



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT
FOR THE PRIMARY SCHOOL LEAVING EXAMINATION
(PSLE) 2021**

MATHEMATICS



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MATHEMATICS

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CONTENTS

FOREWORD	iv
1.0 INTRODUCTION	1
2.0 ANALYSIS OF THE CANDIDATES' RESPONSES IN EACH QUESTION	3
2.1 Section A: Multiple Choice Items	3
2.2 Section B: Short Answer Items	45
3.0 SUMMARY OF THE CANDIDATES' RESPONSE ANALYSIS	55
4.0 CONCLUSION AND RECOMMENDATIONS	56
4.1 Conclusion	56
4.2 Recommendations	56
APPENDIX I	58

FOREWORD

The Candidates' Response Analysis Report for Primary School Leaving Examination (PSLE) in 2021 was prepared in order to provide feedback to educational stakeholders on how the candidates answered the examination questions.

The analysis of the candidates' responses was conducted in order to identify the competencies which were well, averagely and poorly performed. The competency of *applying Mathematics to solve problems in different contexts* had an average performance. The analysis further showed that the competencies of *using mathematical language to present ideas or arguments* and *applying skills of reasoning and proofs in real life contexts* were poorly performed.

Weak performance of the candidates was due to the following reasons: failure to formulate equations from word problems and geometrical figures; to apply formulae for finding the area of figures such as triangle, square and the surface of a rectangular prism; failure to find the volume of figures; and failure to change various units that were used.

The National Examinations Council of Tanzania hopes that this report will help to improve the candidates' performance in future Mathematics examinations.

Finally, the Council would like to thank all the examination officers and other experts who participated in preparing this report.



Dr. Charles E. Msonde

EXECUTIVE SECRETARY

1.0 INTRODUCTION

The Primary School Leaving Examination in 2021 for Mathematics paper was held on 8th October, 2021. In that sitting, a total of 1,132,084 candidates were registered, out of which 1,107,788 (97.85%) candidates sat for the paper. The analysis of the examination results shows that 638,127 (57.63%) candidates passed. In 2020, a total of 1,009,559 candidates sat for the Mathematics examination, of which 651,703 (64.64%) candidates passed. Thus, the pupil's performance in SFNA 2021 has decreased by 7.01 percent compared to 2020. The comparison of the candidates' performance in each grade for the year 2020 and 2021 is shown in the Figure 1.

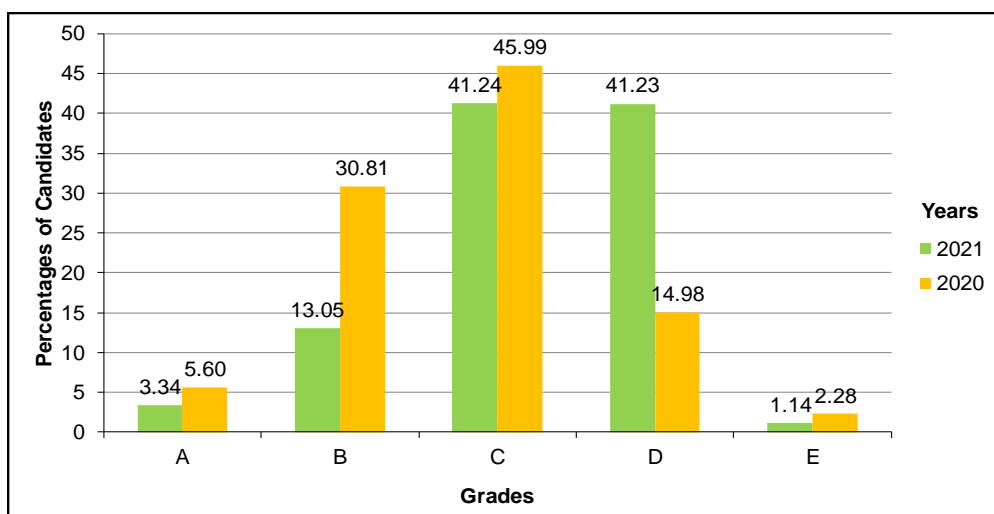


Figure 1: Comparison of the candidates' performance grades for 2020 and 2021 examinations

The Primary School Leaving Examination in Mathematics subject held in 2021 consisted of Sections A and B, with a total of 45 questions covering Mathematical Operations, Figures and Word Problems. Section A had 40 multiple choice questions carrying 01 mark each, whereas Section B had 5 short answer questions each carrying 02 marks.

