AMESA NEWS
The Association for Mathematics Education of South Africa
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From the President's Desk...

At present preparations are in full swing for our National Congress in Polokwane. The NOC and LOC have done sterling work. Our theme "Deepening the quality of mathematics teaching and learning" is very significant in the current education scenario in South Africa. AMESA members have a very important role to play in this regard. We firmly believe that attending branch, regional and national conferences of AMESA will go a great way toward "deepening" this quality. Our on-going accredited "Problem solving course" for teachers is also indicative of our seriousness in this matter. I, hereby, make the call to all our Mathematics teachers in South Africa, irrespective of grade taught, to give a solemn pledge to "deepen the quality of mathematics teaching and learning" in our classes. This is in our hands. Let it not slip from our grasp. Please let me hear your thoughts on this important matter.

Editor's Comment...

In this issue we get to know our President, Vasuthavan Govender and his work in AMESA. In addition, Cosmo Baartman a school principal and a Mathematics teacher, shares how he assists mathematics learners at his school. We introduce six high school leaners who will represent South Africa at the 56th International Mathematical Olympiad (IMO) to be held in Chiang Mai, Thailand (4-16 July 2015). We showcase AMESA regional conferences in the Free State and North West regions. We have included our analyses of the 2014 Grade 12 Mathematics and Mathematics Literacy examination papers and Grades 3, 6 & 9 Annual National Assessments (ANA) for Mathematics. These are very important professional activities for our members and we call upon more of our members to participate in these analyses in September and November later this year. You will be greatly enriched. We also pay tribute to our sponsors and show an interesting result involving birthdays though the use of very simple mathematics. Look out for the page on ICME 13 which is to be held in Hamburg, Germany in 2016.
Enjoy reading!

If you wish to contribute an article or share AMESA activities in your area, write to me at vicepresident@amesa.org.za.

Contents

Interview with the President of AMESA: Vasuthavan Govender

1. When did you join AMESA?
I joined AMESA in 1993.

2. Why did you join AMESA?
I was always looking to learn more about my favourite subject Mathematics. I had joined MASA (Mathematical Association in 1989) and MASA was one of the founder members of AMESA. I was also a member of the Teachers Association of South Africa (TASA) which had a committee called the TASA Mathematics Society, another founder member of AMESA.

3. How have you benefitted from AMESA since you joined the association?
I have benefited immensely. I served in the Port Elizabeth branch in various capacities. I was Congress Director in 1999 and 2008; I learnt a lot about administration and organization which I have put to good use in my daily work duties. I have learnt more about both mathematics content and pedagogy. My ability to do research in Mathematics Education has improved immensely; especially with regard to teaching and learning as well as problem solving. I have become more confident about presenting papers at branch, regional and national conferences. I also had occasion to present papers internationally. I have been reviewing research articles for Pythagoras and Congress proceedings since 2009. I represent AMESA on the Advisory Committee for Mathematics (ACM), a sub-committee of SAMF; in fact I was one of the founder members of this committee in 2012.

4. As the president of AMESA and working full time in the Department of Basic Education, how do you determine priorities in scheduling your time? Give examples.
I like working in advance so planning is the key. I make sure I check my emails very early in the morning and in the evening to keep track of what is going on in AMESA and respond to executive and council issues. From time to time I am consulted by the media on issues regarding Mathematics teaching and learning so I have to make time for that. I am very fortunate to have a Director who is understanding and supportive. He knows that I bring a lot of knowledge and skills to my district. I always make sure that my district responsibilities are taken care of first before I attend to my AMESA duties. I have very demanding duties in my district; I serve as Deputy Chief Education Specialist for Mathematics & Science, FET coordinator and Subject Advisor for Mathematical Literacy. In some parts of the country, this work would be done by three people. However, I am not complaining as I believe in making a positive difference to my teachers and learners at large.

5. Describe some projects or ideas (not necessarily your own) that were implemented, or carried out successfully primarily because of your efforts.
I have been involved in many projects over the years. In fact, one of my first efforts was a non-racial Mathematics conference in Port Elizabeth in 1988. Although it was during apartheid, the conference was attended by 40 delegates (of all races). We were privileged to have two guest presenters, Professor Moon Moodley from the then UDW and Professor John Webb from UCT.

Some of my recent projects/ideas include:

- *Involvement in the Govan Mbeki Mathematics Development programme, first as a facilitator and then as a project manager in 2010*
- *Project leader of National Mathematics week in 2010*
- *Project leader of a Mathematics/Science outreach project in the Alice-Fort Beaufort area of the Eastern Cape in 2012*
- *Initiating a meeting between the ACM and People-to-people delegation from the USA in October 2013 (details published in AMESA News #54; March 2014)*
- *Project leader of National Science week in 2014*
- *Project leader of PE District support programme for FET teachers in 2014 and 2015*
- *Arranging funding for PE District FET Awards function in March 2015. More than 30 trophies were given out to schools which improved their subject and overall performance in 2014*

6. How has AMESA under your leadership contributed to the professional growth of its members?

I think it is still developing. I was given a motion of confidence by national council members after chairing my first National Council meeting in February 2015. My first experience with rank and file members was at the AMESA Free State conference in Bloemfontein in April 2015. My three presentations there would have helped in their professional growth. I am currently working with the AMESA Eastern Cape chair with a project to boost the professionalism of mathematics teachers in Port Elizabeth. Eight AMESA regions have had their regional conferences so there would definitely be professional growth and development amongst our regional members. I am sure that those attending the AMESA Congress in Polokwane would find the academic programme very engaging and informative.

7. How have your predecessors made the role of President of AMESA easier or difficult?

I have served in the National Council since 2009. I learnt about AMESA culture from Ms Elspeth Khembo. I was fortunate to serve as vice-president under AMESA stalwart Alwyn Olivier and I learnt a lot from him. In fact, under his leadership we instituted a very fool- proof and effective financial system. All AMESA transactions are seen daily by the three signatories (President; Vice-President and Treasurer) Alwyn is currently the chairperson of our National Organising Committee (NOC) which is a big help as we move towards our National Congress in Polokwane, Limpopo.

8. Where do you see AMESA in the next ten years in the light of diminishing sponsorships?

I see AMESA as a vibrant organization with more than 5000 members. This is an attainable goal and will ensure that AMESA will survive as a result of its membership. The loss of our previous sponsorship after 20 years has been a bitter blow but we have managed to keep afloat since them. We were fortunate to have received R200000 from the Oppenheimer Memorial Trust in support of our activities and we thank them for this wonderful gesture. We are also grateful to the WITS School of Education to allow us to continue using offices at their Marang block, despite the closure of the RADMASTE centre. We have been there since 1997.

We would welcome any other sponsor to come on board and work with us to attain our goals. I would like to see AMESA become more structured with more full time staff along the lines of similar organisations in other countries. Would it not be great for AMESA to have its own National Office in 2025 and regional offices in all 9 provinces?

AGENDA FOR THE AMESA AGM TO BE HELD IN POLOKWANE, LIMPOPO (CONGRESS 2015)

AGENDA OF THE 22nd AGM 30 June 2015

1. **Welcome**

2. **Finalising the Agenda**

3. **Apologies**

4. **Minutes of the 2014 AGM held in Kimberley: G Powell**

5. **National Council Report on the Activities of the Association: G Powell**

6. **Financial Report and Budget: R Govender**

7. **President's Report: VG Govender**

8. **Motions:**
   That in Clause 61 of the AMESA Constitution "Commissioner of Inland Revenue" be replaced with **"Commissioner for the South African Revenue Service": R Govender**

9. **Elections:**

Office	Name	Nominated by
Treasurer	R Govender	National Council

10. **General**

11. **Closure**

AMESA REGIONAL CONFERENCES 2015

For the first time in many years, 8 of our 9 regions have already had their Annual General Meetings and Regional Conferences in the first half of the year. In this edition of AMESA News we report on two of them, namely, Free State and North-West.

(1) AMESA Free State Regional Conference Report:

Compiled by the AMESA President: Vasuthavan (Nico) Govender

AMESA FS has been one of the most vibrant regions of AMESA over the years. Unfortunately, after a period of various issues and incompetence which was investigated by the President and Treasurer, the National Council of AMESA took a decision at its meeting on 6/7 February 2015 to disband the regional executive committee of AMESA FS. The President was entrusted with the task of writing to the AMESA FS chair to inform him of this decision. This was done at the beginning of March 2015. In the meantime, the President worked with long standing AMESA member Pam Hugo in the Free State to work towards building an interim structure to run AMESA FS matters. The idea of a mini-conference was mooted and this was accepted by various stakeholders in the Free State.

Working with FS Department of Education structures, Ms Hugo was able galvanise support for the AMESA FS mini-conference. Due to the demand and support for the mini-conference, the mini-conference was changed into a fully- fledged regional conference. The conference took place on Saturday 18 April 2015 at the Dr Viljoen Combined School in Willows, Bloemfontein and was attended by more than 200 delegates, all of whom became AMESA members. The conference consisted of an opening plenary by the President of AMESA (Vasuthavan Govender), titled , "Teaching mathematics to develop learners' problem solving (and thinking abilities)" two parallel sessions (for the different phases), election of the AMESA FS executive and a second plenary which closed the conference. This plenary by MS Mosia from the University of the Free State was entitled "Lesson study in Mathematics"

The President also did two other sessions on with FET teachers titled "Teaching Mathematics in a connected way" and "The Mathematics in Mathematical Literacy". Other topics covered in the parallel sessions were "Similarity"; "The Pythagorean theorem"; "Euclidean Geometry"; "Factorisation methods"; "Bar graph scale". The election of the interim committee went smoothly and the following persons were elected onto the AMESA FS interim regional committee:

Position	Name	Email	Institution/Office
Chairperson	Dr A. Milne	annarimilne@gmail.com or milnea@edu.fs.gov.za	Xhariep Education District
Vice Chairperson	Mr ZM Porogo	zporogo@gmail.com	Sasolburg Education District
Secretary	Mr SC Mdlalose	mdlalosesandile@gmail.com	Thiboloha Special School for Blind & deaf learners
Treasurer	Mrs A Mulder	anetmul@gmail.com	Dr Viljoen CS

We would like to thank Casio for the sponsorship of the conference bags and Sharp for the calculator gifts.

