

The Grade 9 Maths ANA – What Can We See After Three Years?

Craig Pournara, Sihlobosenkosi Mpofo & Yvonne Sanders

School of Education, University of the Witwatersrand

craig.pournara@wits.ac.za sihlobosenkosi@gmail.com Yvonne.gubler@gmail.com

INTRODUCTION

The Annual National Assessments (ANA) were introduced to address South Africa's poor performance in international mathematics assessments such as TIMSS and SACMEQ. The Grade 9 test was first written in 2012 with a national average of 12.7%. In 2013 the average increased to 13.9% but then dropped to 10.8% in 2014. The overall picture is one of very poor performance with the result that many questions are being asked about the value and purpose of the ANA.

The Department of Basic Education (DBE) identifies three purposes for the ANAs: (1) a measure for the state to gauge improvement in the education system, based on learner performance year-on-year; (2) a diagnostic assessment to identify areas of weakness in learners' performance; and (3) to provide a model of good assessment practice. While these are all important goals, they are not necessarily achievable through a single instrument. However, this is not the focus of our article. Our purpose here is to report on a content analysis of the three ANA papers which we undertook in the first quarter of 2015, paying particular attention to cognitive demand and levels of difficulty. We share our findings on these aspects, as well as on trends that arise as we look across the first three years of the Grade 9 Maths ANA.

CLASSIFICATION OF ITEMS

Classification of items into taxonomies is never a simple matter, and there are no perfect taxonomies. We have attempted to use existing taxonomies with which teachers are familiar but we are not suggesting that these are definitive levels or categories.

LEVELS OF COGNITIVE DEMAND

Levels of cognitive demand describe the nature of the item in terms of the mathematical demand. An early Grade 9 ANA document (DBE, 2011) distinguishes three levels: knowledge of basic concepts, application of concepts and non-routine problem solving. However, we chose to work with the four levels of cognitive demand as described in the CAPS document since these are the levels that teachers work with regularly.

- *Knowledge* – requires straight recall, use of mathematical facts, identification and direct use of formulae.
- *Routine procedure* – well-rehearsed and familiar algorithms, simple calculations that may involve several steps, use of formulae requiring change of subject.
- *Complex procedure* – several calculations that are not all of the same type, complex calculations, route to solution is not entirely obvious, connecting representations, developing proof, requires conceptual understanding.
- *Problem solving* – unseen, non-routine problems, route to solution is not suggested, also requires conceptual understanding.

Ana Maths Grade 9

Johann Christian Zahn

A red circular graphic with a gradient, appearing as a semi-circle or a partial circle, located to the right of the author's name.

Ana Maths Grade 9:

Il principio di minimo e sue applicazioni alle equazioni funzionali S. Faedo, 2011-06-14 L Nirenberg On elliptic partial differential equations S Agmon The L_p approach to the Dirichlet problems C B Morrey Jr Multiple integral problems in the calculus of variations and related topics L Bers Uniformizzazione e moduli **Theory of Functional Differential**

Equations Jack K. Hale, 2012-12-06 Since the publication of my lecture notes Functional Differential Equations in the Applied Mathematical Sciences series many new developments have occurred As a consequence it was decided not to make a few corrections and additions for a second edition of those notes but to present a more comprehensive theory The present work attempts to consolidate those elements of the theory which have stabilized and also to include recent directions of research The following chapters were not discussed in my original notes Chapter 1 is an elementary presentation of linear differential difference equations with constant coefficients of retarded and neutral type Chapter 4 develops the recent theory of dissipative systems Chapter 9 is a new chapter on perturbed systems Chapter 11 is a new presentation incorporating recent results on the existence of periodic solutions of autonomous equations Chapter 12 is devoted entirely to neutral equations Chapter 13 gives an introduction to the global and generic theory There is also an appendix on the location of the zeros of characteristic polynomials The remainder of the material has been completely revised and updated with the most significant changes occurring in Chapter 3 on the properties of solutions Chapter 5 on stability and Chapter 10 on behavior near a periodic orbit **Annual Performance Plan** Mpumalanga (South Africa). Department of Education, 2015