The candidates were instructed to answer all questions in both sections. In Section A, the candidates were required to work out the answer in each question and shade the letter of the correct answer in

the Optical Mark Reader (OMR) forms. In Section B, they were required to work out the answer in each question by showing the work in the space provided on the second side of the OMR form.

The candidates' responses in Section A were analysed and their performance was categorised in three classes according to the percentage of the candidates who correctly answered a particular question as follows: 60 - 100 percent is categorised as good performance, 40 - 59 percent as average performance and 0 - 39 percent as weak performance. In Section B, the analysis of the candidates' performance was done by considering percentage of the candidates who scored 0 - 0.5, 1.0 and 1.5 – 2.0 marks.

In this report, Tables and Charts have been used to illustrate the candidates' performance statistics. In both Tables and on Charts, the asterisk (*) is placed beside the correct answer for the multiple choice questions. Moreover, the word "*Others*" denotes the candidates who either chose more than one option or did not respond to the question. Also, in the analysis, the green, yellow and red colours represent good, average and poor performance, respectively.

Finally, the report shows the comparison of candidates' performance Competency-wise in 2020 and 2021, and provides recommendations for the improvement of candidates' performance in future.

2.0 ANALYSIS OF THE CANDIDATES' RESPONSES IN EACH QUESTION

2.1 Section A: Multiple Choice Items

Question 1: Five pupils were assigned to write numbers on the board, one number for each pupil. Which of the following is the smallest number which was written by the pupils?

- A 0.457 B $\frac{2}{3}$ C 40%
D 0.53 E 0.80

The data shows that 1,086,361 (98.07%) candidates attempted this question. Amongst, 279,145 (25.20%) candidates chose the correct answer C “40%”. Thus, performance of the candidates in this question was weak as shown in Table 1.

Table 1: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	131,068	520,963	279,145	96,860	58,325	21,427
Percentage of Candidates	11.83	47.03	25.20	8.74	5.26	1.93

Most candidates (72.87%) selected the distractor A, B, D or E. Some of these candidates compared values written in different forms. This mistake led the candidates to choose the distractor A “0.457”. They were supposed to convert fraction and decimals into percentages and comparing the numerals of obtained percentages. The candidates who chose the distractor E “0.80” wrongly compared the values from rightmost digit of each value instead of leftmost ones. Furthermore, other candidates chose distractor D “0.53” after considering the value with fewer decimal places and then smallest value of the decimal part.

On the other hand, competent candidates converted 0.457, $\frac{2}{3}$, 0.53 and 0.80 into percentages and got 45.7%, 66.67%, 53% and 80% respectively. Through comparison of magnitude of numerals of the percentages, they realized that 40% is the smallest value in the list.

Question 2: The following table shows the number of Standard Seven pupils in Roman and the drinks they mostly like.

Drinks	Fanta	Pepsi	Tea	Water	Milk
Number of pupils	XCI	XC	CIX	CVI	CX

Which drink is preferred by most of the pupils?

- A Fanta B Pepsi C Tea
D Water E Milk

The question tested the candidates' competency in reading Roman number. Performance of the candidates in this question was average, since 439,105 (39.64%) candidates chose the correct answer. The performance is presented in Table 2.

Table 2: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	138,056	67,894	291,304	154,839	439,105	16,590
Percentage of Candidates	12.46	6.13	26.30	13.98	39.64	1.50

The candidates who chose the correct answer were conversant with Roman numbers XCI, XC, CIX, CVI and CX that equals to 91, 90, 109, 106 and 110 respectively. Thus, they identified that the greatest number of pupils is 110 and consequently opted the correct answer, E "Milk".

In contrast, 652,093 (58.86%) candidates chose the distractor A, B, C or D. These candidates failed to demonstrate the knowledge of reading Roman numbers. As the consequence, they failed to identify the largest number.

Question 3: The place value of the underlined digit in the numeral 504251 is

- A tens B thousands
C ten thousands D hundreds
E hundred thousands

This question assessed ability of the candidates to identify place values of digits in whole numbers. The candidates' performance in this question was good as 687,375 (62.05%) candidates chose the correct answer D "hundreds". These candidates correctly identified the place value of the underlined digit "2" by counting the digits starting from the rightmost digit while moving leftwards. Through this approach, they realized that 2 is the third digit in 504251 and therefore, its place value is hundreds.

