



ANNUAL NATIONAL ASSESSMENT 2013
GRADE 1 MATHEMATICS
MEMORANDUM
EXEMPLAR QUESTIONS

This memorandum consists of 4 pages.

General marking notes:

1. Give full marks for answers only, unless otherwise stated.
2. Accept any alternative correct answer that is not included in the memoranda unless otherwise stated

NO HALF MARK TO BE AWARDED.

QUESTION	EXPECTED ANSWER(S)		MARK(S)	TOTAL
1.	   Accept if it's a marked, ticked or circled		1 1 1 mark each	3
2.	a.	7 ✓	1	4
	b.	Nine ✓	1	
	c.	8 ✓ and eight ✓	2	
3.	a.	6; 8; 12 ✓	1	3
	b.	10; 20; 30 ✓	1	
	c.	16; 19 ✓	1	
		(Award one mark if all 3 are correct. No mark awarded if only 1 or 2 numbers are correct)		
4.	a.	14 ✓	1	3
	b.	12 ✓	1	
	c.	9 ✓	1	
5.	a.		1	3

Ana 2013 Memo Mathematics Grade 6

Persi Diaconis, Jason Fulman



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The Mathematics of Shuffling Cards Persi Diaconis, Jason Fulman, 2023-03-20 This book gives a lively development of the mathematics needed to answer the question How many times should a deck of cards be shuffled to mix it up The shuffles studied are the usual ones that real people use riffle overhand and smooshing cards around on the table The mathematics ranges from probability Markov chains to combinatorics symmetric function theory to algebra Hopf algebras There are applications to magic tricks and gambling along with a careful comparison of the mathematics to the results of real people shuffling real cards The book explores links between shuffling and higher mathematics Lie theory algebraic topology the geometry of hyperplane arrangements stochastic calculus number theory and more It offers a useful springboard for seeing how probability theory is applied and leads to many corners of advanced mathematics The book can serve as a text for an upper division course in mathematics statistics or computer science departments and will be appreciated by graduate students and researchers in mathematics statistics and computer science as well as magicians and people with a strong background in mathematics who are interested in games that use playing cards Analytic Trends in Mathematical Physics Houssam Abdul-Rahman, Robert Sims, Amanda Young, 2020-01-06 This volume contains the proceedings of the Arizona School of Analysis and Mathematical Physics held from March 5 9 2018 at the University of Arizona Tucson Arizona A main goal of this school was to introduce graduate students and postdocs to exciting topics of current research that are both influenced by physical intuition and require the use of cutting edge mathematics The articles in this volume reflect recent progress and innovative techniques developed within mathematical physics Two works investigate spectral gaps of quantum spin systems Specifically Abdul Rahman Lemm Lucia Nachtergaele and Young consider decorated AKLT models and Lemm demonstrates a finite size criterion for D dimensional models Bachmann De Roeck and Fraas summarize a recent proof of the adiabatic theorem while Bachmann Bols De Roeck and Fraas discuss linear response for interacting Hall insulators Models on general graphs are the topic of the articles by Fischbacher on higher spin XXZ and by Latushkin and Sukhtaiev on an index theorem for Schrödinger operators Probabilistic applications are the focus of the articles by DeMuse and Yin on exponential random graphs by Saenz on KPZ universality and by Stolz on disordered quantum spin chains In all the diversity represented here is a testament to the enthusiasm this rich field of mathematical physics generates Non-Semisimple Extended Topological Quantum Field Theories Marco De Renzi, 2022-05-24 View the abstract **From the Basic Homotopy Lemma to the Classification of C^* -algebras** Huaxin Lin, 2017-08-11 This book examines some recent developments in the theory of algebras which are algebras of operators on Hilbert spaces An elementary introduction to the technical part of the theory is given via a basic homotopy lemma concerning a pair of almost commuting unitaries The book presents an outline of the background as well as some recent results of the classification of simple amenable algebras otherwise known as the Elliott program This includes some stable uniqueness theorems and a revisiting of Bott maps via stable homotopy Furthermore

theory related rotation maps are introduced The book is based on lecture notes from the CBMS lecture sequence at the University of Wyoming in the summer of 2015 Wireless Communications Keith Q. T. Zhang, 2015-12-14 Understand the mechanics of wireless communication Wireless Communications Principles Theory and Methodology offers a detailed introduction to the technology Comprehensive and well rounded coverage includes signaling transmission and detection including the mathematical and physics principles that underlie the technology s mechanics Problems with modern wireless communication are discussed in the context of applied skills and the various approaches to solving these issues offer students the opportunity to test their understanding in a practical manner With in depth explanations and a practical approach to complex material this book provides students with a clear understanding of wireless communication technology

Multicultural Instructional Design: Concepts, Methodologies, Tools, and Applications Management Association, Information Resources, 2019-07-05 As the world becomes more globalized student populations in educational settings will continue to grow in diversity To ensure students develop the cultural competence to adapt to new environments educational institutions must develop curriculum policies and programs to aid in the progression of cultural acceptance and understanding Multicultural Instructional Design Concepts Methodologies Tools and Applications is a vital reference source for the latest research findings on inclusive curriculum development for multicultural learners It also examines the interaction between culture and learning in academic environments and the efforts to mediate it through various educational venues Highlighting a range of topics such as intercultural communication student diversity and language skills this multi volume book is ideally designed for educators professionals school administrators researchers and practitioners in the field of education **Analysis, Complex Geometry, and Mathematical Physics** Paul M. N. Feehan, Jian Song, Ben

Weinkove, Richard A. Wentworth, 2015-07-21 This volume contains the proceedings of the Conference on Analysis Complex Geometry and Mathematical Physics In Honor of Duong H Phong which was held from May 7 11 2013 at Columbia University New York The conference featured thirty speakers who spoke on a range of topics reflecting the breadth and depth of the research interests of Duong H Phong on the occasion of his sixtieth birthday A common thread familiar from Phong s own work was the focus on the interplay between the deep tools of analysis and the rich structures of geometry and physics Papers included in this volume cover topics such as the complex Monge Amp re equation pluripotential theory geometric partial differential equations theories of integral operators integrable systems and perturbative superstring theory

Davenport-Zannier Polynomials and Dessins d'Enfants Nikolai M. Adrianov, Fedor Pakovich, Alexander K. Zvonkin, 2020-06-29 The French expression dessins d'enfants means children s drawings This term was coined by the great French mathematician Alexandre Grothendieck in order to denominate a method of pictorial representation of some highly interesting classes of polynomials and rational functions The polynomials studied in this book take their origin in number theory The authors show how by drawing simple pictures one can prove some long standing conjectures and formulate new

ones The theory presented here touches upon many different fields of mathematics The major part of the book is quite elementary and is easily accessible to an undergraduate student The less elementary parts such as Galois theory or group representations and their characters would need a more profound knowledge of mathematics The reader may either take the basic facts of these theories for granted or use our book as a motivation and a first approach to these subjects

Descriptive Complexity of Formal Systems Michal Hospodár, Galina Jirásková, Stavros Konstantinidis, 2019-07-08
This book constitutes the proceedings of the 21st International Conference on Descriptive Complexity of Formal Systems DCFS 2019 held in Košice Slovakia in July 2019 The 18 full papers presented in this volume were carefully reviewed and selected from 25 submissions The book also contains 4 invited talks They deal with all aspects of descriptive complexity and costs of description of objects in various computational models such as Turing machines pushdown automata finite automata grammars and others

Official Gazette of the United States Patent and Trademark Office, 2005

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