Frontiers in Number Theory, Physics, and Geometry II Pierre E. Cartier, Bernard Julia, Pierre Moussa, Pierre Vanhove, 2007-07-18 Ten years after a 1989 meeting of number theorists and physicists at the Centre de Physique des Houches a second event focused on the broader interface of number theory geometry and physics This book is the first of two volumes resulting from that meeting Broken into three parts it covers Conformal Field Theories Discrete Groups and Renormalization offering extended versions of the lecture courses and shorter texts on special topics **Complex Analysis** Klas Diederich, 2013-04-17 This volume contains the Proceedings of the International Workshop Complex Analysis which was held from February 12-16 1990 in Wuppertal Germany in honour of H Grauert one of the most creative mathematicians in Complex Analysis of this century In complete accordance with the width of the work of Grauert the book contains research notes and longer articles of many important mathematicians from all areas of Complex Analysis Altogether there are 49 articles in the volume Some of the main subjects are Cauchy Riemann Equations with estimates q convexity CR structures deformation theory envelopes of holomorphy function algebras complex group actions Hodge theory instantons Kähler geometry Lefschetz theorems holomorphic mappings Nevanlinna theory complex singularities twistor theory uniformization

Old Babylonian Grammar Michael P. Streck, 2022-08-22 Akkadian written in the cuneiform script is the most important language of the Ancient Near East and one of the most important members of the Semitic language family Old Babylonian is

the best attested period and dialect of Akkadian Old Babylonian was written all over Mesopotamia modern Iraq Syria and some neighboring regions during the first half of the 2nd millennium BCE The book describes the language of middle Old Babylonian from the kings Sin muballit to Samsu iluna Volume 1 extensively describes the orthography phonology nouns pronouns and numbers of Old Babylonian *Spectrum Test Prep, Grade 2* Spectrum,2015-01-05 Spectrum Test Prep Grade 2 includes strategy based activities for language arts and math test tips to help answer questions and critical thinking and reasoning The Spectrum Test Prep series for grades 1 to 8 was developed by experts in education and was created to help students improve and strengthen their test taking skills The activities in each book not only feature essential practice in reading math and language arts test areas but also prepare students to take standardized tests Students learn how to follow directions understand different test formats use effective strategies to avoid common mistakes and budget their time wisely Step by step solutions in the answer key are included These comprehensive workbooks are an excellent resource for developing skills for assessment success Spectrum the best selling workbook series is proud to provide quality educational materials that support your students learning achievement and success Math Practice, Grade 5 ,2014-03-15 Kelley Wingate s Math Practice for fifth grade is designed to help students master basic math skills through focused math practice Practice pages will be leveled in order to target each student s individual needs for support Some pages will provide clear step by step examples The basic skills covered include multiplication and division of fractions more advanced division decimals volume and a comprehensive selection of other fifth grade math skills This well known series Kelley Wingate has been updated to align content to the Common Core State Standards The 128 page books will provide a strong foundation of basic skills and will offer differentiated practice pages to make sure all students are well prepared to succeed in today s Common Core classroom The books will include Common Core standards matrices cut apart flash card sections and award certificates This series is designed to engage and recognize all learners at school or at home **Mathematical Analysis and Numerical Methods** Aliaa Burqan,Rania Saadeh,Ahmad Qazza,Osama Yusuf Ababneh,Juan C. Cortés,Kai Diethelm,Dia Zeidan,2024-10-05 This book presents a thoughtful compilation of chapters derived from the proceedings of the 8th International Arab Conference on Mathematics and Computations IACMC 2023 held at Zarqa University in Zarqa Jordan from 10 12 May 2023 Encompassing a broad spectrum of themes crucial to contemporary research and development the book delved into subjects ranging from partial and differential equations to fractional calculus from probability and statistics to graph theory and from approximation theory to nonlinear dynamics Moreover it explores pivotal areas such as numerical analysis and methods as well as fostering interdisciplinary mathematical research initiatives Building upon the legacy of its predecessors IACMC 2023 served as a premier platform for scholars researchers and industry professionals to converge and exchange insights on a myriad of cutting edge advancements and practical applications within the realm of mathematical sciences This volume encapsulates the essence of IACMC 2023 offering readers a comprehensive overview of the latest