Despite good performance, a total of 405,508 (37.49%) candidates selected incorrect responses, of which, 141,550 (12.78%) selected A, 129,726 (11.71%) selected B, 91,209 (8.23%) selected C and 14,905 (1.35%) selected E. These candidates counted the positions of the digits inappropriately. For example, the candidates who chose the distractor B "thousands" named the place values of digits from the left hand side to the right hand side.

Question 4: A gas jar full of gas has a capacity of 10 litres. If 1.5 litres have been used, what fraction of the volume of gas has remained?

- | | | | | | |
|---|----------------|---|-----------------|---|-----------------|
| A | $\frac{3}{20}$ | B | $\frac{20}{23}$ | C | $\frac{17}{20}$ |
| D | $\frac{3}{23}$ | E | $\frac{3}{17}$ | | |

The question tested the candidates' understanding about the concept of fraction. In this question, 323,863 (29.24%) candidates chose the correct answer C " $\frac{17}{20}$ ". Therefore, the performance of candidates in this question was weak as shown in Table 2.

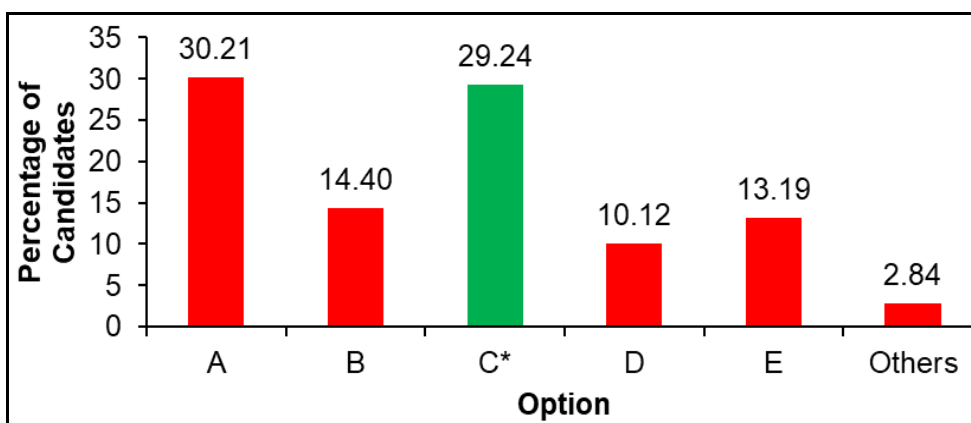


Figure 2: *Percentage of Candidates for each Option in Question 4*

As Figure 2 shows, a total of 752,472 (67.92%) candidates chose incorrect answers. These candidates misinterpreted the concept of fractions. The candidates who selected distractor A “ $\frac{3}{20}$ ” computed the fraction of volume of gas that has been used instead of that of the gas that remained in the jar. Some candidates misinterpreted that both 1.5 litres and 10 litres are components of the jar; hence they got an incorrect volume of the jar as 11.5 litres. With this misconception, some of them chose B “ $\frac{20}{23}$ ” after expressing 10 litres as the fraction of 11.5 litres while others chose D “ $\frac{3}{23}$ ” after expressing 1.5 litres as the fraction of 11.5 litres. The candidates who chose distractor E “ $\frac{3}{17}$ ” correctly determined the volume of gas that remained in the jar (8.5 litres), however they wrongly computed the fraction by assuming that 1.5 litres is part of 8.5 litres.

Conversely, the candidates who chose the correct answer C “ $\frac{17}{20}$ ” subtracted 1.5 litres from 10 litres to get the volume of gas that remained in the jar (8.5 litres). Then, they realized that 8.5 litres is part of 10 litres of the gas jar. Hence, these candidates expressed this statement in fraction form ($\frac{8.5}{10}$) and simplified it to get $\frac{17}{20}$.

Question 5: In Uhuru primary school, 60 Standard Four pupils attended in the classroom during reading session and 20 pupils did not attend. What is the percentage of pupils who did not attend in that class?