Delegates at the AMESA FS Conference on 18 April 2015

(2) North West Regional Conference Report:

(Compiled by AE Thavhanyedza, new North-West AMESA Chairperson)

The North West Regional Conference and elections took place on Saturday 23 May 2015 at Lebone II College **(Phokeng, 25 km outside Rustenburg)**. The conference was attended by **265** participants, including **10** Regional Council members. In some instances more than four members from a single school attended the conference. Outgoing Regional Chairperson, Mr Makhalanyane Moeti welcomed the participants made the opening remarks. He reminded participants of their roles as Mathematics teachers & members of AMESA: **"Effective teaching must be their priority"**. The Bojanala District Director, Ms P Mokhutle was the key note speaker and officially opened the conference. She was fascinated by the large group of teachers participating in Mathematics activities (AMESA) and encouraged them to use the knowledge from the conference to raise the learners' participation and performance in Mathematics at their respective schools and North West Province in totality.

Parallel Sessions

The conference covered all phases of the school curriculum, from Foundation Phase to FET and included Mathematical Literacy. Some of the key content areas covered during the parallel sessions included the following: Problem-solving & Mental Calculations (Foundation Phase); Fractions & Constructions (Intermediate and Senior Phases respectively); Probability (Maths FET) and Measurement (Mathematical Literacy).

Most of the attendees were from primary schools, with only few from Secondary Schools. All the presenters were acknowledged.

Sponsorship

The conference was blessed with sponsorship from the following companies: The Red-Pencil Group, MacMillan, Vivlia, Lesedi bookshop and Shooters & Shutters were available for our teachers. They sponsored the Conference with pens and bags and some books (e.g., dictionaries that were used for our Lucky draw).

Announcements

The Annual General meeting was held where members were informed about other activities that are unfolding. They were urged to support all AMESA activities. The Secretary made an announcement of National Conference to be held at University of Limpopo **(Turfloop Campus)** from 29th June to 3rd of July 2015. She also announced the Provincial Maths week that will be held on 1st August 2015 at Zeerust Combined School (Ngaka Modiri Molema District).

The new North-West Regional Council

The contact details for the newly-elected North West Regional Council members are:-

Position	Name	Email	Branch
Chairperson and National Representative	Mr AE Thavhanyedza	athavhanyedza@nwpg.gov.za	Kgetleng 079 493 5599
Deputy Chairperson	Mrs CK Pilane	www.tsopilane@gmail.com	Bojanala 082 399 5478
Secretary	Mrs OD Thibodi	othibodi@gmail.com	Bojanala 078 449 1935
Deputy Secretary	Ms E Morake	morakekeabaka@gmail.com	Taung 082 304 5926
Treasurer	Mr HO Opio	opio@vodamail.co.za	Kgetleng 072 868 0194
Event Co-ordinator	Mrs Segatle	lmothodi@nwpg.gov.za	Delareyville 073 300 9066

The outgoing chairperson, Mr Makhalanyane congratulated the new executive committee and wished them well in their new responsibilities.

Ms P Mokhutle (left) addressing teachers and NW Chairperson (Mr Eddy Thavhanyedza)

Audience during welcome address by Bojanala District Director Ms P. Mokhutle

Ms N. Chidi (from Madibeng AO) with Foundation Phase participants

Senior Phase teachers with Ms O. Ramalepa (from Letlhabile AO), enjoying "Fractions"

INTERNATIONAL MATHEMATICAL OLYMPIAD TEAM ANNOUNCEMENT

Six South African high school learners have been selected to participate in the 56th International Mathematical Olympiad (IMO) to be held in Chiang Mai, Thailand from the 4th till the 16th of July 2015. Last year this prestigious Olympiad took place in Cape Town.

The competition dates as far back as 1959 when Romania hosted the first ever IMO. Today there are over 100 countries from five different continents that will be participating. In this Olympiad questions testing advanced thinking skills are chosen from mathematical topics including Geometry, Combinatorics, Number Theory and Algebra. The IMO brings young minds together not only for competition purposes but also for instilling a spirit of friendship. The team has been selected based on the results of last year's South African Mathematics Olympiad, followed by an intensive training programme.

The following learners have been selected:

NAME	GRADE	SCHOOL
Nicholas Kroon	Grade 11	St Andrew's College in Grahamstown
Andrew McGregor	Grade 11	Rondebosch Boys High School in Cape Town
Mohammed Yaseen Mowzer	Grade 11	Fairbairn College in Cape Town
Sanjiv Ranchod	Grade 11	Westerford High School in Cape Town
Bronson Rudner	Grade 11	South African College High School Cape Town
David Broodryk	Grade 11	Westerford High School in Cape Town

Bronson Rudner, Yaseen Mowzer and Sanjiv Ranchod represented South Africa in IMO 2014 and Andrew McGregor represented the country in 2013 in Colombia. One of the most important goals of the IMO is to allow learners to exchange important ideas about themselves, their education and their diverse cultures.

Prof Johann Engelbrecht, Executive Director of the SAMF encourages the mathematical interaction of high school pupils from across the globe. "Competing with young minds from all over the world is a wonderful experience and we wish the South African team the best of luck".

Yaseen Mowzer

Nicholas Kroon

Sanjiv Ranchod

Andrew McGregor

David Broodryk

Bronson Rudner

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HELPING LEARNERS IN MATHEMATICS

Cosmo Baartman, a high school principal in one of Port Elizabeth townships is also a very dedicated and enthusiastic mathematics teacher. He assists learners who experience either learning barriers or need further clarity on issues that impact in their understanding of Mathematics. He elaborates:

- *My approach in all my engagements is to understand the misconceptions and give clarity on those issues. What drives me at the end of it all is the satisfaction I get after seeing improvement.*

- *One thing I make certain is for learners not to depend on me but being able to move on with confidence in solving other problems. At first I ask learners which areas they are not confident with or sure about and thus need clarity on. If that is not successful, I find out about the work they were currently busy with.*

- *I then follow up with the checking of their books especially gaps in their work. It could be missing exercises, corrections or even unmarked exercises. By now I have a fairly clear idea as to where the learners are in respect of their understanding of Mathematics.*

- *I normally use techniques and examples that will improve understanding. I make sure that all the learners are engaging and are writing out the work. In other words, they must be actively involved. This involvement requires them to talk to me about the mathematics they were doing and to state some mathematics concepts, procedures or facts used in the process.*

- *If they struggle with the work, I ask them to observe my methods or check with their friends to gain some confidence. Thereafter, they are free to use their own methods. I find that when learners get enough practice working through the various examples, they become more confident and are better able to understand the work.*

We would like to thank Cosmo Baartman for sharing his ideas with us.

AMESA report on the 2014 Grade 12 November Mathematics & Mathematical Literacy Examination Papers

INTRODUCTION

The grade 12 Mathematics and Mathematical Literacy papers were written on Friday 31 October 2014 and Monday 3 November 2014.Teachers from our AMESA regions (provinces) participated in workshop activities to review the 2014 Grade 12 Mathematics & Mathematical Literacy examination papers according to specific criteria and guidelines developed by our National Curriculum Committee. The regions then submitted their reports to the AMESA National Curriculum Committee, and the Curriculum Committee compiled this report as a summary of the findings and key trends and features of the AMESA provincial reports. The report covers specific comments on the papers, focusing on the following:

A. Overall Review

1. Technical aspects (typing, diagrams, etc.)
2. Language used
3. Content area (syllabus) coverage
4.1 Standard of paper
4.2 Compliance with levels of thinking
5. Comparison with the 2013 paper
6. Overall verdict

B. Question by Question Analysis

In 2012, we "trained" regional representatives in the analysis of questions using the analysis tool. Although we do not claim any validity of the analysis, we are confident that it represents a fairly balanced and accurate perspective from a cross-section of teachers throughout the country.

MATHEMATICS PAPER 1

A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

The Department of Basic Education is to be complimented for the high technical standards of the paper. All diagrams were clear and well-drawn. Teachers noted that a diagram sheet was not provided for the sketching of the graph in Q9.2; this would have resulted in learners spending time constructing a scaled- axis for the graph.

2. Language used

The language used in the paper was at an appropriate level for grade 12 learners. The explanations were short and precise and questions were well-phrased. There were no questions that may disadvantage learners as a result of language related issues.

3. Content area (syllabus) coverage

Code	Content/Topic	Suggested	Actual
1	Algebra and equations (inequalities)	25 (± 3)	21
2	Patterns and sequences	25 (± 3)	31
3	Finance, growth and decay	15 (± 3)	13

Code	Content/Topic	Suggested	Actual
4	Functions and graphs	35 (± 3)	33
5	Differential calculus	35 (± 3)	36
6	Probability	15 (± 3)	16
	Total	**150**	**150**

4.1 Standard of paper

The standard was consistent with the exemplar paper set and with most provincial preliminary examinations. All cognitive levels were covered in more or less the correct ratio. Learners achievement in this paper should be an accurate reflection of their understanding of the Mathematics as prescribed in the CAPS curriculum

4.2 Compliance with levels of thinking

Levels of thinking	Suggested	November 2013 (%)	November 2014 Marks	November 2014 (%)
1 – Knowledge	± 20%	19%	38%	25,3%
2 – Routine procedures	± 35%	42%	51%	34%
3 – Complex procedures	± 30%	27%	44%	29,3%
4 – Solving problems	± 15%	12%	17%	11,4%

5. Comparison with 2013 paper

With the changes in the curriculum it is difficult to compare the 2014 paper with that of the 2013 paper. However, the common topics in both papers were covered in more or less the recommended ratios. One anomaly was that the content area “Algebra and equations” had less marks allocated while “Patterns and sequences” counted for slightly more marks. Although these allocations affected a perfect balance in the paper, this deviation is very negligible. When examining the cognitive levels, questions set at the “complex procedures” (level 3) and the “solving problems” (level 4) were very similar to the 2013 allocation. There was an increase in questions set at the “knowledge” level (level 1) and a decrease in questions set at the “routine procedures” level (level 2).

