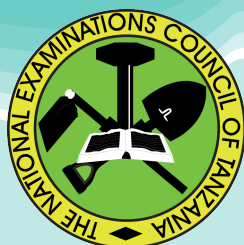


THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**PUPILS' ITEMS RESPONSE ANALYSIS REPORT
FOR STANDARD FOUR NATIONAL ASSESSMENT
(SFNA) 2015**

04E MATHEMATICS

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**PUPILS' ITEMS RESPONSE ANALYSIS REPORT ON
STANDARD FOUR NATIONAL ASSESSMENT FOR
THE YEAR 2015**

04E MATHEMATICS

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TABLE OF CONTENTS

FOREWORD	iv
1.0 INTRODUCTION	1
2.0 ANALYSIS OF PUPILS' RESPONSES	2
3.0 ANALYSIS OF PERFORMANCE IN EACH TOPIC.....	33
4.0 CONCLUSION.....	34
5.0 RECOMMENDATIONS.....	35
APENDICES	37
Appendix A	37
Appendix B	39
Appendix C	39

FOREWORD

The report on the analysis of pupils' responses in Standard Four National Assessment in Advanced Skills of Reading, Writing and Arithmetic (3Rs) in Mathematics subject was prepared for the purpose of providing feedback to pupils, teachers, policy makers, curriculum developers and other education stakeholders on how pupils responded to the assessment questions. Pupils' response to the assessment questions is one of the indicators that highlight issues that pupils learnt efficiently and those which they did not learn efficiently in the period of four years in primary education.

The analysis on the responses indicate that, among the reasons that made pupils fail to respond correctly to the assessment questions are: failure to understand the requirement of the question, lack of understanding the required concept, lack of competences in Advanced Skills of Reading, Writing and Arithmetic and failure to identify the needed mathematical operation in solving questions on word problem. The analysis for each question has been done whereas the observed discrepancies at the time pupils were answering the questions are indicated.

The National Examinations Council believes that the feedback provided shall enable the various education stakeholders to take appropriate measures in improving the Arithmetic skills in Standard Four pupils. If the Advanced Arithmetic skills are improved, they shall build the strong foundation for Standard Four Pupils to be capable in various Mathematics skills in future classes such as class five, six, even class seven.

Finally, the Council would like to thank the examinations officers and all others who participated in one way or another in preparing this analysis report. The Council shall appreciate to get comments from all education stakeholders which shall help to improve the analysis reports.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

The National Assessment in Advanced Skills of Reading, Writing and Arithmetic (3Rs) for Mathematics was done in November, **2015**. A total of **1,064,267** pupils were registered in which **1,001,423 (94.1%)** pupils sat for the assessment. The statistics of pupils who sat for mathematics shows that, **456,838 (45.6%)** pupils passed this assessment. Therefore the general performance in this assessment was poor as **54.4** percent failed.

The assessment in Mathematics consisted of 25 questions of which pupils were required to answer all. Each question had a weight of 2 marks. The pupils' responses were analyzed to identify the assessed competences, the total number of pupils who were able and those who were unable to respond and the reasons that caused inability to respond correctly to the respective question.

The topics that were assessed include: Whole numbers which comprised of questions number 1 to 7, Roman numbers which contained question numbers 23 and 24, Fraction which consisted of questions 8 to 11, Geometry which had questions number 15 to 18, Measurement that had questions number 19 to 22, money which had question 12 to 14 and Statistics for question 25.

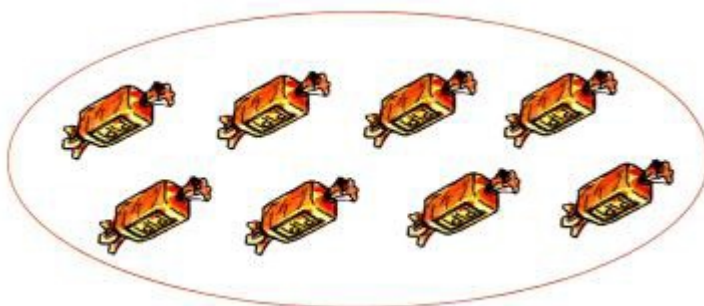
The overviews of what pupils were required to do; their approaches and samples of extract of pupils' responses have been inserted in appropriate places to illustrate the cases presented.

The analysis report has also shown the pupils' performance in each question as well as the performance per each topic. Finally, the analysis has provided the recommendations to education stakeholders so as to improve the teaching and learning. Therefore, the National Examinations Council hopes that this analysis will be potential to education stakeholders in finding strategies to enhance knowledge, skills, competences and pupils' ability in Standard IV for National development.

2.0 ANALYSIS OF PUPILS' RESPONSES

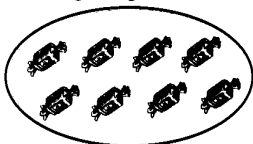
For each of the questions from 1 to 25, a pupil was required to work out the answers and then write the correct answer in the space provided.

Question 1: Write the number of sweets in the following diagram:



The question assessed the ability of pupils in counting and writing a total number of real objects. A total of 870,606 (86.9%) pupils were able to count and write the correct answer 8, as the total number of sweets that were asked. This was the leading question for being well answered as compared to all other questions because it involved the picture of real objects. Extract 1.1 shows a correct answer of a pupil who was able to apply the competence of arithmetic and writing skills.

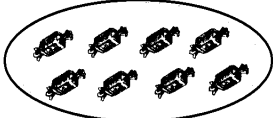
Extract 1.1

1.	Write the number of sweets in the following diagram: 	$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$	<u>There are</u> <u>Eight sweets</u>
----	---	---	---

Extract 1.1 shows a sample of the correct response of a pupil who counted in both rows to get 8 sweets.

However, 129,766 pupils equivalent to 13.0 percent were not able to answer this question, a situation which shows that they lacked knowledge on arithmetic and writing skills. Extract 1.2 shows a sample of an incorrect answer from the script of one pupil.

Extract 1.2

1.	Write the number of sweets in the following diagram: 	4	4
----	--	---	---

In Extract 1.2 the pupil counted the sweets in only one of the rows and got 4, instead of counting the sweets in both rows.

Question 2: Write “five thousand seven hundred and forty nine” in figures.

Question 2 assessed pupils’ ability to write in figures the whole numbers given in words. The performance in this question was average as 556,786 (55.6%) of the pupils were able to write correctly the number in figures. Extract 2.1 shows a sample of the correct answer.