- A 33.3% B 80% C 25%
D 75% E 66.7%

The question assessed competency of the candidates in writing fraction from the word problem involving whole numbers as well as converting it into percentages. The data shows that 338,434 (30.64%) candidates chose the correct answer implying weak performance. The performance of Candidates in this question is shown in Table 3.

Table 3: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	225,296	393,542	339,434	66,371	62,837	20,308
Percentage of Candidates	20.34	35.53	30.64	5.99	5.67	1.83

As Table 3 shows, a total of 748,046 (67.53%) candidates chose incorrect answers; A, B, D or E. Most of these candidates assumed that the classroom consists of 60 pupils, including 20 pupils who did not attend the reading session. As the consequence, some of these candidates chose distractor A “33.3%” after converting $\frac{20}{60}$ into

percentage while those who converted $\frac{40}{60}$ into percentage chose

the distractor E “66.7%”. The candidates who chose the distractor B “80%” simply added up the number of pupils who attended the reading session (60) and those who did not attend the session (20). Furthermore, the candidates who chose the distractor D “75%” only considered the number of pupils who attended the reading session by converting $\frac{60}{80}$ into percentage.

Question 6: A certain village had a total of 3,845,308 cattle. What is the total number of those cattle to the nearest ten thousands?

- A 3,854,310 B 3,845,300 C 3,846,000
D 3,850,000 E 3,845,000

This question tested competency of the candidates in rounding off whole numbers. In this question, 1,087,021 (93.13%) candidates attempted the question while 20,767 (1.87%) skipped it. About 370,681 (33.46%) candidates chose the correct answer, thus the performance was generally weak as shown in Table 4.

Table 4: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	126,694	221,054	187,203	370,681	181,389	20,767
Percentage of Candidates	11.44	19.95	16.90	33.46	16.37	1.87

Data show further that 716,340 (59.69%) candidates chose the incorrect options. These candidates failed to determine the digit whose place value is ten thousands. For instance, the candidates who wrongly named the place values of digits from the leftmost one ended up with incorrect option, B “3,845,300”.

On the other hand, competent candidates correctly rounded off 3,845,308 to the nearest ten thousands and got 3,850,000. Therefore, they chose the correct answer D “3,850,000”. These candidates identified that the digit whose place value is ten thousands is 4 and the next right digit from it is 5. Thus, they added 1 to the digit whose place value is ten thousands (4) and making all digits in the right side equals zero.

Question 7: Tanganyika got her independence in 1961. If Mwanakwetu was two years old by then, how old was she in 2020? (Give the answer in Roman numbers).

- A LIX B LXI C XLI
D ILX E XIL

Data show that 1,085,450 (97.98%) candidates answered this question, of which, 384,541 (34.71%) chose the correct answer ‘B

LXI'. Therefore, the overall performance of the candidates in this question was weak as shown in Figure 3.

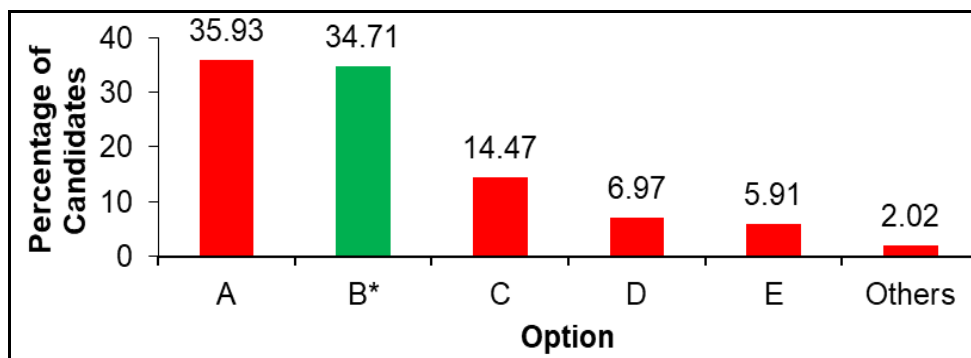


Figure 3: *Percentage of Candidates for each Option in Question 7*

Data show further that 700,909 (63.27%) candidates chose the distractors. The candidates who chose the distractor A 'LIX' indicate that they only subtracted 1961 from 2020 and got 59. In order to get the correct answer '61', the candidates were supposed to add 2 to the obtained difference "59".

