahill (The SI Organization, Inc., Rosemont PA)

Art Hovey (Galvanized Jazz Band, Milford, CT)

José Ignacio Íñiguez de la Torre (Universidad de Salamanca, Salamanca, Spain)

Per-Olof Jansson (Ericsson Telecommunications, Stockholm, Sweden)

Matthew W. Milligan (Farragut High School, Knoxville, TN)

Carl E. Mungan (U. S. Naval Academy, Annapolis, MD)

Thomas Olsen (Northern Virginia Community College, VA)

Joseph Rizcallah (SABIS Educational Services, Adma, Lebanon)

Michael Roth, student (Neuqua Valley High School, Naperville, IL)

Thomas Salyard (Scotus Central Catholic High School, Columbus, NE)

Eduarda Sá Marta, student (Infanta D. Maria Secondary School, Coimbra, Portugal)

Jason L. Smith (Richland Community College, Decatur, IL)

Asif Shakur (Salisbury University, Salisbury, MD)

Nihar Sheth, student (Neuqua Valley High School, Naperville, IL)

Cássio dos Santos Sousa, student (Instituto Tecnológico de Aeronáutica, São Paulo, Brazil)

Clint Sprott (University of Wisconsin – Madison, WI)

Alice Zheng, student (Wuxi Tianyi High School, Wuxi, Jiangsu, China)

Guidelines for contributors:

- We ask that all solutions, preferably in Word format, be submitted to the dedicated email address ***challenges@aapt.org***. Each message will receive an automatic acknowledgment.
- The subject line of each message should be the same as the name of the solution file (see the instructions below).
- The deadline for submitting the solutions is the last day of the corresponding month.
- We can no longer guarantee that we'll publish every successful solver's name; each month, a representative selection of names will be published, both in print and on the web.
- If your name is—for instance—Ted Cruz, please name the file "**Dec13Cruz**" (do not include your first initial) when submitting the December solution.
- If you have a message for the Column Editor, you may contact him at ***korsunbo@post.harvard.edu***; however, please do not send your solutions to this address.

As always, we look forward to your contributions and hope that they will include not only solutions but also your own *Challenges* that you wish to submit for the column.

Many thanks to all contributors and we hope to hear from many more of you in the future!

Boris Korsunsky, Column Editor