6. Overall verdict

Overall, the Department of Basic Education and the examining panel are to be complimented on a well-set paper. There were enough level 1 and level 2 questions (62%) for the majority of learners to pass the paper and possibly obtain good marks. At the same time, the level 4 questions were both unique and thought provoking, and would have challenged the top learners. There were concerns that the questions in question 12 (counting principles) were only concerned with the calculation of sample spaces or events and not one of these questions were linked with probability. This was probably an oversight by the examining panel and/or moderators. Another issue which surfaced during discussions was what constitutes “an approved scientific calculator which is non- programmable and non-graphical”. Teachers stated that some of the new scientific calculators are programmable to a certain extent.

In conclusion, we believe that the paper was a “top-notch” paper set at the appropriate level and could be classified as a very “fair” paper which would be a true indicator of learner performance in the topics/content areas for Mathematics paper 1.

B. QUESTION BY QUESTION ANALYSIS

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
Question 1: Algebra and equations								
1.1.1	Solve for x quadratic eq.	2				2	4	Knowledge
1.1.2	Use quadratic formula	3	1			4		Straightforward
1.1.3	Solve for x(exponents)	1	2			3		Simple applications and calculations.
1.2	Simultaneous equation	2	4			6		Simple applications and calculations.
1.3	Inequality	1	2			4		Similar to class exercises
1.4	Nature of roots/ inequality	1	1	1		2		No obvious route to the problem.
Total		**10**	**10**	**1**	**0**	**21**		
Question 2: Number Patterns								
2.1	Finding a term by inspection	1				1	2	Follow pattern
2.2	Calculating term using formula	2	1			3		Use of mathematical facts
2.3.	Writing in sigma notation		1	1		2		Well known procedures needed
2.4	Calculating sum using formula	2				2		Use of correct formula
2.5	Finding divisible terms				4	4		Need higher order of reasoning
Total		**5**	**2**	**1**	**4**	**12**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 3: Number Patterns

3.1.1	Finding a term of a quadratic sequence	2				2	**2**	Knowledge
3.1.2	Finding nth term of sequence	1	2	1		4		Similar to those encountered in class
3.1.3	Finding a values of terms given the first difference				4	4		Requires conceptual understanding
3.2.1	Finding a term in geometric sequence	1	2			3		Knowledge and routine
3.2.2	Calculating sum of a geometric sequence	2				2		Use of formula
3.3	Calculating the product of terms			2	2	4		Non-routine problem
Total		**6**	**4**	**3**	**6**	**19**		

Question 4: Functions and graphs (the hyperbola)

4.1	Calculating equation of hyperbola	2				2	**4**	Perform well known procedures
4.2	Calculating x-intercept hyperbola	1	1			2		Knowledge and routine
4.3	Write new equation of horizontally shifted graph			1		1		Use of mathematical facts
4.4	Intersection of graphs then find length		2	3		5		Make connections between graphs
4.5	Nature of roots in hyperbola graph				1	1		Require conceptual understanding
Total		**3**	**3**	**4**	**1**	**11**		

Question 5: Functions & Graphs; Logs

5.1	Finding the equation of a log graph.		2	2		2	**4**	Perform well known procedures
5.2	Equation of the inverse of the log function	2		2		2		Knowledge
5.3	Reflection about x axis for log graph	1		1		1		Use of mathematics facts

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
5.4	Domain of g	1				1		Straightforward
5.5	Log inequality		1	2		3		Require conceptual understanding
Total		**4**	**3**	**2**	**0**	**9**		

Question 6: Functions and graphs (Parabola)

6.1	x intercept of parabola	1	1			2	**4**	Perform well known procedures
6.2	turning point of parabola	1	1			2		Similar to those encountered in class.
6.3.1	Equation for maximum length		2	1		3		Complex calculations
6.3.2	Finding maximum length		2	4		6		Higher order understanding
Total		**2**	**6**	**5**	**0**	**13**		

Question 7: Financial Mathematics

7.1	Depreciation on reducing balance	1	2			3	**3**	Similar to those encountered in class.
7.2.1	Calculate monthly instalment on loan		1	3		4		Use present value formula; manipulation
7.2.2	Calculating n in loan repayment			4		4		Use present value formula; manipulation; logs
7.2.3	Justifying which person paid more interest.				2	2		Show using calculations
Total		**1**	**3**	**7**	**2**	**13**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 8: Calculus

8.1	First principles - cubic function	3	2			5	**5**	Perform well known procedures
8.2	Basic application of differential rules	2				2		Simple calculations that involve many steps
8.3	Application of differential rules in a complex problem			3		3		Require conceptual understanding
8.4	Investigating stationary points (Concavity)			4		4		Non-routine problem. (New content)
Total		**5**	**2**	**7**	**0**	**14**		

Question 9: Calculus

9.1	Calculation of turning points of cubic function		4	2		6	**5**	Involves many steps
9.2	Graph sketching		3	1		4		Perform well known procedures
9.3	Investigating function				3	3		Require conceptual understanding
Total		**0**	**7**	**3**	**3**	**13**		

Question 10: Calculus

10.1	Expressing length in terms of h	1				1	**5**	Make use given information; manipulation
10.2	Writing equation for volume		3			3		No obvious solution
10.3	Using calculus to find maximum		2	3		5		Involve complex calculations; use formula
Total		**1**	**5**	**3**	**0**	**9**		

Question 11: Probability (Contingency tables)

11.1.1	Basic probability	1				1	**6**	Knowledge
11.1.2	Complement		2			2		Similar to those encountered in class
11.2	Proving independent events			3	1	4		Higher order understanding
Total		**1**	**2**	**3**	**1**	**7**		

Question 12: Probability (Counting principles)

12.1.1	Counting principles		2			2	**6**	Perform well known procedures
12.1.2	Counting principles			2		2		Require conceptual understanding
12.2.1	Counting principles		2			2		Similar to those encountered
12.2.2	Counting principles			3		3		No obvious route to the solution.
Total		**0**	**4**	**5**	**0**	**9**		

Overall total (Mathematics P1)	**Levels**				**Marks**
	1	**2**	**3**	**4**	
All questions	**38**	**51**	**44**	**17**	**150**

MATHEMATICS PAPER 2

A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

The paper was generally well laid out with clear diagrams and text. However, there were some issues. Full stops should not be used at the end of mathematical expressions/equations. There are a number of examples in the paper which show this; for example, questions 3.2; 4.3; 6.3; 7.2; 9.1.2; 10.6. It should be noted that full stops are only indicated for text as indicated for questions 1.1; 1.2; 1.3; etc.

The angle marker for angle y at A in the diagram for question 5 might have been confused with the angles at P. Another issue in the paper were the six pages of annexures; unless these were stapled together at the exam venue, there may be some problems at the marking centres. The annexures should have been printed in a separate booklet or have the questions of paper 2 answered in a special answer book. This would cut down on mark transference errors at the marking centre and make life easier for the candidate.

2. Language used

The language used in the question paper was simple English. There were no statements that were confusing. Basic Mathematics language with (prove, solve, use, calculate, determine, etc.) was used. There were some issues with the phrasing/wording of some questions:

Question 1.6 should be “to identify” rather than “and identify”. In question 8.2, the last statement “$\widehat{ODF} = 30^\circ$ and OF are joined” does not make sense. In any case, one can **draw** OF or **join** O and F.

3. Content area (syllabus) Coverage

Code	Content area/Topic	Suggested	Actual
1	Statistics	20 (±3)	20
2	Analytical Geometry	40 (±3)	40
3	Trigonometry	40 (±3)	40
4	Euclidean Geometry and Measurement	50 (±3)	50
	Total	**150**	**150**

4.1 Standard of paper

Teachers were very impressed with the ways by which the examining panel went to some lengths to make the paper manageable and user-friendly (especially in view of all the "new" work). Candidates were often led through, or pointed in the right direction, and (by virtue of the way the question was phrased) were not necessarily penalised by getting the first part wrong. Questions were generally neatly scaffold.

However, the number of separate pieces of paper to be handed in would be a logistical concern.

Teachers wanted to know whether this new "style" of setting was just for 2014 or can one expect this for 2015 as well. They also inquired whether this type of setting should be introduced at school level.

4.2 Compliance with levels of thinking

Levels of thinking	Suggested	November 2013 (%)	November 2014 Marks	November 2014 (%)
1 – Knowledge	± 20%	23%	31	20,7%
2 – Routine procedures	± 35%	31%	58	38,7%
3 – Complex procedures	± 30%	27%	47	31,3%
4 – Solving problems	± 15%	19%	14	9,3%

5. Comparison with 2012 paper

To compare the paper to the 2012 paper, a column was added to the above table to include our analyses of the 2012.

6. Overall verdict

We would like to pay tribute to the examining panel. They came up with a very good paper, which was fair to all and very "cleverly" constructed. There would be enough questions to enable learners to pass; a number of learners would be able to get 60% but to obtain 80% and higher would be regarded as a significant achievement.

However, the Department of Basic Education should keep the paper at this level for the foreseeable future. Teachers reminded us of the situation in 2009 when the standard of both Mathematics papers was raised so drastically and took all teachers by surprise.