The candidates who chose the distractor D "ILX" or E "XIL" indicate lack of knowledge about Roman numbers. This is because both ILX and XIL are meaningless in the context of Roman numbers. Similarly, most of the candidates who chose the distractor C "XLI" correctly determined that the age of Mwanakwetu in 2020 was 61 years. However, they failed to write "61" using Roman numbers as they ended up with XLI.

The candidates who chose the correct answer B "LXI" had logical reasoning that directed them to identify the required basic operations. These candidates subtracted 1961 from 2020 and got 59. Then, they added 2 (which is the number of years of Mwanakwetu in 1961) and got 61, equivalent to LXI.

Question 8: Maneno was given the numbers 21, 29, 37, 45, 49, 51, 53, 57, 59 and 61 in order to identify the prime numbers. If he wrote the prime numbers correctly, which of the following numbers did he write?

- | | | | |
|---|-----------------------|---|-----------------------|
| A | 21, 45, 51 and 57 | B | 29, 37, 51, 59 and 61 |
| C | 29, 37, 53, 59 and 61 | D | 29, 49 and 59 |
| E | 21, 51 and 61 | | |

The question assessed competency of the candidates in identifying prime numbers. This question was averagely performed whereby 504,464 (45.54%) candidates chose the correct option, C as shown in Table 5.

Table 5: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	134,926	242,233	504,464	109,986	95,011	21,168
Percentage of Candidates	12.18	21.87	45.54	9.93	8.58	1.91

The candidates who correctly responded to this question identified that the prime numbers in the given list are 29, 37, 53, 59 and 61, which are presented in option C. These numbers are only divisible without remainder by 1 and itself and not divisible to other numbers including 2, 3, 5, 7, 11, 13, 17 and so on.

In contrast, 582,156 (52.55%) candidates chose options whose list include 21, 45, 49 or 51, which are not prime numbers. For example, those who chose distractor A failed to realize that 21 is divisible to 3 and 7; 45 is divisible to 3, 5, 9 and 15; and 51 is divisible to both 3 and 17.

Question 9: The ages of four children were arranged in consecutive years 13, 18, 23 and _____. What is the age of the fourth child?

- | | | | | | |
|---|----|---|----|---|----|
| A | 28 | B | 24 | C | 22 |
| D | 12 | E | 41 | | |

This question assessed the candidates' ability to apply the concept of patterns to solve real life problems. The data analysis shows that, the candidates' performance was good because 902,651 (81.48%) candidates chose the correct answer as shown in Table 6.

Table 6: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	902,651	53,930	36,326	60,902	39,878	14,101
Percentage of Candidates	81.48	4.87	3.28	5.50	3.60	1.27

The candidates who chose the correct answer A “28” demonstrated understanding of patterns of numbers. They recognized that the common difference of two consecutive numbers in the list is 5. Therefore, they added 5 to the third number (23) and got the fourth number of the list which is 28.

The data further show that 191,036 (17.25%) candidates chose incorrect answers. Most of these candidates failed to recognize the pattern of the numbers. For example, those who chose distractor E “41” computed sum of the second and third numbers. Also, some candidates added 1 to the third number (23) and chose B “24” while other candidates subtracted 1 from the third number and thus chose C “22”.

Question 10: The revenue collections for five consecutive years were listed by using the number 2, 4, 7, 12 and 19. What is the number of revenue for the sixth year in that sequence?

- | | | | | | |
|---|----|---|----|---|----|
| A | 18 | B | 28 | C | 20 |
| D | 31 | E | 30 | | |

This question assessed the candidates’ ability to apply the concept of patterns to solve real life problems. The performance of candidates in this question is presented in Figure 4.

