Letters to the Editor

A Sufficient Condition for Success in Calculus

The article by Professors Bressoud and Rasmussen in the February 2015 *Notices* provides seven characteristics that contribute to the success of a calculus program. I believe that one important characteristic, which is embedded in characteristic 2, the effectiveness of placement procedures, needs to be stated explicitly. I have been teaching calculus since 1976 at various schools and with a wide spectrum of students. I have found that a necessary condition for a student's success in calculus is the student's mastery of functions and trigonometry. I have found that some schools (both high schools and colleges) pay little attention to the rigor of the pre-calculus course that is the prerequisite for calculus. It is my belief that first year calculus is easy to learn and easy to teach if the students have mastered the pre-requisite topics.

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Update on Gender, Culture, and Math Performance

We previously reported [1] that mathematics performance for both boys and girls exhibits a strong positive correlation with some measures of gender equity, especially participation rates and salaries of women in the paid labor force relative to men. This finding was largely based upon data obtained from the 2003 and 2007 Trends in International Mathematics and Science Study (TIMSS) and the 2009 Programme for International Student Assessment (PISA). Data from the 2011 TIMSS and 2012 PISA has subsequently appeared, allowing us to determine whether these correlations continue to hold with newer data sets. The answer is yes. For example, the Pearson correlation between mean mathematics score for girls on the 2011 TIMSS and the economic participation rate and income earned (EPI) subcomponent of the Social Watch's Gender Equity Index for a country in 2011 is 0.444 ($p < 0.01$); for boys it is 0.519 ($p < 0.001$). Likewise, these correlations between EPI and mean mathematics score on the 2012 PISA for girls and boys are 0.470 ($p < 0.001$) and 0.463 ($p < 0.001$), respectively. We yet again failed to observe a significant negative correlation between measures of gender equity for countries and the gap in mean mathematics scores between their boys and girls, a correlation observed only with the 2003 PISA data set [2]. On the other hand, using the 2011 TIMSS data set, we failed to confirm our previous finding of a correlation between gender gap and ratio of the variances in the mathematics scores for eighth-grade boys and girls within a country which was evident using the 2007 TIMSS data set. The loss of this correlation was likely due to the absence from the 2011 data of several Middle Eastern countries with very high variance ratios.

On a related note, we also previously reported data indicating that during the two-decade time period, 1988–2007, approximately twenty percent of US IMO team members were ethnic Jews [3]. Nevertheless, in paraphrasing an article by Ron Unz [3], David Brooks wrote, "Jewish achievement has collapsed. In the 1970s, for example, forty percent of top scorers in the Math Olympiad had Jewish names. Now 2.5 percent do." [4] These statements and the conclusion drawn from them are simply wrong; Unz based them upon "five minutes of cursory surname analysis." Thus, he miscounted many Christian Germans and Poles as Jews and Israeli-Americans (such as Oaz Nir) and Jews with Anglicized names (such as Daniel Kane) as non-Jews. In reality, Jewish representation on US IMO teams has gradually declined over the past four decades from approximately 1/4th to 1/8th of total members [6]. This modest drop is consistent with demographic changes in the ethic/racial composition of US high school students, with Asian-Americans becoming a larger percentage of US IMO team members in recent years.

References

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[2] L. Guiso, F. Monte, P. Sapienza, and L. Zingales, Culture, gender, and math, *Science* **320** (2008), 1164–1165.

[3] T. Andreescu, J. A. Gallian, J. M. Kane, and J. E. Mertz, Cross-Cultural Analysis of Students with Exceptional Talent in Mathematical Problem Solving, *Notices of the AMS* **55** (2008), 1248–1260.

[4] R. Unz, *The Myth of American Meritocracy*, The American Conservative, November 28, 2012.

[5] D. Brooks, The 2012 Sidney Awards I, *New York Times*, December 25, 2012, page A27.