B. QUESTION BY QUESTION ANALYSIS

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
Question 1: Statistics								
1.1	Mean	1	1			2	1	Use calculator
1.2	Standard deviation	1				1		Use calculator
1.3	Use of standard deviation			3		3		Application of Standard deviation
1.4	Regression line equation		2	1		3		Use of calculator
1.5	Prediction from formula	1	1			2		Substitution into formula and simplify
1.6	Identifying outliers	1				1		Straightforward
Total		**4**	**4**	**4**	**0**	**12**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 2: Statistics

2.1	Modal class	1				2	**4**	IReading off from the histogram (highest frequency)
2.2.1	Determining cumulative frequency		2			2		Writing the cumulative frequency
2.2.2	Drawing ogive		3			2		Sketching an ogive
2.3	Interpretation from ogive		2					Interpretation
Total		**1**	**7**	**0**	**0**	**8**		

Question 3: Analytical Geometry

3.1	Length of radius	1				1	**2**	Reading off from sketch.
3.2	Equation of circle	1				1		Substitution into circle equation
3.3	Coordinates of point		3			3		Substitution, simplification and selecting
3.4.1	Gradient		2			2		Calculating gradient
3.4.2	Equation of a tangent		3			3		tan $\perp$ rad (product of gradients) and substituting a point
3.5	Equation of a line		2			2		Noting that ON=4, radius = 5, gradient = 0 and coordinates of S
3.6	Coordinates of a point		2			2		Solve simultaneously
3.7	Distance formula		2			2		Substituting into the distance formula
3.8	Equation of circle			5		5		Interpret and establish relationships.
Total		**2**	**14**	**5**	**0**	**21**		

Question 4: Analytical Geometry

4.1	Coordinates of a point		2			2	**2**	Substitution into the equation of straight line
4.2	Inclination			3		3		Inclination; then exterior angle of a Δ.
4.3	Equation of a straight line		1	3		4		Using inclination and a point
4.4	Coordinates of a point		4			4		Using two equations; point of intersection
4.5	Area of a quad				6	6		Using areas of 2 Δs and subtracting
Total		**0**	**7**	**6**	**6**	**19**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 5: Trigonometry

5.1	Trig ratio	2				2	**3**	Some candidates may use sine rule
5.2	Cosine rule			4		4		Determine ∠CPA then using it for∠APD
5.3	Sine rule		2	1		3		Find angle using sine rule
Total		**2**	**2**	**5**	**0**	**9**		

Question 6: Trigonometry

6.1	Reduction formulae and identity proof		3	2		5	**3**	Reductions and Identities
6.2	Derivation of sine compound angle identity	3				3		Theory
6.3	Identity proof using double angle identities			4		4		Use co-ratios
Total		**3**	**3**	**6**	**0**	**12**		

Question 7: Trigonometry

7.1	Range		2			2	**3**	Straightforward- read from graph
7.2	Double angle- manipulation			2		2		Use of identity
7.3	General solution			4		4		Use results in 7.2
7.4	Graph		3			3		Drawing of $y = \cos 2x$
7.5	Values of x for which graphs are equal			3		3		Shifting and then deciding on required values
7.6	Use of graphs for which the series converges				5	5		Use of convergence in graphs, tricky for learners.
Total		**0**	**5**	**9**	**5**	**19**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 8: Euclidean Geometry

8.1	Size of an angle	4				4	**4**	Direct application of theorem
8.2	Size of an angle	2	2			4		Direct application of theorem
8.3.1	Reason for statements	2				2		Direct application of theorem
8.3.2	Calculate length		4			4		Use Pythagoras
Total		**8**	**6**	**0**	**0**	**14**		

Question 9: Euclidean Geometry

9.1.1	Areas of Δs between same parallel lines	1		5		1	**4**	Knowledge of axiom
9.1.2	Completion of theorem	5				5		Write missing statements and reasons
9.2.1	Ratio and proportion		3			3		Proportion, line // to a side of Δ
9.2.2	Ratio and proportion			3		3		Proportion, line // to a side of Δ
9.2.3	Ratio of areas of Δs			4		4		Areas of Δs, express in ratio form
Total		**6**	**3**	**7**	**0**	**16**		

Question 10: Euclidean Geometry

10.1	Reasons for various statements	5				5	**4**	Applying various theorems
10.2	Rewriting in terms of RT			2		2		Using proportionality (parallel lines)
10.3	Identify angles		4			4		Using exterior angle of cyclic quadrilaterals and parallel lines
10.4	Proving two angles equal			3		3		Making use of other relationships
10.5	Proving two triangles similar		3			3		Make use of equal angles
10.6	Application of similarity				3	3		Make use of previous results
Total		**5**	**7**	**5**	**3**	**20**		

Overall total (Mathematics P2)	Levels				Marks
	1	2	3	4	
All questions	31	58	47	14	150

MATHEMATICAL LITERACY PAPER 1

A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

The Department of Basic Education is to be complimented for the high technical standard of the paper. All diagrams were clear and readable. .However, it is not clear in question 3.1 whether there is a button at the top where the shirt is folded. There was also some concern about the diagram for question 4.1 (page 10).

2. Language used

The language used in the English paper would have been within the scope of most grade 12 learners. However, there were some concerns with regard to the Afrikaans version of the paper, especially for question 3.1

3. Content area (syllabus) coverage

Code	Content areas (contexts)	Suggested (CAPS)	Actual
1	Finance	53 (±7)	55
2	Measurement	30 (±7)	26
3	Maps, plans and other representations	23 (±7)	17
4	Data Handling	37 (±7)	37
5	Probability	Min 7	7
	Total	**150**	**150**

4.1 Standard of paper

The content coverage in the paper was in line with the CAPS document. The paper was set at the appropriate level for what comprises Mathematical Literacy Paper 1.

4.2 Compliance with levels of thinking

Levels of thinking	Suggested	November 2013 (%)	November 2014 Marks	November 2014 (%)
1 – Knowledge	60% (±5)	63%	94	62,7%
2 – Routine procedures	35% (±5)	37%	45	30%
3 – Multi-step procedures	5% (minimum)	-	11	7,3%
4 – Reasoning and analysis	0%	-	-	-
Total	**100%**	**100%**	**150**	**100%**

5. Comparison with 2013 paper

Although it is difficult to do a comparison with the 2013 paper due to the change to CAPS, one can infer from the cognitive levels of thinking that the 2014 paper was marginally more difficult. The questions set at level 1 comprised a similar percentage of marks in both the 2013 and 2014 papers. The change came at level 3, where for the first time, 7,3% of the paper consisted of level 3 questions. This resulted in a reduction in the percentage of marks allocated to level 2 questions.

6. Overall verdict

Our compliments go to the examining panel and the Department of Basic Education for making Mathematical Literacy Paper 1, slightly more cognitively demanding than papers of the last few years as this has been our request for some time. We are, thus, able to conclude that the paper was reasonable and "fair".

B. QUESTION BY QUESTION ANALYSIS

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
Question 1: Finance								
1.1.1	Interest rate	2				2	1	Reading off
1.1.2 a	Monthly instalment		2			2		Division
1.1.2 b	Original selling price	2				2		Addition
1.1.2 c	Calculation of deposit		2			2		Percentage calculation
1.1.2 d	Total cost	1	2	1		4		Multiplication plus deposit
1.2.1	Reading off from till slip	2				2		Recognition
1.2.2	Reading off from till slip	1	2			3		Division
1.2.3	Missing value A	2				2		Total of all amounts
1.2.4	Time	1	1			2		Approximately 2 months
1.2.5	Price per kg		1	2		3		Conversion
1.2.6	Vat exempted items	2				2		Addition
1.2.7a	Missing value B	2				2		Rounding off
1.2.7b	Missing values C and D	3				3		Addition; then subtraction
1.2.8a	Calculation of profit	2	2					Profit of one then multiplied by 12
1.2.8b	Percentage mark up		2	1		3		Calculation of percentage
Total		**20**	**14**	**4**	**0**	**38**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 2: Measurement

2.1.1	Number of vegetable fields	2				2	**2**	Read off from diagram
2.1.2a	Length of wire	2	1			3		Perimeter less existing fence
2.1.2b	Number of poles	1	2			3		Division
2.1.3	Ratio	2				2		Simple division
2.1.4	Total area	2	1			3		Simple multiplication
2.2.1	Conversion	2				2		Convert from mm to m
2.2.2	Volume of cylinder	2	3			5		Use given formula
2.3.1	Calculation of time	3				3		Subtraction of time
2.3.2	Temperature conversion	3				3		Use given formula
Total		**19**	**7**	**0**	**0**	**26**		

Question 3: Maps, plans and other representations

3.1.1	Scale		2			2	**3**	Explain given scale
3.1.2	Scaled length	2				2		Use given scale
3.1.3	Number of buttons	2				2		Reading off from diagram
3.1.4	Length of piping	2	1			3		Convert to actual length
3.1.5	Stating a side	2				2		Use logical reasoning
3.2.1	Missing length	2				2		Calculation from diagram
3.2.2	Number of persons	2				2		Careful use of multiplication and division
3.2.3	Missing value T		2	2		4		Use diagram sheet and given measurements
3.2.4	Route	2				2		Read off from diagram
3.2.5	Compass direction	2				2		Straight-forward
3.2.6	Alternative scenario		2			2		New calculations
Total		**16**	**7**	**2**	**0**	**25**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			

Question 4: Data Handling

4.1.1	e-toll tariff					2	**4**	Assumption that learners know about e-tolls
4.1.2	Reading off	2				2		Straightforward
4.1.3 a	Mean	2	2			4		Straightforward
4.1.3 b	Median	2	1			3		Straightforward
4.1.3 c	Choice of mean or median	2				3		Which represents the data better?
4.1.4	Difference					3		Use subtraction
4.1.5	Ratio	3				2		Division
4.1.6	Calculate savings	2	1			2		Subtraction
4.1.7	Bar graph	1				5		Draw simple bar graphs
4.2.1	Identify from pie charts	2				2		Straightforward
4.2.2	Percentage	1	1			2		Add and subtract from 100%
4.2.3	Percentage calculation	1	2			3		Simple calculation
4.2.4	Reading off	2				2		Straightforward
4.2.5	Writing in words	2				2		Testing “literacy” of learners
Total		**27**	**7**	**3**	**0**	**37**		

Question 5: Integrated question

5.1.1	Write down equation	1	2			3	**5**	Use given information
5.1.2	Draw line graph	3	2			5		Use table
5.1.3	Calculation of distance	2	2			4		Use table or equation
5.1.4	Total taxi fare	1	2	2		5		Use table or equation plus other information
5.2.1	Complete tree diagram	3				3		Fill in missing information
5.2.2	Probability	2				2		Making a selection
5.2.3	Tree diagrams		2			2		Determine probability
Total		**12**	**10**	**2**	**0**	**24**		

Overall total (Mathematics P1)	Levels				Marks
	1	2	3	4	
All questions	**94**	**45**	**11**	**-**	**150**

MATHEMATICAL LITERACY PAPER 2

A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

All technical aspects of the paper were in keeping with the high standards of the Department of Basic Education. All diagrams and annexures were clear and easy to read. However, the diagrams could also have been included with the questions to make it less time consuming for the learners instead of them paging to the back for the annexures all the time.