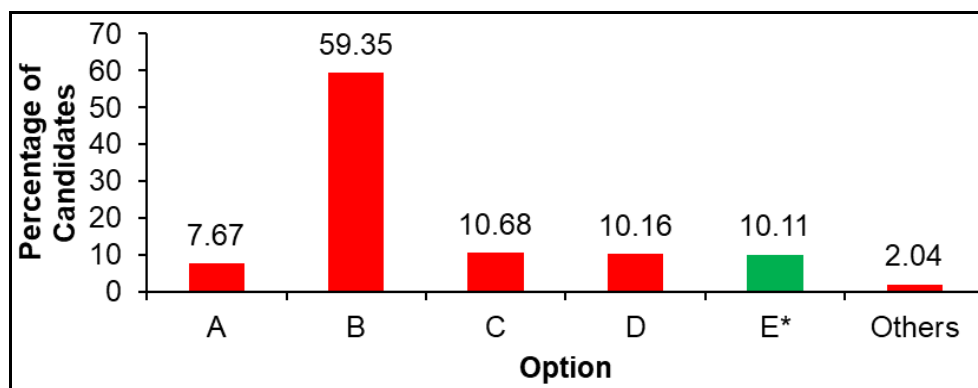


Figure 4: *Percentage of Candidates for each Option in Question 10*

As Figure 4 shows, 111,954 (10.11%) candidates chose the correct answer E “30” indicating weak performance. Many candidates correctly generated new list; 2, 3, 5 and 7 which represents the difference of two consecutive numbers. However, they failed to identify the pattern of the new list. Most of these candidates wrongly assumed that the difference of any two consecutive numbers in the

new list (2, 3, 5 and 7) is 2. Thus, they added 2 to 7 to get 9 and computed the sum of 19 and 9 to get 28, the answer which led them to select the distractor B. This approach is incorrect because the difference of 2 and 3 is 1 (not 2) and therefore, the difference of two consecutive terms is not constant. Some candidates chose the distractor C “20” after adding 1 to the fifth number (19) while other candidates chose the distractor D “31” after adding the fourth and fifth numbers (12 and 19).

The candidates who chose the correct option E “30” realized that the second, third, fourth and the fifth numbers of the given list are obtained by adding 2, 3, 5 and 7 respectively the preceding number. Also, they identified that the added numbers form a pattern of prime numbers and thus the next prime number is 11. Therefore, they added 11 to 19 and got 30 as the revenue of the sixth year.

Question 11: The following sequence represents the weights of pupils standing on a line according to their weight:

59, 55, 51, ____, 43, 39, 35.

What is the weight of the pupil that should be written in the blank space?

- | | | | | | |
|---|----|---|----|---|----|
| A | 52 | B | 47 | C | 44 |
| D | 42 | E | 50 | | |

This question tested the candidates’ competency in identifying the missing numbers in a sequence. The overall performance of the candidates was good because 829,895 (74.91%) candidates selected the correct answer as shown in Table 7.

Table 7: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	59,557	829,895	69,951	68,232	63,942	16,211
Percentage of Candidates	5.38	74.91	6.31	6.16	5.77	1.46

In this question, competent candidates realized that the given sequence forms descending pattern whereby two consecutive numbers differ by 4. Therefore, they subtracted 4 from 51 or added 4 to 43 and got the correct missing number, 47.

However, 261,682 (23.62%) candidates selected incorrect answers. These candidates chose one of the distractors A “52”, C “44”, D “42” or E “50” indicating common misconception that any two consecutive numbers always differ by 1. Therefore, some candidates added 1 to 51 or 43 while others subtracted 1 from 43 or 51.

Question 12: The Standard One pupils’ attendance at Mtakuja Primary school was decreasing for five consecutive days as follows: 78, 75, 72, 69, _____. How many pupils attended on the fifth day?

- A 70 B 68 C 66
D 79 E 77

The candidates had good performance in this question, as shown in Table 8.

Table 8: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	65,262	73,575	845,267	60,306	48,147	15,231
Percentage of Candidates	5.89	6.64	76.30	5.44	4.35	1.37

In this question, competent candidates understood that the given sequence form a descending pattern which is decreasing by 3. Thus, they correctly identified the missing number by subtracting 3 from 69 resulting in choosing C “66”.

Nevertheless, 244,290 (22.32%) candidates selected distractors A “70”, B “68”, D “79” or E “77”. They assumed that any two consecutive numbers differ by 1. Therefore, they added 1 to 78 or 69 while others subtracted 1 from 78 or 69. With this mistake, those who considered the first number (78) chose the distractor D “79” or E “77” while those who considered the fourth number (68) chose the distractor A “70” or B “68”.

Question 13: Mshikamano villagers contributed 325,500 shillings to build a school toilet. If each villager contributed 500 shillings, how many villagers contributed?

- A 6,051 B 6,501 C 32,600
D 651 E 325,000

This question assessed ability of the candidates in solving word problems involving division of numbers. A total of 495,841 (44.76%) candidates chose the correct option, D. Hence, the overall performance in this question was average as shown in Table 9.