[6] J. E. Mertz, Janet Mertz on Ron Unz's "Meritocracy" article, posted March 6, 2013, at `andrewgelman.com/wp-content/uploads/2013/03/Mertz-on-Unz-Meritocracy-Article.pdf`. Also, J. E. Mertz, Mertz's Response to "Meritocracy: Almost as Wrong as Larry Summers", posted March 18, 2013, at `andrewgelman.com/wp-content/uploads/2013/03/Mertz-response-to-Unz-March-9-post-final.pdf`.

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Addendum on Frans van Schooten

In the middle of the left column of Bill Casselman's contribution on page 147 of the February 2015 issue of the *Notices*, regarding the cover of that issue, there occurs an unfortunate slip of the pen. Namely, he mentions René van Schooten the Younger. Of course, he means Frans van Schooten the Younger (born 1615–died 1660); René is the first name of Descartes. Perhaps here is the right place to observe the appearance in 2014 of a doctoral dissertation (written in English) by Jantien Dopper (see [2]), which is devoted to the work and life of Frans van Schooten the Younger. The dissertation also provides a very nice, detailed, and extensive view of the intellectual and

mathematical environment at Leiden in Van Schooten's days. On pages 7 and 8 of [2], Dopper provides an overview of the work in the past on Van Schooten; among others, she mentions [4]. As to mathematics, we read on page 9 of [2]: "Van Schooten's major achievements were the interpretation, dissemination and exploration of Cartesian geometry, but there is more to van Schooten than Cartesian geometry alone." Indeed, Frans van Schooten the Younger happened to be a prolific figure in the seventeenth century; he visited and studied at several places in Europe, in Paris for instance.

Reference [1] (in Dutch) provides curriculae vitae of mathematics professors in Leiden from 1575 until 1975. In [1], one finds such information about Frans van Schooten the Elder (born 1581 or 1582–died 1645), about Frans van Schooten the Younger, and about his brother Petrus van Schooten (born 1634–died 1679), as well as such information about thirty-nine other mathematics professors at Leiden.

By the way, *La Géometrie* of Descartes occurs as an appendix (an important one!) to the *Discours de la Méthode*, starting on page 297 (see [3] and in particular the front page of the *Discours de la Méthode*, as printed on page 22 of [1]).

References

[1] Gerrit van Dijk, *Leidse hoogleraren Wiskunde 1575–1975*, Universiteit Leiden, 2011, ISBN: 9789081720113.

[2] Jantien Dopper, *A Life of Learning in Leiden, The Mathematician Frans van Schooten (1615–1660)*, dissertation at the University of Utrecht, 2014, 347 pages, ISBN: 9789064647437.

[3] *The Geometry of René Descartes*, with a facsimile of the first edition, translated from the French and Latin into English, by David Eugene Smith and Marcia L. Latham, Dover Publications, 1954, ISBN: 048660068X.

[4] Joseph Ehrenfried Hofmann, *Frans van Schooten der Jüngere*, Frans Steiner Verlag GmbH, Wiesbaden, 1962.

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Teaching Is a Professional Calling

I would like to congratulate the Editorial Board of the *Notices* and Professor Krantz, its editor, for all their efforts to put together an impressive and diverse collection of research and expository articles on the pages of the *Notices* in the past five years. I was especially very delighted to see the innovative creation of "Doceamus" on mathematics education issues and "Scripta Manent" regarding publishing matters.

Whether we teach at a two-year college or a research university, the quality of what we teach and the students we nurture has a profound impact on the fate of our institutions and the society at large. More than ever, we are all scrutinized by our community leaders and political stake holders who control the budget of our institutions and demand that our graduates be truly literate as well as be able to function in today's complex world. If we are to thrive professionally and help our universities grow, we need to view teaching, especially at the undergraduate level, not as a chore but as a professional calling. To be great teachers, we need to constantly critique and refine our methods, and not blame the students.

In closing, I echo Professor Yakov Sinai's basic principle in teaching, as expressed in an interview with M. Raussen and C. Skau [*Notices*, Volume 62, Number 2, February, 2015]: "If people do not understand my explanations, then this is my fault." My hope is that the *Notices* will continue to be a forum for discussion of educational issues as an integral part of all issues related to our mathematics profession.

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