2. Language used

According to the teachers who participated in this review, learners (especially those who are second language learners) tended to find the language used in the paper quite demanding. This would definitely have an impact on learner performance in this paper. However, the examining panel did attempt to explain some terms/ concepts/formulae. (Questions 1.1; 3.1; 3.2; 4.2; 4.3)

Some issues in the paper included question 1.1 which learners may have misunderstood as most associate violent crime with physical attacks. Another language comprehension problem would have occurred in question 2.2 where learners were confused with the heading of the graph (different stages of child development according to age and average height) with the horizontal axis (age in years)

3. Content area (syllabus) coverage

There was adequate coverage of all the topics (content areas). This was done in an integrated manner as stipulated in the CAPS document. This is shown in the table below:

Code	Content area/Topic	Suggested	Actual
1	Finance	53 (±7)	59
2	Measurement	30 (±7)	27
3	Maps, plans and other representations	23 (±7)	19
4	Data Handling	37 (±7)	37
5	Probability (minimum)	7	8
	Total	**150**	**150**

4.1 Standard of paper

Generally, the paper was of a high standard which required learners to have a certain level of reading, comprehending, interpreting and reasoning skills. Learners, who are below average, would definitely be at a disadvantage.

4.2 Compliance with levels of thinking

Levels of thinking	Suggested	November 2013 (%)	November 2014 Marks	November 2014 (%)
1 – Knowledge	-	-	-	-
2 – Routine procedures	25%	24%	41	27,3%
3 – Multi-step procedures	35%	39%	58	38,7%
4 – Reasoning and analysis	40%	37%	51	34,0%
Total	**100%**	**100%**	**150**	**100%**

5. Comparison with 2013 paper

Although it is difficult to do a comparison with the 2013 paper due to the change to CAPS, one can infer, from the cognitive levels of thinking above, that the 2014 paper was very similar in standard to the 2013 paper.

6. Overall verdict

Teachers, in general, complained that the paper was time consuming, based on their observations of their own learners who could not complete the paper in the prescribed time frame. Some of the sketches/ diagrams were a big challenge to learners as they found it difficult to read or to interpret.

There were some questions which may have been "unfair", "misleading" or required "better phrasing".

These are listed as follows:

- Question 2.1.2 – This is probably biased against girls because not many of them will know the workings of a car
- Question 2.1.3 – This question is misleading because the information only refers to the total distance for the year. Learners are also used to the fact that the petrol price is fluctuating on a monthly basis; hence, they would have ignored this in their calculation. Some of them only worked with petrol price only and ignored the instalments.
- Question 3.1 - The cent value for monthly salary in the English Paper (67 cent) differs from that in Afrikaans Paper (76 cent).
- Question 3.2.4 - This question could be rephrased as "Give a reason, with the necessary calculation, to show …"
- Question 3.3.2 - This question was misleading; this question should have been rephrased as "Explain which other type of graphical representation …" or "Explain which one of the above types of graphical representation ..."
- Question 4.1.2 – This question could be rephrased as "What would be the time in South Africa, when they arrive in Muscat".

The Department of Basic Education should guide learners on how to pace themselves in this examination. The approximate time allocation for each question should be included so that learners do not spend more than the required time on a specific question. This may help them complete the paper in the prescribed time.

Despite the above issues, we were very pleased with the cognitive demand and could classify the paper as being "of an exceptionally high standard" which should become the norm for Mathematical Literacy over the next few years.

B. QUESTION BY QUESTION ANALYSIS

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
Question 1								
1.1.1	Discrete or continuous data		2			2	**1; 4; 5**	Making a choice with a justification
1.1.2	Read off from each "bar"		2	2		4		Multi-step calculations
1.1.3	The mode (for girls)		1		2	3		Giving an explanation
1.2.1	Missing value A		2			2		Subtraction
1.2.2	Mean		3			3		Simple calculation
1.2.3	Missing values B; C; D		2	3		5		First and third quartile plus mean
1.2.4	Probability from data			3		3		Identify number; then work out probability
1.2.5	Reason(s) for committing violent crimes				2	2		Open-ended question
1.3.1	Formula for cost		2	2		4		Tricky question
1.3.2 (a)	Determining maximum number		1	1		2		Division
1.3.2 (b)	Ratio		2	3		5		Number of teachers and learners
1.3.3	Outcomes from two die		2		1	3		Using calculations to make a decision
Total		**0**	**19**	**14**	**5**	**38**		
Question 2								
2.1.1	Petrol consumption and distance			4	2	6	**1; 2; 4;**	Choosing appropriate data and inserting in formula
2.1.2	Other factors				2	2		Division
2.1.3	Choosing economical car		2	3	3	8		Addition
2.2.1	Choosing age group		2			2		Multi- step calculations
2.2.2	Giving reasons for a possible scenario				2	2		Substitution in formula
2.2.3	Identify age group		2			2		Calculation of tax payable
2.2.4	Giving detailed motivation				5	5		
2.2.5	Possible trend				2	2		
2.2.6	Conversion; check with graphs			2	2	4		
Total		**0**	**6**	**9**	**18**	**33**		

Quest.	Content	Levels				Marks	Topic	Comment
		1	2	3	4			
Question 3								
3.1.1	Annual taxable income		2	2		4	**1; 4; 3**	Multiplication
3.1.2	Calculate income tax		2	3		5		Use tables
3.1.3	Net monthly salary		3			3		Subtract from gross monthly income
3.2.1	Budget increase			2	3	5		Use percentage calculations; compare
3.2.2	Comparison of SANDF budget to national budget			3	2	5		Use percentage and other calculations
3.2.3	Actual amount		2	2		4		Use percentage calculations
3.2.4	Rounding		1		2	3		Influence on budget allocation
3.3.1	Explaining the use of graphs				2	2		Bar graph and pie chart used
3.3.2	Making a choice to represent general trend		1		2	3		Choose suitable representation
Total		**0**	**11**	**12**	**11**	**34**		
Question 4								
4.1.1(a)	Seat numbers		3			3	**1; 2; 3**	Identify from annexure C
4.1.1(b)	Missing value x			2		2		Use annexure C
4.1.1(c)	Total income			2	4	6		Multiplication
4.1.2(a)	Total cost in rand			7		7		Cost opera and airline tickets; exchange rates
4.1.2(b)	Time calculation			2		2		Use given table
4.2.1	Direction		2			2		Straight-forward
4.2.2	Explaining a given scenario				2	2		Logical reasoning
4.2.3	Approximate distance			3		3		Use distance chart
4.3.1	Number of spray cans			4	4	8		Multi-step calculation
4.3.2	Scale and actual height			3		3		Calculate actual height
4.4	Writing a set of instructions				7	7		Follow diagrams 1 to 4
Total		**0**	**5**	**23**	**17**	**45**		

Overall total (Mathematics P2)	Levels				Marks
	1	2	3	4	
All questions	**1**	**41**	**58**	**51**	**150**

AMESA REPORT ON THE ANNUAL NATIONAL ASSESSMENT (ANA) FOR MATHEMATICS (GRADES 3; 6 & 9)

AMESA also reported on the Annual National Assessments for grades 3, 6 and 9. Our reports were very favourably received by the Department of Basic Education. We will be doing the reviews of the various ANA papers later in the year and we call upon all regions and branches to give their input on these papers, using the template that we will send to regions once the ANA papers have been written.

Grade 9

PART A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

As in previous years, the technical layout of the paper was in-keeping with the high standards of the Department of Basic Education. All diagrams and tables were clear and there was adequate spacing for learners' answers.

The stimulus for question 11 (diagram and other information) was only linked to 11.1 and 11.2. The other two questions, 11.3 and 11.4 were two separate, independent questions. Thus, it would have been better to number these questions separately.

2. Language used

The language used in the paper was acceptable and should have been within reach of most grade 9 learners. However, the word "root" (question 1.9) was not recognised by a number of learners, possibly through lack of exposure to the word and its meaning in a mathematical context. Other language issues in the paper included the following:

- The use of terms such as "product" and "decrease" should be within easy reach of most grade 9 learners. However, it would appear that some learners had difficulty in understanding these terms.
- Question 2.2 should have been phrased as "Evaluate without using a calculator", rather than "Calculate without using a calculator".
- The words "calculate" and "calculation" was used more than nine times in the paper. Rather, use words such as "Simplify", "Evaluate", "Determine" or "Find the value of", where appropriate.
- Some second language learners had difficulty with question 6.2 "Write down the general term() of the pattern"
- The phrasing of 11.4 (carrying only 1 mark) was confusing to learners.

Teachers also commented that the Afrikaans version of the paper was one of the best translations to date. Admittedly, the language skills of a number of learners were not at the level required. Despite this positive comment about the Afrikaans translation, the footnote at the bottom of each page was in English.

3. Content area (coverage)

Code	Content area/Topic	Actual	%
1	Numbers, operations and relationships	38	27,1%
2	Patterns, Functions and Algebra	47	33,6%
3	Space and Shape	34	24,3%
4	Measurement	21	15,0%
5	Data Handling	Nil	Nil
	Total	**140**	**100%**

4.1 Standard of paper

The paper was in keeping with the standard of a typical mathematics paper for grade 9 learners. However, it would appear that according to teachers, learners in grade 9 are not at the required maturity level to sit for a 140 mark paper. They also commented that some second language learners may have had problems with identifying or recognizing some of the terms used in the paper.

The comments of some of the teachers participating in this review are summarised below:

- Testing learners on a wide variety of topics can be counterproductive as the majority of learners can barely cope with recent work covered and get overwhelmed with a 2 ½ hour paper as their concentration levels and recall is limited.
- The expectation for learners to use formulas was also a problem, as many teachers do not believe that learners should be taught formulas in Grade 9, especially in the straight-line graphs.
- Learners need to understand, not simply regurgitate formulas. This meant that learners at some schools, where understanding is taken for granted, were heavily penalised in question 7.1 as a mark was allocated for the formula. It was evident from the memo that "not using the formula and attaining +5 as an answer using rise over run or how far up over how far across" received no marks, even though a learner may have a better understanding of gradient than just simply substituting into a formula.
- Question 8.4 was regarded by most as a "trick" question since both alternatives given were incorrect. The correct answer is "neither". During the memo discussion in some provinces/districts, this question was "left out" during the marking process.
- There were places where the top learners were penalised, such as in question 11.1. Learners were not permitted to answer AT = 4 (Pythagorean triple) (They had to show working, using the theorem of Pythagoras)
- Mark allocation was not always ideal. For example 11.2.2: the majority of learners will not know the formula for area of a trapezium and will break the composite figure up into basic shapes. This involves a lot more time and more marks should have been allocated for this question.