Table 9: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	59,329	87,089	174,360	495,841	270,188	20,981
Percentage of Candidates	5.36	7.86	15.74	44.76	24.39	1.89

The candidates who opted for the correct answer D “651” realized that the word problem is solved by applying knowledge of division of whole numbers. They correctly divided the total amount contributed for building a toilet (325,500 shillings) by the amount contributed by one villager (500 shillings) and got 651 villagers.

Meanwhile, 590,966 (53.35%) candidates chose the incorrect answer A, B, C or E. Candidates who chose either A “6051” or B “6501” failed to demonstrate knowledge or skills of dividing whole numbers. In addition, some candidates subtracted 500 from 325,500 and got the incorrect answer E “325,000”.

Question 14: Tanganyika got her independence in the year MCMLXI and Zimbabwe got her independence in the year MCMLXXX. How many years passed after independence of Tanganyika until the independence of Zimbabwe?

- A XXI B XIX C XXIX
D IX E XVIII

This question examined the candidates’ competency in subtracting whole numbers as well as writing Roman numbers. The data show

that 1,085,443 (97.98%) candidates attempted the question, of which, 526,762 (47.55%) candidates chose the correct answer. Therefore, the performance of candidates in this question was average. Figure 5 illustrates the performance in this question.

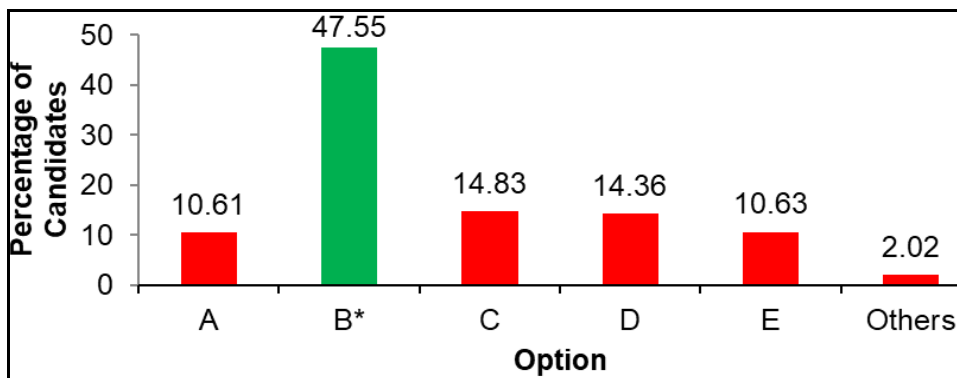
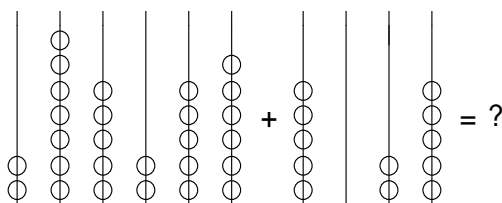


Figure 5: *Percentage of Candidates for each Option in Question 14*

The candidates who opted for the correct answer B “XIX” were knowledgeable about Roman numbers and subtraction on whole numbers. This indicates that they correctly wrote MCMXXX and MCMLXI as 1980 and 1961 respectively. Thereafter, they subtracted 1961 from 1980 and got 19, which is equivalent to XIX.

On the other hand, the candidates who chose the distractors A “XXI”, C “XXIX” or D “IX” indicate incompetency in performing subtraction by regrouping. The numerals for Roman numbers XXI, XXIX and IX are 21, 29 and 9. These numbers signify that such candidates failed to get the correct answer when subtracting 1961 from 1980. Apart from this, the candidates who chose distractor E “XVIII” correctly subtracted 1961 from 1980; however they failed to write 19 in Roman numbers as they wrote XVIII instead of XIX.

Question 15: A teacher made five groups of pupils and assigned them a task to find the sum of numbers in two abacuses as shown in the following figure:



Which of the following is the correct answer?

- A 280,281 B 280,271
C 270,231 D 270,271
E 280,291

This question assessed candidates' ability to perform addition on whole numbers. Data show that 603,431 (54.47%) candidates chose the correct answer. Thus, the candidates had average performance in this question as shown in Table 10.