Extract 2.1

2.	Write “five thousand seven hundred and forty nine” in figures.	5,749	5,749
----	--	-------	-------

Extract 2.1 shows a sample of the correct response of the pupil who wrote in figures the number which was given in words.

However, 443,670(44.3%) pupils did not manage to write in figures the words which they were given. These pupils have also proved lack of knowledge to differentiate between ten thousands and thousands a skill which could help them to write a correct answer. Extract 2.2 shows a sample of incorrect response.

Extract 2.2

2.	Write “five thousand seven hundred and forty nine” in figures.	50749	80749
----	--	-------	-------

In Extract 2.2 a pupil wrote a number with 5 digits instead of four.

Question 3: $72 + 16 =$

Question 3 assessed the ability of the pupils on adding of whole numbers. A total of 729,184 (72.8%) pupils were able to add and write 88 which is the correct answer. This is the second question which was done well as compared to other questions. Extract 3.1 illustrates how a pupil correctly answered the question.

Extract 3.1

3.	72+16=	$\begin{array}{r} 72 \\ +16 \\ \hline 88 \end{array}$	88
----	--------	---	----

Extract 3.1 shows how a pupil arranged vertically the numbers and carried the addition of ones and tens to get 88.

On the other hand, 271,278 (27.1%) pupils failed to add the given numbers. These pupils had no knowledge and techniques of adding numbers that have tens and ones. For instance, many pupils added 7 and 6 to get 13, and then added 1 and 2 to get 3. Finally they wrote 133 which was incorrect. However, other pupils wrote meaningless answers which do not relate to the question. Extract 3.2 shows an incorrect response of a pupil.

Extract 3.2

3.	72+16=	$72 + 16 = 507470$	507407
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Extract 3.2 shows a pupil who wrote a total which do not originate from the given question.

Question 4: 3566 – 2285 =

The question assessed the ability of the pupils to subtract the whole numbers by borrowing and it was averagely performed. A total of 586,689 (58.6%) pupils were not able to subtract the given numbers. Some of the pupils who failed this question were not able to match the figures in the place value of ones, tens, hundreds, and thousands while others failed to borrow while doing subtraction. Extract 4.1 indicates a sample of an incorrect response of a pupil who failed to subtract the given numbers.

Extract 4.1

4.	$3566 - 2285 =$	$\begin{array}{r} 8566 \\ - 2285 \\ \hline 6281 \end{array}$	6281
----	-----------------	--	------

Extract 4.1 shows a sample of an incorrect response of a pupil who wrongly copied the given number 3,566 and wrote it as 8,566, hence failed to obtain correct answer.

However, 413,760 (41.3%) pupils were able to subtract 2,285 from 3,566 and got 1,281 which is the correct answer. Although the question was written in horizontal form, some of the pupils used the technique of arranging those figures vertically and subtracted following the place value of each figure. Extract 4.2 shows a sample of the correct answer which was written by a pupil.

Extract 4.2

4.	$3566 - 2285 =$	$\begin{array}{r} 3566 \\ - 2285 \\ \hline 1281 \end{array}$	1281
----	-----------------	--	------

Extract 4.2 indicates a sample of the correct answer of a pupil who subtracted the numbers vertically basing on borrowing approach and the place value of a number.

Question 5:

$$\begin{array}{r} 115 \\ \times 6 \\ \hline \end{array}$$

Question 5 assessed the pupils' ability to multiply the whole numbers by vertical method and it was averagely performed. A total of 565,144 (56.4%) pupils were not able to multiply the given whole numbers.

Further analysis showed that, most pupils knew the concept of multiplication but they failed to perform carrying of the obtained number from the previous product. Extract 5.1 indicates a sample of an incorrect answer which does not come from the product of the numbers 115 and 6.

Extract 5.1

5.	$\begin{array}{r} 115 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 115 \\ \times 6 \\ \hline 6630 \end{array}$	6630
----	--	---	------

Extract 5.1 illustrates one of the wrong answers. The pupil wrote 30 in the calculations instead of 0 and carry 3 forward.

On the other hand, 436291 (43.5%) pupils were able to multiply the given whole numbers and wrote 690 which is the correct answer. These pupils indicated the competence of multiplication and arranging numbers focusing on their place values. Extract 5.2 shows one of the pupils' correct response.

Extract 5.2

5.	$\begin{array}{r} 115 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 115 \\ \times 6 \\ \hline 690 \end{array}$	690
----	--	--	-----

Extract 5.2 illustrates one of the correct responses of a pupil who was able to multiply and use the rule of carrying.

Question 6: $8 \overline{)456}$

Question 6 assessed the pupils' competence on the concept of division of the whole numbers by long way method. This question had an average performance.

A total of 780,290 (77.9%) pupils failed to divide the given numbers. Most of the pupils who failed this question did not focus on the correct steps and techniques of division by long way. For example, the pupils were supposed to check whether the quotient when multiplied by the divisor gives 456. Extract 6.1 shows a sample of the incorrect response of a pupil who made wrong division.

Extract 6.1

6.	$8 \overline{)456}$	$ \begin{array}{r} 32 \\ 8 \overline{)456} \\ \underline{176} \\ 320 \end{array} $	<u>Ans 32</u>
----	---------------------	---	---------------

In Extract 6.1, the pupil thought that 456 divided by 8 is 32 instead of 57. This pupil did not know that $32 \times 8 = 256$ and not 456.

However, 220,152 (22.0%) were able to arrange the dividend and the divisor in their places. They followed all the steps using the correct technique during the process of division. Eventually, they obtained the correct answer 57. Extract 6.2 shows a sample of a correct response from a script of a pupil.

Extract 6.2

6.	$8 \overline{)456}$	$ \begin{array}{r} 57 \\ 8 \overline{)456} \\ \underline{40} \\ 56 \\ \underline{56} \\ 0 \end{array} $	57
----	---------------------	--	----

Extract 6.2 indicates a sample of correct answer of which a pupil proved that $57 \times 8 = 456$.

Question 7: The book has 125 pages. How many pages are there in 150 books of that kind?

Question 7 assessed the pupils' ability to identify the mathematical operation sign to be used in solving word problems which involve whole numbers. In this word problem the pupils were supposed to do multiplication in order to identify the number of pages which are found in 150 books. This question had a poor performance.

A total of 902,139 (90.1%) pupils failed to identify the required mathematical operation sign. Many students added the numbers 125 and 150 instead of multiplying. Others wrote answers that do not come from the given numbers. Extract 7.1 indicates an incorrect answer found in a script of a pupil.