4.2 Language used

Teachers reported that most learners just about managed to finish the paper. They wrote for the full 2½ hours. They compared the Mathematics paper to the English paper, where learners wrote for 2 hours and the paper was out of 80. The mathematics paper was out of 140.

In this regard, teachers remarked that the mathematics paper was too "long". When comparing this to grade 12 Mathematics , where learners write for 3 hours (150 marks), it becomes a tall order for learners in grade 9 to write for 2 ½ hours (140 marks), especially if they are not used to writing for such a long lime, under stringent exam conditions. It should be understood that the Grade 9 syllabus is made up of a lot of smaller sections (as opposed to in the FET) and a myriad of topics are assessed for far fewer marks.

It is also noted that grade 9 learners are not at the required level of experience and maturity to write for 2 ½ hours. Learners tend to get tired toward the end and this may lead to poor results. The analysis of performance by teachers in questions 9, 10 and 11 (the geometry questions) which showed that learners performed poorly is a case in point. Teachers reported that throughout the year the duration of mathematics papers is 1 hour while the ANA was 2 ½ hours. It would appear that learners did not pace themselves well for the ANA paper.

Thus, it is important for grade 9 learners to get the necessary experience in writing a 2 to 2 ½ paper. Learners could be gradually introduced to these "long" papers. A suggestion in which this could be achieved is as follows:

Grade 8 June Exam:	1 ½ hours
Grade 8 November Exam:	2 hours
Grade 9 June Exam:	2 hours
Grade 9 ANA:	2 ½ hours

4.3 What did learners say about the paper?

It would appear that learners, in the main, found the paper to be of a much higher standard than what they had been used to. Teachers reported that they worked very hard with their learners and were hoping that their learners' performances would be much better than previously. In some provinces, schools were allowed to use this result towards their term mark this year (for the first time) which now means that this mark is also lower than it should be an not a fair reflection of their actual ability. At one "working class" school, the teacher commented that it seemed as if the learners "didn't know what was happening". Learners found Q11.4 to be extremely difficult, even though it carried only one mark.

4.4 Compliance with ANA Framework for grade 9 Mathematics

4.4.1 Difficulty level

Difficulty level *	Easy M	Moderate E	Difficult D
Actual %	17,9%	61,4%	20,7%

4.4.2 Cognitive level

Cognitive levels **	Knowledge of basic concepts K	Application of concepts A	Non-routine problem solving N
Actual %	18,6 %	59,3%	22,1 %

4.4.3 Format of questions

Format of question	Multiple choice M	Written response showing calculation C	Graph questions G
Actual %	7,1%	87,9%	5%

PART B. QUESTION-BY-QUESTION REVIEW

1. WEIGHTING OF CONTENT AREA PER QUESTION

Key: 1 – Numbers, operations and relationships
2 – Patterns functions and algebra
3 – Space and shape
4 – Measurement

CONTENT AREA/QUESTION	1	2	3	4	TOTAL
1	7	3	-	-	10
2	9	-	-	-	9
3	-	14	-	-	14
4	-	8	-	-	8
5	-	9	-	-	9
6	-	5	-	-	5
7	-	5	1	-	6
8	19	-	-	-	19
9	-	-	2	9	11
10	-	-	31	-	31
11	-	-	-	12	12
12	3	3	-	-	6
Total	**38**	**47**	**34**	**21**	**140**

SUMMARY OF CONTENT AREA

CONTENT AREA/QUESTION	1	2	3	4	TOTAL
MARK	**38**	**47**	**34**	**4**	**140**
%	**27,1%**	**33,6%**	**24,3%**	**21**	**100%**

2. DIFFICULTY LEVELS PER QUESTION

Key: E – Easy; M – Moderate; D - Difficult

QUESTION/DIFFICULTY LEVEL	E	M	D	TOTAL
1	1	6	3	10
2	3	6		9
3	-	11	3	14
4	2	6		8
5	-	9		9
6	1	2	2	5
7	-	6	-	6
8	3	14	2	19
9	3	4	4	11
10	5	21	5	31
11	7	1	4	12
12	-	-	6	6
Total	**25**	**86**	**29**	**140**

SUMMARY OF DIFFICULTY LEVELS

DIFFICULTY LEVEL	E	M	D	TOTAL
MARK	**25**	**86**	**29**	**140**
%	**17,9%**	**61,4%**	**20,7%**	**100%**

3. COGNITIVE LEVELS PER QUESTION

Key: K – Knowledge; A – Application; N – Non-routine problem-solving

QUESTION/LEVEL	K	A	N	TOTAL
1	2	7	1	10
2	3	4	2	9
3	-	14	2	14
4	4	4	-	8
5	-	9	-	9
6	3	-	2	5
7	-	6	-	6
8	-	11	8	19
9	5	3	3	11
10	5	21	5	31
11	4	4	4	12
12	-	-	6	6
Total	**26**	**83**	**31**	**140**

SUMMARY OF COGNITIVE LEVELS

COGNITIVE LEVELS	E	M	D	TOTAL
MARK	**26**	**83**	**31**	**140**
%	**17,9%**	**59,3%**	**22,1%**	**100%**

PART C: CONCLUSION

1. Highlights

As per request from several quarters, the 4th term work was left out of the paper. For most schools and districts, writing the grade 9 ANA paper in Mathematics is a highlight in itself. In examining the different questions in the paper, we would like to confirm that these are typical grade 9 mathematics questions and the majority of the questions should have been within easy reach of grade 9 learners (if they were taught and had sufficient revision)

2. Challenges

- There are still challenges with respect to the implementation of ANA in some of our provinces. In one province, schools are able to use the ANA results as part of their September third term mark. In other provinces this is not the case. This has resulted in learners from these provinces not taking the ANAs seriously.

- Teachers are not really sure about the ranking of questions such as Easy, Moderate and Difficult or Knowledge, Application and Non-routine problem solving. It is important that subject advisors have regular workshops with teachers on how to classify questions. In this regard, teachers should ensure that their learners are exposed to the different levels of questions in their teaching and school- based assessment.

- A large portion of the paper was devoted to Space and Shape (Geometry) and Measurement. It would appear that learners had difficulty with the Geometry section of the paper. This should not be the case. It would seem that learners are not able to make the transition from informal geometry to formal geometry. This needs to be looked at very closely by the DBE and provincial departments of education.

- Most teachers believed that the timing of the ANA, in mid-September is not conducive to good teaching and learning. In 2014 teachers were under pressure to complete all the third term work by mid-September, even though there were still two full weeks of the term left. The ANA would best serve teaching and learning by being scheduled for the fourth term. However, this begs the question, should the ANA rather be placed by a proper grade 9 Mathematics examination which covers all four terms and all content areas?

3. Comparison with 2012

The mathematical demand of the 2014 paper was in-line with 2013 paper. However, in 2014, Data Handling did not form part of the paper, meaning that more questions had to be set on other content areas, especially in Space and Shape and Measurement. The performance of the 2014 learners should be seen in this context.

4. Overall verdict

From the content coverage of the paper, we would definitely agree that the content coverage from the remaining content areas of the grade 9 curriculum for mathematics was adequate and in keeping with the Curriculum and Assessment Policy Statement (CAPS). From our both our “difficulty level” and “cognitive level” analyses, we note that there was a close relationship between the (E; M; D) questions and the (K; A; N) questions. This confirms our view, that notwithstanding the views of some teachers, that the paper would be regarded as “fair”.

5. Concluding remarks

We are convinced that the Grade 9 ANA for Mathematics is an important part of the grade 9 curriculum. However, it would appear that the writing of the paper in mid-September may be seen as more of a hindrance rather than one which encourages teaching and learning. We believe that there should be a rethink on its scheduling. An ANA paper (or grade 9 National Mathematics paper) which is written in November (and covering all content areas) is far more likely to yield better learning outputs in learners than one written in September.

In our 2013 review, we called for training and workshops for all Senior Phase mathematics teachers. We have a similar call in 2014. We believe that there should be a concerted effort by the Department of Basic Education and the Provincial Departments of Education to continue with this training. Teachers at high schools should also use the first two or three months of the grade 8 academic year to address learners’ shortcomings and gaps in their mathematical knowledge.

Grade 6

PART A. OVERALL REVIEW

1. Technical aspects (typing, diagrams, etc.)

As in previous years, the technical layout of the paper was in-keeping with the high standards of the Department of Basic Education. All diagrams and tables were clear and there was adequate spacing for learners' answers.

2. Language used

The language used in the paper was fairly simple and should be within the comprehension of most grade 6 learners. However, there were some issues:

- Q1.6 – the wording is not very clear for grade 6 learners
- Q19.1 - an easy question, but pupils struggled to decide what was wanted

3. Content area (coverage)

Code	Content area/Topic	Actual mark	%	Required %
1	Numbers, operations and relationships	39	52%	50%
2	Patterns, Functions and Algebra	9	12%	10%
3	Space and Shape	10	13,3%	15%
4	Measurement	9	12%	15%
5	Data Handling	8	10,7%	10%
	Total	**75**	**100%**	**100%**

4.1 Standard of paper

All sections/topics of the grade 6 syllabus were included. The geometry and data handling sections were very easy and learners scored well in these sections. This led to a number of teachers concluding that the paper was "far too easy".

4.2 Comment on the time allocated: Did learners finish on time?

The learners had more than enough time to complete the paper and the majority of learners completed the paper in the stipulated time.

4.3 What did learners say about the paper?

They very pleased with the paper and generally found the paper easy.