breakthroughs and trends in mathematical sciences while serving as a testament to the collaborative spirit and intellectual vigor that define this esteemed conference series Encyclopedic Dictionary of Mathematics Nihon Sūgakkai,1993 V 1 A N v 2 O Z Apendices and indexes **Math Practice, Grade 5** Carson-Dellosa Publishing,2014-03-15 Kelley Wingate s Math Practice for fifth grade is designed to help students master basic math skills through focused math practice Practice pages will be leveled in order to target each student s individual needs for support Some pages will provide clear step by step examples The basic skills covered include multiplication and division of fractions more advanced division decimals volume and a comprehensive selection of other fifth grade math skills This well known series Kelley Wingate has been updated to align content to the Common Core State Standards The 128 page books will provide a strong foundation of basic skills and will offer differentiated practice pages to make sure all students are well prepared to succeed in today s Common Core classroom The books will include Common Core standards matrices cut apart flashcard sections and award certificates This series is designed to engage and recognize all learners at school or at home **Recent Developments in Quantum**

Mechanics Anne Boutet de Monvel,P. Dita,G. Nenciu,Radu Purice,2012-12-06 Proceedings of the Brasov Conference Poiana Brasov 1989 Romania *Math for Life 6' 2006 Ed. ,* Complex Analysis - Fifth Romanian-Finnish Seminar. Proceedings of the Seminar Held in Bucharest, June 28 - July 3, 1981 C. Andreian Cazacu,N. Boboc,M. Jurchescu,I. Suciu,2006-11-15

Summability Theory And Its Applications Feyzi Basar,2012-09-07 The theory of summability has many uses throughout analysis and applied mathematics Engineers and physicists working with Fourier series or analytic continuation will also find the concepts of summability theory valuable to their research The concepts of summability have been extended to the sequences of fuzzy numbers and also to the theorems of ergodic theory This ebook explains various aspects of summability and demonstrates applications in a coherent manner The content can readily serve as a useful series of lecture notes on the subject This ebook comprises of 8 chapters starting from classical sequence spaces and covering matrix transformations and fuzzy numbers An accompanying bibliography with extensive references makes this a valuable source of information for readers interested in summability theory as well as other branches of science **Gotische Bibelübersetzung die älteste Germanische Urkunde ...**

Friedrich Karl Fulda,1805 *Ulfilas Gothische Bibelübersetzung die älteste germanische Urkunde nach Ihre'ns Text, mit einer grammatischwörtlichen lateinischen Uebersetzung zwischen den Zeilen, samt einer Sprachlehre und einem Glossar, ausgearbeitet von F. K. Fulda ... das Glossar umgearbeitet von W. F. H. Reinwald ... und den Text, nach Ihre'ns genauer Abschrift der silbernen Handschrift in Upsal sorgfältig berichtigt, die Uebersetzung und Sprachlehre verbessert und ergänzt, auch mit Ihre'ns lateinischer Uebersetzung ... und einer vollständigen Kritik und Erläuterung in Anmerkungen ... samt einer historischkritischen Einleitung versehen und herausgegeben von J. C. Zahn. (Nachricht von dem Leben und den Schriften F. C. Fulda's.) Lat.&Goth ,1805 Ulfilas Gothische Bibelübersetzung Zahn,1805 Ulfilas gothische Bibelübersetzung, die älteste germanische Urkunde nach Ihre'ns Text, mit einer*

grammatisch-wörtlichen lateinischen Uebersetzung zwischen den Zeilen, samt einer Sprachlehre und einem Glossar Johann Christian Zahn, 1805 Ulfilas gothische Bibelübersetzung Iohann Christian Zahn, 1805

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