Extract 7.1

7.	The book has 125 pages. How many pages are there in 150 books of that kind?	100	100
----	---	-----	-----

Extract 7.1 shows one of the incorrect answers of the pupil who wrote a number (100) which does not relate to the given numbers.

However, 98,352 (9.8%) pupils recognized the appropriate mathematical operation and calculated the correct answer 18,750. Pupils who got the correct answer managed to multiply the given numbers correctly. Extract 7.2 indicates an example of the correct answer written by one of the pupils.

Extract 7.2

7.	The book has 125 pages. How many pages are there in 150 books of that kind?	$ \begin{array}{r} \times 150 \\ \hline 125 \\ 750 \\ 18750 \\ \hline \end{array} $	18750 pages
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Extract 7.2 indicates a correct answer of a pupil who multiplied and arranged the numbers vertically.

Question 8: Victoria shared a loaf with her three friends. If, everyone got an equal piece, what fraction of the loaf was given to each of them?

This question assessed the knowledge of the pupils about the concept of fraction numbers and its application in solving the word problems. This question had very poor performance. A total of 900,657 (89.9%) pupils were not able to solve the word problem because they failed to recognize that the proper mathematical operation that was needed was division. Extract 8.1 shows an incorrect answer that do not relate to the asked question.

Extract 8.1

8.	Victoria shared a loaf with her three friends. If everyone got the same piece of the loaf. What fraction of the loaf was given to each of them?	$ \begin{array}{r} \times 4 \\ 4 \overline{) 16} \\ \underline{16} \\ 0 \end{array} $	<p>Every one got</p> <p><u>4 same piece of</u></p> <p><u>a loaf</u></p>
----	---	--	---

Extract 8.1 shows a sample of incorrect response of a pupil who regarded a piece of the loaf to be 16 and divided by 4 to get 4.

On the other hand, 99,822 (10%) pupils were able to identify the required concept of fractions mentioned in the word problem. They showed a good understanding of fractions as they identified that the

loaf of bread was to be divided into 4 equal parts, that is $1 \div 4 = \frac{1}{4}$.

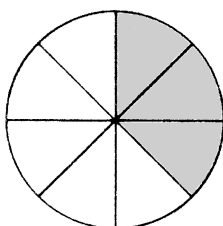
Extract 8.2 shows a sample of a correct response.

Extract 8.2

8.	Victoria shared a loaf with her three friends. If everyone got the same piece of the loaf. What fraction of the loaf was given to each of them?	<u>everyone got quarter piece of the loaf</u>	<u>everyone got quarter piece of the loaf</u>
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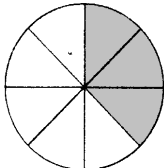
In Extract 8.2, the pupil recognized that each person could get a quarter of the loaf.

Question 9: What fraction is shaded in following figure?



Question 6 assessed pupils' ability to read and understand the concept of fraction so as to identify the shaded regions in a circle divided equally. A total of 651,791 (65.1%) of the pupils were able to recognize the shaded part of the circle. They counted and wrote the correct fraction as $\frac{3}{8}$. In general, in this question pupils' performance was good. Extract 9.1 shows a sample of the correct answer.

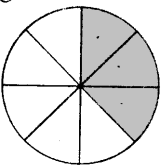
Extract 9.1

9.	What fraction is shaded in following figure? 		$\frac{3}{8}$
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Extract 9.1 indicates a sample of the correct answer of a pupil who identified the shaded regions as 3 among the 8 regions.

On the other hand, 348,724 (34.8%) pupils were not able to identify the correct shaded fraction of the circle. Although the circle was divided into 8 parts and 3 of them were shaded, many pupils wrote the answer as $\frac{8}{3}$ instead of $\frac{3}{8}$ as required. Other pupils counted the shaded and non-shaded part and wrote $\frac{3}{5}$. Extract 9.2 illustrates a sample of what some pupils wrote in their scripts.

Extract 9.2

9.	What fraction is shaded in following figure? 	$\frac{8}{3}$ Ans	$\frac{8}{3}$ Ans
----	---	-------------------	-------------------

Extract 9.2 shows a sample of an incorrect response of a pupil who wrote the required fraction as the total number of regions of a circle over the shaded regions.

Question 10: $\frac{3}{10} + \frac{5}{10} =$

Question 10 assessed the pupils' competence in addition of fractions with common denominators.

A total of 728,476 (72.7%) pupils managed to answer this question correctly. This shows that many pupils understood the concept of fractions and additional techniques of fractions. This question was correctly answered by many pupils because the fractions have common denominators (10) which makes it simple for them to add all the numbers in the numerators. Extract 10.1 shows a sample of the correct answer by a pupil.

Extract 10.1

10.	$\frac{3}{10} + \frac{5}{10} =$	$\frac{3}{10} + \frac{5}{10} = \frac{8}{10}$	$\frac{8}{10}$
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Extract 10.1 indicates a sample of the correct response of a pupil who added the fractions to obtain the required fraction.

On the other hand, 272,054 (27.2%) pupils failed to answer this question. They lacked knowledge on the concept of adding fractions. Some of the pupils added both numerators and denominators while others added the numerators only and wrote the answer in whole numbers. Figure, 10.2 shows an incorrect answer of a pupil who answered the question.

Extract 10.2

10.	$\frac{3}{10} + \frac{5}{10} =$		8
-----	---------------------------------	--	---

Extract 10.2 shows a sample of an incorrect response of a pupil who wrote 8 as a fraction after adding the numerators only.

Question 11: $\frac{5}{9} - \frac{2}{9} =$

Question 11 assessed the knowledge of the pupils about the subtraction of fractions with common denominators.

The question performance was good as 652,482 (65.2%) pupils understood the concept of subtractions of fractions with common denominators. For example, they managed to arrange the numerator by subtracting 2 from 5 and obtained 3 as the difference which was put on top of the denominator as follows:

$\frac{5}{9} - \frac{2}{9} = \frac{5-2}{9} = \frac{3}{9}$. Extract 11.1 represents a sample of a correct response written by one pupil.

