
**The Montana Mathematics Enthusiast
Monographs in Mathematics Education**

Monograph 12

*Crossroads in the History of Mathematics
and Mathematics Education*

Information Age

The Montana Mathematics Enthusiast Monographs in Mathematics Education

Monograph 12

*Crossroads in the History of Mathematics
and Mathematics Education*

Edited by

Bharath Sriraman

The University of Montana, USA



INFORMATION AGE PUBLISHING, INC.
Charlotte, NC • www.infoagepub.com

Library of Congress Cataloging-in-Publication Data

Copyright © 2012 Information Age Publishing Inc. & The Montana Council of Teachers of Mathematics

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the publisher.

Permission to photocopy, microform, and distribute print or electronic copies may be obtained from:

Bharath Sriraman, Ph.D.
Editor, *The Montana Mathematics Enthusiast*
The University of Montana
Missoula, MT 59812
Email: sriramanb@mso.umt.edu
(406) 243-6714

Printed in the United States of America

CONTENTS

Topics in History and Didactics of Calculus and Analysis

1. A note on the institutionalization of mathematical knowledge or “What was and is the Fundamental Theorem of Calculus, really”?
Eva Jablonka and Anna Klisinska (Sweden) 3
2. Transitioning students to calculus: Using history as a guide
Nicolas Haverhals & Matt Roscoe (USA) 41
3. The tension between intuitive infinitesimals and formal mathematical analysis
Mikhail Katz (Israel) & David Tall (UK) 71
4. The didactical nature of some lesser known historical examples in mathematics
Kajsa Bråting (Sweden) Nicholas Kallem & Bharath Sriraman (USA) 91
5. The Brachistochrone Problem: Mathematics for a Broad Audience via a Large Context Problem
Jeff Babb & James Currie (Canada) 115
6. Chopping Logs: A Look at the History and Uses of Logarithms
Rafael Villarreal-Calderon (USA) 131
7. The history of mathematics as a pedagogical tool: Teaching the integral of the secant via Mercator’s projection
Nicolas Haverhals & Matt Roscoe (USA) 139

Topics in the History and Didactics of Geometry and Number

8. Euclid’s Book on the Regular Solids: Its Place in the Elements and Its Educational Value
Michael N. Fried (Israel) 173
9. Book X of The Elements: Ordering Irrationals
Jade Roskam (USA) 197

10. The Origins of the Genus Concept in Binary Quadratic Forms
Mark Beintema & Azar Khosravani (USA) 215
11. Where are the Plans: A socio-critical and architectural survey of early Egyptian Mathematics
Gabriel Johnson, Bharath Sriraman, Rachel Saltzstein (USA) 229
- History of Mathematics in Mathematics Education***
12. Classifying the arguments and methodological schemes for integrating history in mathematics education
Constantinos Tzanakis & Yannis Thomaidis (Greece) 247
13. A first attempt to identify and classify empirical studies on history in mathematics education
Uffe Thomas Jankvist (Denmark) 295
14. Reflections on and benefits of uses of history in mathematics education exemplified by two types of student work in upper secondary school
Tinne Hoff Kjeldsen (Denmark) 333
15. Adversarial and friendly interactions: Progress in 17th century mathematics
Shirley B. Gray & Libby Knott (USA) 357