4.4 Compliance with ANA Framework for grade 6 Mathematics

4.4.1 Difficulty level

Difficulty level *	Easy M	Moderate E	Difficult D
Actual %	77%	23%	0

4.4.2 Cognitive level

Cognitive levels **	Knowledge	Routine procedures	Complex procedures	Problem-solving
Actual %	48%	49,3%	1,3%	1,3%

4.4.3 Format of questions

Format of question	Multiple choice M	Written response showing calculation C	Graph questions G
Actual %	13,3%	86,7%	0

PART B. QUESTION-BY-QUESTION REVIEW

1. WEIGHTING OF CONTENT AREA PER QUESTION

Key: 1 – Numbers, operations and relationships
2 – Patterns functions and algebra
3 – Space and shape
4 – Measurement
5 – Data

CONTENT AREA/QUESTION		1	2	3	4	5	TOTAL
1.1	Recognising digits to the right of decimal	1					
1.2	Prime numbers	1					
1.3	Equality	1					
1.4	Factors	1					
1.5	Number patterns		1				
1.6	Number patterns		1				
1.7	Lines of symmetry			1			
1.8	3-D object			1			
1.9	Median of a data set					1	
1.10	Temperature				1		
2	Decomposing a 7-digit number	1					
3	Rounding off	1					
4.1	Addition of 5-digit numbers	2					
4.2	Subtraction of 5-digit numbers	2					
4.3	Multiplication of a 4-digit number by a 2-digit number	3					
4.4	Division of a 4-digit number by a 2-digit number	3					
4.5	Addition of mixed fractions	2					
4.6	A fraction of a 3-digit number	2					
4.7	Subtraction of mixed fractions	2					
4.8	Subtraction of decimal numbers	2					

5	Combined operations	1					
6	Number order	1					
7	Multiples of 7	1					
8	Read and interpret a problem	3					
9	Completing a calculation	1					
10.1	Fraction – percentage	1					
10.2	Percentage – decimal	1					
10.3	Decimal – fraction	1					
11	Interpreting the meaning of half-way; then coming up with the required number	1					
12	Read and interpret a problem	2					
13	Fill in a number to make calculation true	1					
14	Input and output numbers		2				
15.1	Working with operations in flow diagram		1				
15.2	Working with operations in flow diagram		1				
16	Identifying pattern		1				
17.1	Recognising angles in picture			1			
17.2	Recognising angles in picture			1			
18.1	2-D shapes			1			
18.2	2-D shapes			1			
18.3	2-D shapes			1			
19.1	Properties of 2-D shapes			1			
19.2	Properties of 2-D shapes			1			
20	3-D object			3			
21	Read and interpret word problem	1			1		
22.1	Reading time; calculating time difference				1		
22.2	Subtracting time				1		
23	Reading in mL; covert to L				1		
24	Choosing the longest distance				1		
25.1	Mass in in kg				1		
25.2	Converting kg to g				1		
26.1	Reading from pie chart					1	
26.2	Reading from pie chart					1	
26.3	Reading from pie chart					1	
26.4	Reading from pie chart					2	
26.5	Reading from pie chart					1	
27	Determining the mode					1	
28	Understand pattern and complete figure		1				
Total		**39**	**8**	**12**	**8**	**8**	**75**

SUMMARY OF CONTENT AREA

CONTENT AREA	1	2	3	4	5	TOTAL
MARK	39	8	12	8	8	140
%	52%	10,66%	16%	10,66%	10,66%	100%

2. DIFFICULTY LEVELS PER QUESTION

Key: E – Easy; M – Moderate; D - Difficult

QUESTION/DIFFICULTY LEVEL	E	M	D	TOTAL
1	6	4		10
2	1			1
3	1			1
4	14	4		18
5	1			1
6	1			1
7	1			1
8	3			3
9	1			1
10	3			3
11	1			1
12		2		2
13	1			1
14		2		2
15		2		2
16	1			1
17	2			2
18	3			3
19	2			2
20	3			3
21	2			2
22		2		2
23	1			1
24	1			1
25	2			2
26	6			6
27	1			1
28		1		1
Total	**58**	**17**	**0**	**75**

SUMMARY OF DIFFICULTY LEVELS

DIFFICULTY LEVEL	E	M	D	TOTAL
MARK	58	17	0	75
%	77%	23%	0%	100%

3. COGNITIVE LEVELS PER QUESTION

Key: K – Knowledge; A – Application; N – Non-routine problem-solving

QUESTION/LEVEL	K	A	N	TOTAL
1	7	2	1	10
2	1			1
3	1			1
4		18		18
5		1		1
6	1			1
7	1			1
8	3			3
9	1			1
10	3			3
11		1		1
12		2		2
13		1		1
14		2		2
15		2		2
16		1		1
17	2			2
18	3			3
19	2			2
20	3			3
21	2			2
22		2		2
23		1		1
24		1		1
25	1	1		2
26	6			6
27	1			1
28			1	1
Total	**38**	**35**	**2**	**75**

SUMMARY OF COGNITIVE LEVELS

COGNITIVE LEVELS	K	A	N	TOTAL
MARK	**38**	**35**	**2**	**75**
%	**50,7**	**46,7**	**1,3**	**100**
REQUIREMENT	25	45	20	100

PART C: CONCLUSION

1. Highlights

The enthusiasm and anticipation displayed by learners when waiting to write the paper could be regarded as a highlight in many primary schools. The ANA for grade 6 Mathematics gave schools the opportunity of ascertaining where they were in terms of their learners' mathematical development. Teachers would be able to address learners' shortcomings and knowledge gaps in Mathematics. This would be very useful for learners as they move into the Senior Phase (grades 7- 9).

2. Challenges

There were no real challenges to speak of. Teachers believed that the paper would be within reach of most grade 6 learners.

3. Comparison with 2013

The teachers commented that the paper could be regarded as marginally "easier" than the 2013 paper.

4. Overall verdict

Concern was expressed at the level of questions with many grade 4 and 5 items being included. In this regard the following questions were mentioned: 1.7; 4.5; 7; 8; 20; 23.While this may have been a welcome sight to learners, it is rather unwise to have grade 4 or 5 items in the ANA for grade 6 (since each of these grades have their own ANAs for Mathematics). Some concern was expressed by teachers at the low number range for grade 6 learners; further the questions in the paper were set at mostly the knowledge (K) and application (A) levels.
We are mindful of the fact that the ANA caters for learners across the social spectrum and includes both urban and rural schools. In this regard, we may classify the Grade 6 ANA mathematics paper as being very "fair" for all learners. It is highly likely that learners from top schools (mostly ex-model C and private schools) would perform very well in this paper. We are not sure whether this will be the case at all schools.
However, we would like to suggest to the examiners to, in future, include more questions (5% to 10%) with a higher difficulty level and cognitive demand.

5. Concluding Remarks

We believe that the ANA is an important part of our curriculum, especially as it gives an indication of the state of subjects like Mathematics and Languages at our schools. It is highly likely that learner performance in Mathematics may be better than in previous years. This would be very good news and could serve as a motivating factor to all schools to take the ANA more seriously, thereby ensuring that learners are at the right level of their mathematical development.

Grade 3

PART A. OVERALL REVIEW

1. Technical aspects (typing/font, diagrams, etc.)

The font used in the paper was different to that used in grade 6 and 9. This is probably due to age and grade of the learners involved. All diagrams and pictures in the paper were fairly clear. Only one "error" in this regard was noted. This occurred in question 15 where the "g" in the picture looked like an "a". However, we do not think that this would have been a challenge to learners as invigilators would have corrected this "error".

2. Language used

Learners were quite comfortable with the language used in the paper. Thus, there were no negative comments about the language used with teachers being complimentary and stating that the language was "age and grade appropriate".

3. Content area (coverage)

Code	Content area/Topic	Actual mark	%
1	Numbers, Operations and Relationships	26	65%
2	Patterns, Functions and Algebra	2	5%
3	Space and Shape	5	12,5%
4	Measurement	5	7,5%
5	Data Handling	2	10%
	Total	**40**	**100%**

4.1 Standard of paper

The paper was set at the appropriate level for grade 3 learners. It appeared to be easy and most learners would do well in the paper.

4.2 Comment on the time allocated: Did learners finish on time?

The time allocated for the paper (1 hour) was more than enough. According to teachers participating in this review, nearly all learners completed the paper in the allocated time.

4.3 What did learners say about the paper?

They were able to follow the instructions, without any impediment, and learners surveyed by teachers indicated that the paper was quite "easy".

4.4 Compliance with ANA Framework for grade 3 Mathematics

The difficulty levels and cognitive levels must conform to the percentages indicated in the tables.

4.4.1 Difficulty level

Difficulty level *	Easy M	Moderate M	Difficult D
Actual %	46%	37%	17%

Cognitive levels **	Knowledge of basic concepts K	Application of concepts A	Non-routine problem solving N
Actual %	57%	43%	0

4.4.3 Format of questions

Format of question	Multiple choice M	Written response showing calculation C	Graph questions G
Actual %	8%	87%	5%

PART B. QUESTION-BY-QUESTION REVIEW

1. WEIGHTING OF CONTENT AREA PER QUESTION

Key: 1 – Numbers, operations and relationships
2 – Patterns functions and algebra
3 – Space and shape
4 – Measurement
5 – Data

QUESTION	1	2	3	4	5
1	1				
2		1			
3	1				
4				1	
5	1				
6	1				
7.1		1			
7.2	1				
8			1		
9			1		
10			1		
11	1				
12	1				
13	1				
14				1	
15				1	
16				1	
17.1	1				
17.2	1				
18.1	2				

18.2	1				
19	2				
20.1			1		
20.2			1		
21	2				
22	2				
23.1					1
23.2					1
24.1	1				
24.2	1				
25.1	1				
25.2	1				
26	2				
27				1	
28	1				
Total	**27**	**2**	**5**	**5**	**2**

SUMMARY OF CONTENT AREA

CONTENT AREA	1	2	3	4	5	TOTAL
MARK	**26**	**2**	**5**	**5**	**2**	**40**
%	**65%**	**5%**	**12,5%**	**12,5%**	**5%**	**100%**

2. DIFFICULTY LEVELS PER QUESTION

Key: E – Easy; M – Moderate; D - Difficult

QUESTION/DIFFICULTY LEVEL	E	M	D	TOTAL
1		1		1
2		1		1
3		1		1
4		1		1
5	1			1
6	1			1
7.1	1			1
7.2	1			1
8	1			1
9	1			1