Extract 11.1

11.	$\frac{5}{9} - \frac{2}{9} =$	$\frac{5}{9} - \frac{2}{9} = \frac{3}{9}$	$\frac{3}{9}$
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Extract 11.1 is a sample of a correct response of a pupil who subtracted the numerators and wrote that fraction as 3 out of 9

On the other hand, 348,040 (34.8%) pupils used incorrect techniques and steps as a result they got incorrect answers. Some of the pupils subtracted the numerators and wrote the answer in a whole number while others wrote answers which did not relate to the given fractions. Extract 11.2 illustrates the sample of an incorrect answer written by one of the pupils.

Extract 11.2

11.	$\frac{5}{9} - \frac{2}{9} =$	$\frac{7}{9}$	$\frac{7}{9}$
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Extract 11.2 is a sample of an incorrect answer of a pupil who added instead of subtracting 2 from 5.

Question 12: How many 500 shillings notes are there in a note of 10,000 shillings?

Question 12 assessed the knowledge of pupils about mathematical operations especially divisions operations. Despite the fact that the question was related to their daily life experience, majority of the pupils failed this question. A total of 650,500 (64.9%) pupils who failed could not solve the word problem. Extract 12.1 shows an incorrect response.

Extract 12.1

12.	How many 500 shillings notes are there in a note of 10,000 shillings?	$ \begin{array}{r} 10,000 \\ 500 \\ \hline 10,500 \end{array} $	10500
-----	---	--	-------

Extract 12.1 is a sample of incorrect response of a pupil who added the money instead of dividing.

However, 350,007 (35.0%) pupils were able to answer the question correctly. The pupils used the technique of division in a long way method to obtain the correct answer 20. Extract 12.2 indicates a sample of the correct answer.

Extract 12.2

12.	How many 500 shillings notes are there in a note of 10,000 shillings?	$\begin{array}{r} 20 \\ 500 \overline{) 10\,000} \\ \underline{10\,000} \\ 000 \end{array}$	20 shillings note
-----	---	---	-------------------

Extract 12.2 shows a sample of the correct response of a pupil who divided 10,000 by 500 to get 20.

Question 13: 7,425 shillings + 255 shillings =

Question 13 assessed the pupils' ability to add money. A total of 556,416 (55.6%) pupils failed to add the given money. The pupils' performance in this question was average. This situation shows that they had no knowledge, skills and techniques of adding whole numbers which are in thousands. For instance, pupils who failed to perform this question; some made an error in arranging the digits of the numbers in thousands and hundreds during addition while others failed to carry while adding the numbers. Extract 13.1 indicates an incorrect response.

Extract 13.1

13.	7425 shillings + 255 shillings =	7480 sh	748sh
-----	----------------------------------	---------	-------

Extract 13.1 shows a sample of an incorrect response of a pupil who had a problem of adding the money that needed the skills of carrying.

However, 444,076 (44.3%) pupils were able to add the shillings and wrote the correct answer 7,680. This situation indicates that pupils had the knowledge of adding numbers which are in thousands. For

example many pupils arranged the numbers basing on their place value such as ones, tens, hundreds and thousands before adding them. Extract 13.2 illustrates a sample of the correct answer that was written by a pupil.

Extract 13.2

13.	7425 shillings + 255 shillings =	$ \begin{array}{r} 7425 \\ 255 \\ \hline 7680 \end{array} $	Sh. 7680.
-----	----------------------------------	--	-----------

Extract 13.2 is a sample of a correct response of a pupil who added the money using the vertical method.

Question 14: Joyce bought the following items at the market:

7 oranges @ sh. 200.00, 8 bananas @ sh. 250.00, 9 mangoes @ sh. 500.00. How much money did she spend?

This question assessed the competences of pupils on bills that involve mathematical operations of addition and multiplication.

Majority (91.6%) of the pupils who attempted this question failed to get a correct answer. They lacked skills of multiplication and the concept of bills as applied in the topic of Money. One of the incorrect responses is given in Extract 14.1:

Extract 14.1

14.	Joyce bought the following items at the market: 7 oranges @ sh. 200.00 8 bananas @ sh. 250.00 9 mangoes @ sh. 500.00 How much money did she spend?	1137	1137
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In Extract 14.1, the pupil wrote a number that does not have any relation to the asked question.

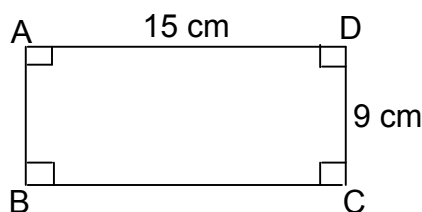
On the other hand, 83,592 (8.3%) pupils managed to answer correctly this question. They had the knowledge of analyzing the bills basic operations. They found the money spent at the market by using the basic skills of multiplication and addition. Extract 14.2 illustrates a sample of a correct response.

Extract. 14.2

14.	Joyce bought the following items at the market: 7 oranges @ sh. 200.00 8 bananas @ sh. 250.00 9 mangoes @ sh. 500.00 How much money did she spend?	$ \begin{array}{r} 7 \times 200 = 1400 \\ 8 \times 250 = 2000 \\ 9 \times 500 = 4500 \\ \hline 7900 \end{array} $	Sh 7900
-----	--	---	---------

Extract 14.2 shows a sample of a correct answer of a pupil who calculated the amount of each item and added using both vertical and horizontal methods.

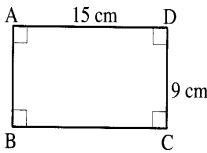
Question 15: Find the perimeter of the rectangle ABCD.



Question 15 assessed pupils' competence in understanding geometrical figures, metric values and the ability to calculate correctly the perimeter of the rectangle.

A total of 756,090 (75.5%) failed to answer this question correctly. These pupils lacked understanding and knowledge of calculating the perimeter of a rectangle. Some of the pupils added the length and width of the rectangle while others found the area by multiplying the length and width. One of the incorrect answers is shown in Extract 15.1.

Extract 15.1

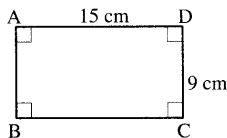
15.	Find the perimeter of the rectangle ABCD.		$P = 5 \times 5 + 5 + 5$ $P = 15 \times 9 \text{ cm}$ $P = 15 \text{ cm} \times 9 \text{ cm}$ $P = 960$	960
-----	---	---	---	-----

Extract 15.1 is sample of an incorrect answer of a pupil who wrote numbers which do not relate to the question.

On the other hand, 244,383 (24.4%) pupils managed to answer this question correctly. They used correct formula to calculate the perimeter of a rectangle as follows:

Perimeter = (length + width) \times 2. One of the correct answers from the script of a pupil is shown in Extract 15.2.

Extract 15.2

15.	Find the perimeter of the rectangle ABCD.		$P = 2l + 2w$ $P = (2 \times 15) + (2 \times 9)$ $30 + 18 = \underline{\underline{48 \text{ cm}}}$	<u>48 cm</u>
-----	---	---	--	--------------

Extract 15.2 is a sample of a correct response of a pupil who calculated the perimeter by using the required formula.

Question 16: Shaame has a square shaped farm. If one side has a length of 50 m. Find the perimeter of the farm.

In question 16 pupils were assessed on the competence to calculate the perimeter of a square. The pupils were supposed to be knowledgeable on geometrical figures, word problems and mathematical operations of addition and multiplication.

A total of 805,566(80.4%) pupils failed to answer it correctly. The pupils calculated the perimeter of a square of the farm without using the required measurements and formula. For example, they were supposed to know that a square has all of its four sides equal. Therefore, the perimeter of a square could have been obtained as follows: Perimeter = 50 m + 50 m + 50 m + 50 m = 200 m or 50 m x 4 = 200 m or (50 m+ 50 m) x 2 = 200 m. Most pupils lacked knowledge of the perimeter of a square. One of the incorrect responses is shown in Extract 16.1.

Extract 16.1

16.	Shaame has a square shaped farm. If one side has a length of 50 m. Find the perimeter of the farm.	$ \begin{array}{r} 50 \\ \times 50 \\ \hline 25 \end{array} $	25
-----	--	--	----

In Extract 16.1, the pupil multiplied 50 by 50 yet obtained wrong answer.

Besides that, 194,922 (19.5%) pupils were able to calculate the perimeter of a square. A pupils' response in Extract 16.2 shows one

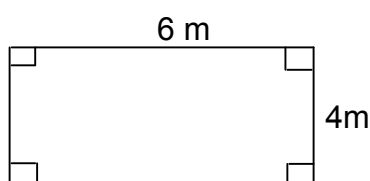
of the correct ways of calculating the perimeter of a square shaped figure.

Extract 16.2

16.	Shaame has a square shaped farm. If one side has a length of 50 m. Find the perimeter of the farm.	$P = 4 \times \text{side}$ $4 \times 50 = 200m$	<u>200m</u>
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Extract 16.2 is a sample of a correct answer of a pupil who calculated the perimeter by multiplying the length of one side times 4 which is the required formula.

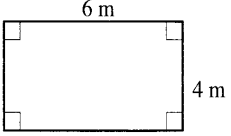
Question 17: Find the area of the following rectangle:



The Question was assessing pupils' knowledge and skills of geometrical figures.

A total of 811,353 (81.0%) pupils answered wrongly this question. This situation shows that, they had insufficient knowledge on calculating the area of the rectangle. For example, some pupils added instead of multiplying the length and the width of the rectangle while others used the formula for finding the perimeter. One of an incorrect responses is given in Extract 17.1:

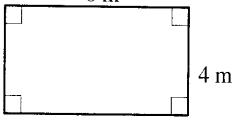
Extract 17.1

17.	Find the area of the following rectangle: 	$\begin{array}{r} 6 \\ 4 \times 4 \\ \hline 34 \end{array}$	34
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Extract 17.1 is a sample of an incorrect response of a pupil who wrote numbers which do not relate to the requirement of the question.

Meanwhile, 189,140 (18.9%) pupils got the question correctly. These pupils recognized that the area of a rectangle is found by multiplying the length by width. Extract 17.2 gives the right way to calculate the area of a rectangle.

Extract 17.2

17.	Find the area of the following rectangle: 	$\begin{aligned} A &= L \times W. \\ A &= 6 \times 4 \\ A &= 24 \text{ m}^2 \end{aligned}$	$A = 24 \text{ m}^2$
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
Extract 17.2 is a sample of a correct answer of a pupil who multiplied the length times the width as a proper formula to get the area of the rectangle.

Question 18: Tabora Airport is 600 m long and 100 m wide. Find its area in hectares.

Question 18 was assessing competence in calculating the area of rectangle and the conversion of metric units.

This question was the most poorly performed. About 960,225 (95.9%) pupils, did not get the right answer. Some of them failed to differentiate between measurements in meters and in hectares as they considered them to be equal while others failed to apply the correct formula of finding the area of a rectangle. Extract 18.1 shows the answer of a pupil, who calculated clearly the area in meters but failed to change in hectares:

Extract.18.1

18.	Tabora Airport is 600 m long and 100 m wide. Find its area in hectares.	$ \begin{array}{r} 600 \\ \times 100 \\ \hline 600 \\ 600 \\ \hline 600 \end{array} $	$L \times W = A$ $600 \times 100 =$ 	60000 hectares.
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Extract 18.1 is a sample of incorrect response of a pupil who considered the meters and hectares equal.

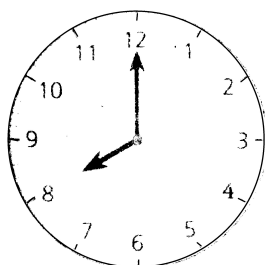
A total of 40,277 (4.0 %) pupils answered the question correctly. They had knowledge on finding the area of a rectangle and also changing meters to hectares. They found the area of the rectangle by using the formula: Area = Length x Width which is 600 m x 100 m = 60000 m² and used the conversion 10000 m² = 1 hectares. Therefore, the required area was supposed to be 60,000 ÷ 10,000 = 6 hectares. Extract 18.2 shows one of the correct responses.

Extract 18.2

18.	Tabora Airport is 600 m long and 100 m wide. Find its area in hectares.	$ \begin{array}{l} A = L \times W \\ = 600 \times 100 \\ = 60000 \\ = 6 \text{ h} \end{array} $	6 hectares
-----	---	--	------------

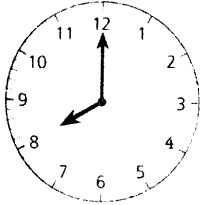
Extract 18.2 is a sample of a correct answer of a pupil who calculated the area and converted the units accordingly.

Question 19: Write down the time shown on the following clock:



This question assessed the competence of the pupils in reading and writing time from the watch correctly. A total of 541,349 (54.1%) pupils failed to answer correctly. The pupils' performance in this question was average. Some of the pupils did not differentiate the arrow for minutes and that for hours to the extent of interchanging the two. Moreover, others were confused by reading 8 as two o'clock instead of eight o'clock. Extract 19.1 shows a sample of the pupils' incorrect response in reading and writing the time.