10		1		1
11		1		1
12	1			1
13	1			1
14	1			1
15		1		1
16	1			1
17.1	1			1
17.2		1		1
18.1			2	2
18.2			1	1
19	2			2
20.1			1	1
20.2	1			1
21	2			2
22			2	2
23.1		1		1
23.2	1			1
24.1			1	1
24.2		1		1
25.1			1	1
25.2		1		1
26			2	2
27	1			1
28		1		1
Total	**18**	**12**	**10**	**40**

SUMMARY OF DIFFICULTY LEVELS

DIFFICULTY LEVEL	E	M	D	TOTAL
MARK	18	12	10	40
%	45%	30%	25%	100

3. COGNITIVE LEVELS PER QUESTION

Key: K – Knowledge; A – Application; N – Non-routine problem-solving

QUESTION/LEVEL	K	A	N	TOTAL
1	1			1
2		1		1
3		1		1
4	1			1
5		1		1
6		1		1
7.1		1		1
7.2		1		1
8	1			1
9	1			1
10	1			1
11	1			1
12	1			1
13	1			1
14		1		1
15	1			1
16	1			1
17.1		1		1
17.2		1		1
18.1	2			2
18.2	1			1
19	2			2
20.1	1			1
20.2	1			1
21	2			2
22	2			2
23.1		1		1
23.2		1		1
24.1		1		1
24.2		1		1
25.1	1			1

3. COGNITIVE LEVELS PER QUESTION (Cont.)

Key: K – Knowledge; A – Application; N – Non-routine problem-solving

QUESTION/LEVEL	K	A	N	TOTAL
25.2	1			1
26		2		2
27	2			1
28				1
Total	**25**	**15**		**40**

SUMMARY OF COGNITIVE LEVELS

COGNITIVE LEVELS	K	A	N	TOTAL
MARK	**25**	**15**	**0**	**40**
%	**57 %**	**43 %**	**0%**	**100**

PART C: CONCLUSION

1. Highlights

The paper accommodated all the learners with different abilities and learners could demonstrate the content and skills that were taught.

2. Challenges

In question 21 learners were penalized for not using the prescribed method; most learners were able to use their own strategies and come up with the correct answer.

3. Comparison with 2013

It would appear that the paper was marginally "easier" than the 2013 paper. Teachers reported that they had covered all the work that was assessed. Based on teacher input and the views of some of the learners, it is highly likely that there would be an improvement in learner performance when compared with 2013.

4. Overall verdict

In coming up with an overall verdict, this report assumes that learners had suitably qualified teachers and were taught the work which was assessed in the ANA mathematics paper for grade 3. Thus, if this was the case then we say that the paper was "fair" and should be within the grasp of grade 3 learners, irrespective of location, language and other socio-cultural factors.

5. Concluding Remarks

Grade 3 is an important grade in that it is the last year of the foundation phase. It is the culmination of the work done in this phase. The results for the grade 3 ANA (Mathematics) should give us an indication as to whether we are on the right track. However, factors such as the lack of suitably qualified teachers (or no teachers in some instances) are likely to impact negatively on the learners in such schools. At these schools, learners would probably start the intermediate phase with "knowledge deficits". Unless, something is done about this situation, these learners are not likely to achieve their full potential as they progress through the grades.

SPONSORSHIPS

Since mid-2013, AMESA has been operating without a main sponsor. However, we are very grateful to CASIO and SHARP who support AMESA at national, regional and branch levels throughout the year. The two organisations receive requests for support from regions and branches through the National Council of AMESA. The Vice-President receives the requests from regions and communicates with both organisations on behalf of the regions. All requests for support must be communicated before the end of February each year. The request should include the following details:

- Name of region
- Date and venue of the regional conference
- Theme of conference (if possible)
- Expected number of attendees
- Draft programme (to be followed by final programme)

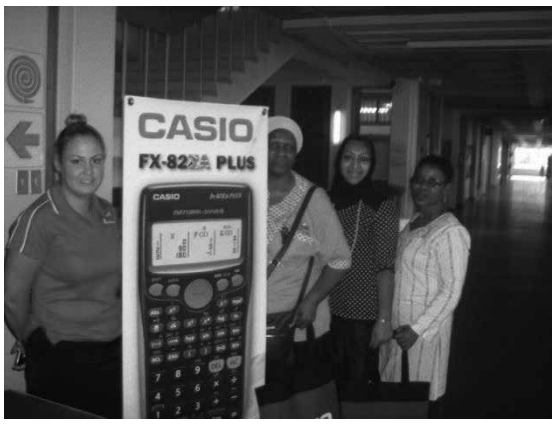
This enables CASIO and SHARP to plan their activities and finances for the current financial year. AMESA is signatory to a memorandum of understanding (MOU) with both organisations. We call upon all regions to respect the MOU between AMESA and the two organisations.

Our agreement with CASIO

CASIO, exclusively, will provide bags to all the participants of all 9 AMESA regional (provincial) conferences and some branches. CASIO will exhibit at each Conference and a free Maths Market session of one hour for at least one FET parallel session will be included in each programme.

Our agreement with SHARP

- SHARP, exclusively, will provide nametags (i.e. lanyards and name holders) to all the participants of all 9 AMESA regional (provincial) conferences.
- SHARP will exhibit at each Conference and a Maths Market session of one hour for at least one FET parallel session will be included in each programme, at a cost of R1 500



CASIO and SHARP at the Regional Conference in KZN (25 April 2015).

AN INTERESTING RESULT: SHARING THE SAME BIRTHDAY

Try this out with one of your classes. Ask your learners what their birthdates are. How many of them share a birthday? Some may calculate the chance of sharing a birthday as follows:

If there are 30 in a class and 365 days in year then the chances of sharing a birthday are:

$\frac{30}{365}$ = 0,08. This sounds about right. But this is **not** correct!

The correct calculation is shown below:

The chances of two learners sharing a birthday is $\frac{1}{365}$ so the chances of them not sharing a birthday is $\frac{364}{365}$ Thus, for 30 learners not sharing a birthday the calculation is as follows:

$\frac{364}{365} \times \frac{363}{365} \times \frac{362}{365} \times \ldots \times \frac{337}{365} \times \frac{336}{365} = 0{,}294$

Thus, chances of sharing a birthday (30 learners/people) is

1 – 0,294 = 0,706 (70,6%)

AMESA NATIONAL COUNCIL 2014 - 2016

Name	Office	Elected	Cell no.	E-mail
Executive				
Vasuthavan Govender	President	2014	082 341 6060	president@amesa.org.za
Busisiwe Goba	Vice-President	2014	073 848 3377	vicepresident@amesa.org.za
Gary Powell	Secretary	2014	083 254 5682	secretary@amesa.org.za
Rajendran Govender	Treasurer	2013	082 451 3648	treasurer@amesa.org.za
Alwyn Olivier		2014	083 292 4077	aio@sun.ac.za
Regional Representatives				
Mzwakhe Sokutu	Eastern Cape	2013	073 158 3609	mzwakhesokotu@yahoo.com
Annari Milne	Free State	2015	082 767 6653	freestate@amesa.org.za
Freddy Tlhavani	Gauteng	2015	0784587006	gauteng@amesa.org.za
Stembiso Khanyile	KwaZulu-Natal	2015	0833 299318	sthekhanyile6@gmail.com
Steven Muthige	Limpopo	2014	072 102 7796	limpopo@amesa.org.za
Phillip Mokoena	Mpumalanga	2015	083 346 6021	mpumalanga@amesa.org.za
Peace Mojaki	Northern Cape	2015	0785175513	northencape@amesa.org.za
Avhafarei Thavhanyedza	North West	2015	079 493 5599	northwest@amesa.org.za
Desiree Timmet	Western Cape	2014	082 803 9354	westerncape@amesa.org.za

ICME13
Hamburg 2016

13th International Congress on Mathematical Education
July 24 – 31, 2016 in Hamburg / Germany

Welcome to ICME-13

The *Society of Didactics of Mathematics* (Gesellschaft für Didaktik der Mathematik – GDM) has the pleasure of hosting ICME-13 in 2016 in Germany. The congress – to be held under the auspices of the *International Commission on Mathematical Instruction* (ICMI) – will take place at the University of Hamburg from **Sunday, 24th July to Sunday, 31st July 2016**. Hamburg is a bustling cosmopolitan port in the north of Germany, and with 1.8 million inhabitants its second largest city. As a fascinating city by the waterfront it offers a perfect environment for a challenging congress.

ICME-3 took place in **Germany** in **1976** in Karlsruhe, and we are proud to welcome mathematics educators from all over the world back to Germany. The congress attendees will experience the very special characteristics of the German tradition in didactics of mathematics dating back to **Felix Klein**, the first President of ICMI. They will participate in the **continuation of this tradition** in **research** on argumentation and proof, teaching and learning of applications and modelling, promotion of teacher education, co-operation between theory and practice, high importance of visualisation and mathematical models and further topics. In addition, the German discussion in mathematics education has close connections to **European traditions** centred on a common understanding of **didactics of mathematics**, whose special features will be apparent at the congress.

The congress will take place at the **University of Hamburg** with its rich variety of buildings and at the **Congress Center Hamburg**, a world-class convention centre opposite the university. The congress venue is well connected to the city and its environs via public transport.

Hamburg can be easily reached by air. Hamburg Airport is one of the most technically advanced airports in Europe. High speed trains from many cities arrive at the Dammtor station directly at the congress venue.

We invite participants from all over the world to come to Hamburg and make ICME-13 a rich experience for all.

Timeline Submission of Papers and Posters

1st October 2015	Submission of papers Submission of posters by those intending to apply for the solidarity fund
10th – 20th December 2015	Decisions on acceptance of papers or posters sent out
22nd December 2015	Application to solidarity fund from researchers of less-affluent countries
12th January 2016	Decisions on funding sent out
31st January 2016	Submission of posters (by those not applying for the solidarity fund)
22nd February 2016	Decisions on acceptance of posters sent out

Timeline of Registration

1st January – 31st March 2016	Early bird registration with 390 € conference fee
1st April – 31st May 2016	Regular registration with 430 € conference fee
1st June 2016 onwards	Late registration with 450 € conference fee

Gabriele Kaiser
University of Hamburg
Convenor of ICME-13

Rudolf vom Hofe
President of the Society of Didactics of Mathematics

For further information see the website: www.icme13.org
Or contact us under: contact@icme13.org

Universität Hamburg
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GDM

ICMI