Extract 19.1

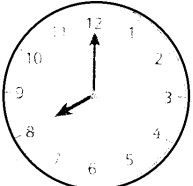
19.	Write down the time shown on the following clock:		
		Two o'clock	Two o'clock

Extract 19.1 is a sample of an incorrect response of a pupil who translated the reading of the watch into English.

On the other hand, 459,162 (45.9%) pupils answered the question correctly. They had good knowledge of reading the watch and writing the corresponding time in numerals or in words. They were

able to identify that the shorter arrow reads time in hours and the longer arrow reads time in minutes. Thus, the time according to the watch is 8:00 or eight o'clock. Extract 19.2 is one of the good responses.

Extract 19.2

19.	Write down the time shown on the following clock: 	Eight o'clock	Eight o'clock
-----	--	---------------	---------------

Extract 19.2 is a sample of a correct response of a pupil who read the watch basing on the correct use of arrows.

Question 20: Asha bought 3 kg of rice. How many grams of rice did she buy?

Question 20 was assessing pupils' competence in understanding measurements of weight and the conversions of one weight measurement to another.

A total of 785,890 (78.4%) pupils did not answer correctly. The pupils who got the question wrong lacked enough knowledge on the relationship between kilograms and grams (1 kilogram = 1000 grams). Some pupils considered one gram equals to 1 kilogram and others wrote numbers of their choice though completely not related to the numbers given in the question. Extract 20.1 shows one of the pupils' incorrect responses.

Extract 20.1

20.	Asha bought 3 kg of rice. How many grams of rice did she buy?	she have buy 2 g	she have buy 2 g
-----	---	------------------	------------------

Extract 20.1 is a sample of an incorrect response of a pupil who thought that 3 kg is equal to 2 gm.

But 214,614 (21.4%) pupils answered the question correctly. They were knowledgeable on conversion of weight measurements from kilograms to grams. They used the relation $1 \text{ kg} = 1000 \text{ g}$ and applied the skills of multiplication operation to get $3 \times 1000 = 3000 \text{ g}$. Extract 20.2 shows the way a correct answer was obtained:

Extract 20.2

20.	Asha bought 3 kg of rice. How many grams of rice did she buy?	$1 \text{ kg} = 1000 \text{ g}$ $= 3 \times 1000$ $= 3000 \text{ g}$	3000 g
-----	---	--	--------

Extract 20.2 is a sample of a good response of a pupil who calculated the required grams by converting 3kg into grams.

Question 21:

	hour	minutes
	5	25
+	2	15
	<hr/>	

This question was assessing the pupils' competence in adding time given in hours and minutes by vertical method.

A total of 507,630 (50.7%) pupils answered this question correctly. The performance of this question was average. The addition of time was obvious for pupils who had knowledge of vertical addition. Most of them had knowledge of arranging hours and minutes, finally adding correctly. For instance, addition of minutes gives 40 minutes and that of hours gives 7 hours. The illustration of the correct response is given in Extract 21.1:

Extract 21.1

21.	hour minutes		HR MIN		Hour	Min
	5	25	5	25		
	+ 2	15	+2	15		
			7	40	7	40

Extract 21.1 is a sample of a correct response of a pupil who added and arranged hours and minutes properly.

On the other hand, 492,899 (49.2%) pupils failed to answer the question correctly. These pupils lacked the knowledge of adding time. Some of them had no knowledge of the concept of carrying numbers during addition. An example of an incorrect response is shown in Extract 21.2:

Extract 21.2

21.	hour minutes		h min			
	5	25	5	25	h min	
	+ 2	15	+2	15		
			6	40		

Extract 21.2 is a sample of an incorrect response of a pupil who failed to add hours and minutes in the calculations, though initially the arrangement of hours and minutes were done as required.

Question 22: Mwanaidi travelled by UDA bus service for 1 hour and 10 minutes and then walked for 1 hour and 15 minutes. How long did she travel?

Question 22 was assessing the pupils' competence in adding time in hours and in minutes correctly. It also assessed the pupils understanding in solving of word problems. The question required the pupils find the total time taken in the whole journey.

About 703,020 pupils, equivalent to 70.2, percent failed to answer the question correctly. They did not understand what the word problem required; as a result, they added numbers as if all were representing time in hours. Extract 22.1 indicates an incorrect answer.

Extract 22.1

22.	Mwanaidi travelled by UDA bus service for 1 hour and 10 minutes and then walked for 1 hour and 15 minutes. How long did she travel?	$ \begin{array}{r} 15 \\ 10 \\ + \quad 1 \\ \hline 27 \text{ long time} \end{array} $	27 long time
-----	---	---	--------------

Extract 22.1 is a sample of an incorrect response of a pupil who added hours and minutes together without separating them.

On the contrary, 297,509 pupils, equivalent to 29.7 percent answered the question correctly. They had good knowledge on word problems and on calculating time in hours and minutes. Extract 22.2 shows the way pupils answered this question correctly:

Extract 22.2

22.	Mwanaidi travelled by UDA bus service for 1 hour and 10 minutes and then walked for 1 hour and 15 minutes. How long did she travel?	<table><tr><td>h</td><td>min</td></tr><tr><td>1</td><td>15</td></tr><tr><td>1</td><td>10</td></tr><tr><td>2</td><td>25</td></tr></table>	h	min	1	15	1	10	2	25	2hrs 25min
h	min										
1	15										
1	10										
2	25										

Extract 22.2 is a sample of a correct response of a pupil who arranged properly the units of hours and minutes.

Question 23: Write XXIV in ordinary numbers.

This question assessed the competence of pupils to understand and convert correctly the Roman numbers into ordinary numbers and vice versa.

There were 531,532 (53.1%) pupils who responded correctly to this question. These pupils had the knowledge on the Roman numbers: I = 1, V = 5 and X = 10 and know how to write roman numbers into ordinary number. Therefore, XXIV = 10 +10+5-1=24. Extract 23.1 is an example of a correct pupils' response.

Extract 23.1

23.	Write XXIV in ordinary numbers.	XXIV=24	<u>24</u>
-----	---------------------------------	---------	-----------

Extract 23.1 is a sample of a correct answer of a pupil who wrote the required number after the conversion of XXIV into ordinary number.

On the other hand, 469,020 (46.8%) pupils failed to answer the question correctly. These pupils lacked knowledge to recognize the Roman numbers as well as the ability to change them into ordinary numbers. Extract 23.2 gives one of the incorrect answers.

Extract 23.2

23.	Write XXIV in ordinary numbers.	xxiv 49	49
-----	---------------------------------	---------	----

Extract 23.2 is sample of an incorrect responses of a pupil who wrote a different number all together.

Question 24: Change 67 to Roman numbers.

Question 24 intended to assess the pupils' competence in converting the ordinary numbers into Roman numbers correctly.

A total of 749,539 (74.8%) pupils failed to answer the question correctly. When compared to question 23, this question also needed knowledge of relating ordinary numbers with Roman numbers, but it shows that many pupils were more able to convert Roman numbers to ordinary numbers than converting ordinary numbers into Roman numbers. Those who answered incorrectly wrote any of the Roman numbers to represent 67 instead of LXVII. Extract 24.1 gives an incorrect answer.

Extract 24.1

24.	Change 67 to be in Roman numbers.	VIIII	VIIII
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Extract 24.1 is a sample of an incorrect response of a pupil who wrote Roman numbers which had no relation to the ordinary number given.

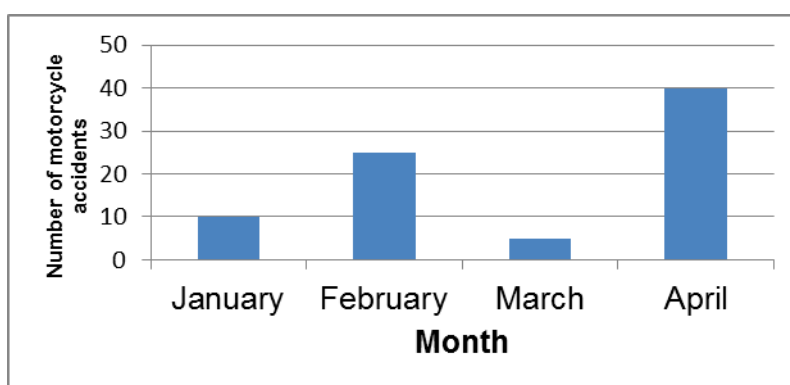
On the other hand, 250,837 (25.0%) pupils answered this question correctly. These pupils had knowledge to relate between Roman Numbers and ordinary numbers. The correct answer is given in Extract 24.2:

Extract 24.2

24.	Change 67 to be in Roman numbers.	67 = LXVII	<u>LXVII</u>
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Extract 24.2 is a sample of a correct response of a pupil who wrote LXVII as a correct Roman number of 67.

Question 25: The following graph shows the number of motorcycle accidents in Mjimwema village for a period of four months:



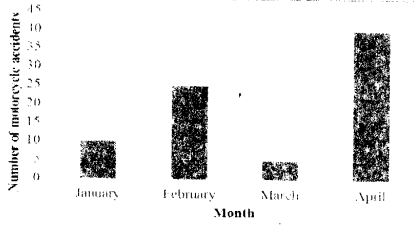
Which month was found to have a small number of motorcycle accidents?

Question 25 was assessing the competence of the pupils in reading correctly the data on the bar graphs.

A total of 509,027 (50.8%) pupils answered this question correctly. Those who provided correct answers had knowledge of reading the graphs correctly. The pupils identified that the month with small number of motorcycle accidents is the one having the shortest bar

graph and that was March. Extract 25.1 gives one of the correct answers from the pupils:

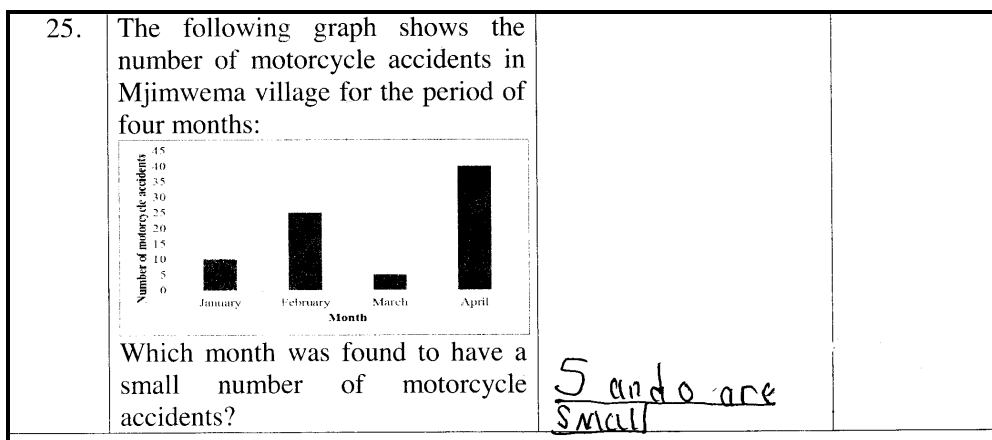
Extract 25.1

25.	<p>The following graph shows the number of motorcycle accidents in Mjimwema village for the period of four months:</p>  <p>Which month was found to have a small number of motorcycle accidents?</p>	March	March
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Extract 25.1 is a sample of the correct response of a pupil who identified the month found to have small number of motorcycle accidents after careful reading of the chart.

However, 491,123 (49.0%) pupils did not manage to answer the question correctly. They had no knowledge and skills in reading bar graphs and relating them to the given information. Some of the pupils, wrote the numbers and explanations which did not relate to the question. Extract 25.2 shows one of the pupils' incorrect answers.

Extract 25.2



In Extract 25.2, the pupil wrote the value (5) contrary to the requirement of the question.

3.0 ANALYSIS OF PERFORMANCE IN EACH TOPIC

The general analysis shows that, there is no any topic that had good performance. However, the topics on **whole numbers, fractions, statistics, Roman numbers, measurements and money** had the average performance while the topic of **geometry** had a weak performance. The pupils' performance for each topic in the assessment is shown in attachments A and B.

On the other hand, the analysis focused on the 25 questions that were in the assessment tool, grouping of questions in each topic, percentage of performance in each question and average performance of each topic. Furthermore, the percentage of pupils in the analysis are 61% – 100% good performance, 41% – 60% average and 0% – 40% poor performance.

The analysis for each question has revealed that questions 1, 3 and 10 were well performed. Other questions that had a good performance were

questions 9 and 11. The analysis has shown that the questions that had average performance were 2, 4, 5, 13, 19, 21, 23 and 25. However, poor performance has been identified in twelve questions which are 6, 7, 8, 12, 14, 15, 16, 17, 18, 20, 22 and 24. Pupils' performance in each question for this years' assessment is shown in Appendix C.

Generally, the performance in Mathematics subject in Standard Four National assessment has been poor, standing at 39 percent. The reason behind is that, 12 out of 25 questions that were assessed were poorly performed such that it affected the general performance. Moreover, all over the topics were averagely performed except the topic of geometry that had poor performance.

4.0 CONCLUSION

The general analysis of the results shows that the assessment in Mathematics was poorly performed. Many questions and the corresponding topics had low performance. This is shown in colors in Appendix A. The yellow color indicates average performance and red color is for poor performance. The green colour shows good performance, however this colour is not indicated because none of the topics attained good performance.

The analysis revealed also that, topics on Whole Numbers, Fractions, Statistics, Money, Roman numbers and Measurements had average performance while the topic on Geometry had a poor performance.

Many pupils failed to answer the questions correctly because they were not able to understand the needs of a particular question, they

lacked skills and knowledge required to solve the given question and also were not able to understand and solve word problems.

The analysis of each question has been done in order to identify the discrepancies which were observed when answering the questions. The challenges observed should be changed into opportunity for improving the teaching and learning processes.

Basing on this analysis it is recommended that; all stakeholders concerned should play their roles in order to improve the teaching and learning processes. However, responsible authorities are advised to take appropriate measures for enhancing teaching and learning so as to attain high level of performance in reading, writing and arithmetic skills. Eventually, this will improve the results of future assessments.

5.0 RECOMMENDATIONS

In order to make Standard Four Pupils acquire the intended knowledge in Advanced Skills of Reading, Writing and Arithmetic, the following should be observed:

1. The responsible authorities and stakeholders concerned should assist in providing training for capacity building of teachers in teaching Mathematics. This will help teachers to acquire knowledge and skills for effective teaching and induce pupils to learn Mathematics.

2. Teachers should effectively teach and insist on the concepts of numbers in all topics in order to make pupils attain the basic skills and knowledge of understanding and solving the word problems.
3. Teachers should emphasize, in the process of teaching and learning, the understanding on how to perform mathematical operations specifically addition, subtraction and multiplication. Pupils should be able to differentiate these operations mostly when dealing with word problems.

APENDICES

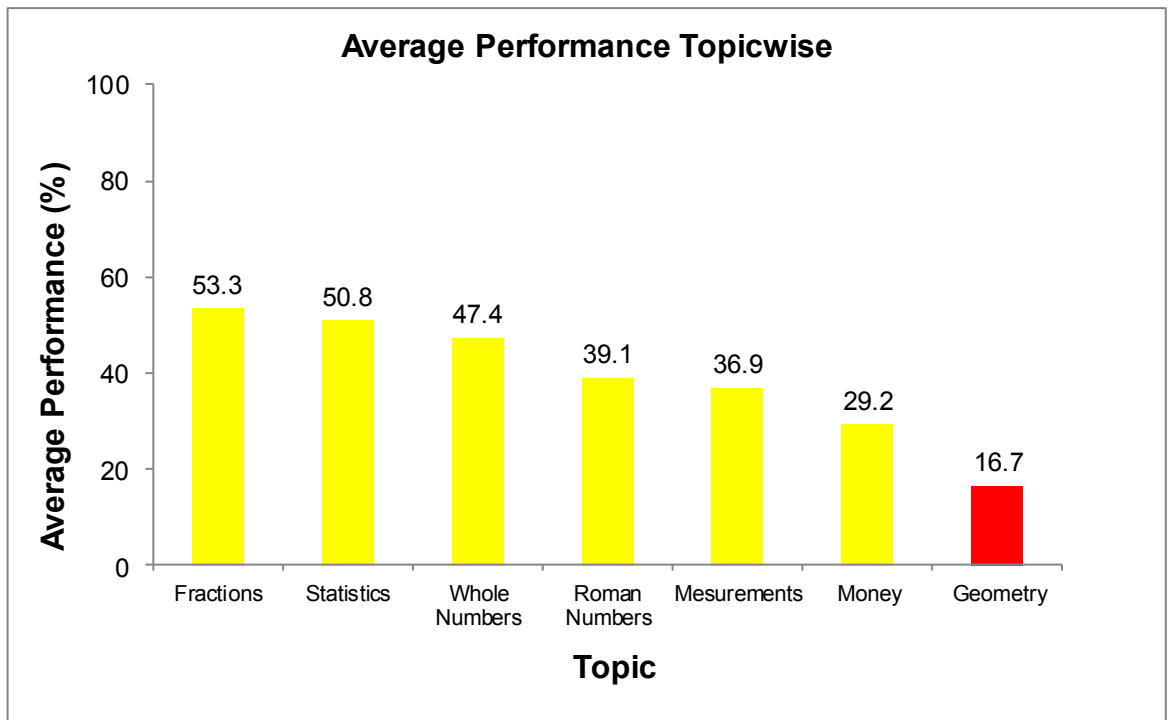
Appendix A

THE SUMMARY OF ANALYSIS OF PERFORMANCE FOR PUPILS IN EACH TOPIC OF MATHEMATICS SUBJECT AT STANDARD FOUR NATIONAL ASSESSMENT 2015

SN	TOPIC	ASSESSMENT FOR 2015			
		PERFORMANCE PER QUESTION		AVERAGE PERFORMANCE (%)	COMMENTS
		Question Number	% of Performance		
1	Fraction	8	10	53.3	Average
		9	65.1		
		10	72.7		
		11	65.2		
2	Statistics	25	50.8	50.8	Average
3	Whole Numbers	1	86.9	47.4	Average
		2	55.6		
		3	72.8		
		4	41.3		
		5	43.5		
		6	22		
		7	9.8		
4	Roman Numbers	23	53.1	39.1	Poor
		24	25		
5	Measurement	19	45.9	36.9	Poor
		20	21.4		
		21	50.7		
		22	29.7		

SN	TOPIC	ASSESSMENT FOR 2015			
		PERFORMANCE PER QUESTION		AVERAGE PERFORMAN CE (%)	COMMENTS
		Questio n Number	% of Performan ce		
6	Money	12	35	29.2	Poor
		13	44.3		
		14	8.3		
7	Geometry	15	24.4	16.7	weak
		16	19.5		
		17	18.9		
		18	4		
Overall Average Performance				39.1	Weak

Appendix B



Appendix C