Table 10: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	603,431	150,381	169,996	98,683	66,043	19,254
Percentage of Candidates	54.47	13.57	15.35	8.91	5.96	1.74

In this question, competent candidates chose the correct answer A "280,281". These candidates were knowledgeable about the presentation of numbers using abacus as well as addition on whole numbers. They derived the numbers 275,256 and 5,025 from the given abacuses and computed their sum and got 280,281.

On the other hand, 485,103 (43.79%) candidates chose incorrect answers. The candidates who chose distractor B "280,271" or D "270,271" failed to perform addition by regrouping. For instance, those who opted for "D 270,271" did not regroup both tens and ten thousands. The candidates who opted for E "280,291" considered the process of regrouping, but they carried 2 (instead of 1) to tens. In contrast, the candidates who chose the distractor C "270,231"

indicate that they subtracted 5,025 from 275,256 instead of adding them.

Question 16: John got a profit of sh 600,000 after selling chickens and eggs. If the profit from selling one chicken was sh 1,500 and the profit from one tray of eggs was sh 1,000, how many trays of eggs did John sell if he sold 300 chickens?

- | | | | | | |
|---|-----|---|-----|---|-----|
| A | 400 | B | 450 | C | 300 |
| D | 150 | E | 100 | | |

The question tested knowledge and skills of the candidates to solve word problems relating to purchases and sales. Figure 6 shows the performance of the candidates in this question.

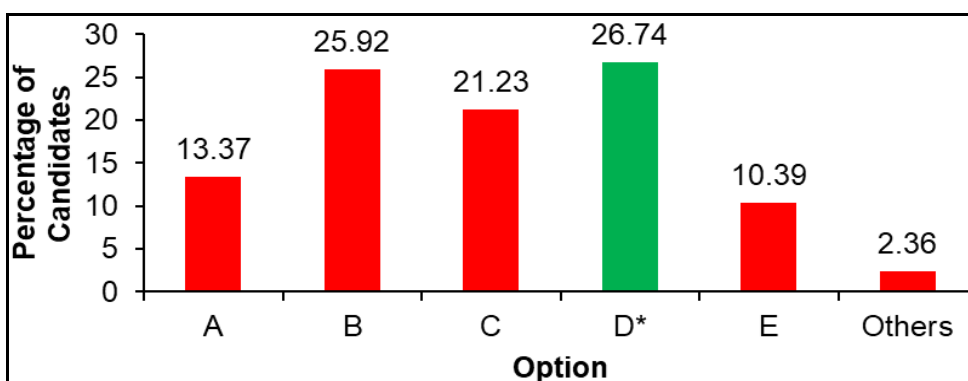


Figure 6: *Percentage of Candidates for each Option in Question 16*

As Figure 6 shows, 26.74 per cent, equivalent to 296,171 candidates chose the correct option D “150” indicating poor performance. The data show further that 785,466 (70.90%) candidates chose incorrect options. These candidates worked out on given numbers without considering interpretation of the answers. For example, the distractor A “400” is a result of dividing profit from both chickens and eggs (sh 600,000) by profit of one chicken (sh 1,500). This approach is inappropriate because the answer cannot be interpreted whether it is number of chickens or eggs. Similarly, option B “450” is the result of dividing profit of chickens (sh 450,000) by profit of one tray of eggs (sh 1000).

The candidates who chose the correct option had logical reasoning and performed the operations correctly. They determined the profit

from all 300 chickens as sh 450,000 after multiplying sh 500 by 300. Then, they subtracted sh 450,000 from sh 600,000 to get sh 150,000 which is the profit from all trays that were sold. These candidates also divided sh 150,000 by the profit of one tray (sh 1,000) and got the number of trays that were sold as 150.

Question 17: Ashura has 43 mangoes and Asha has 17 mangoes. How many mangoes does Asha need from Ashura so that they have equal number of mangoes?

- A 26 B 13 C 60
D 30 E 43

The question tested the candidates' ability to calculate the average using different data. The performance of the candidates in this question was weak summarized in Table 11.

Table 11: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	626,849	217,499	135,669	88,562	25,500	13,709
Percentage of Candidates	56.59	19.63	12.25	7.99	2.30	1.24

As Table 11 shows, 626,849 (56.59%) candidates chose the correct answer B "13". These candidates realized that the question is related to the application of the concept of average and thus, they calculated average of the two numbers, 43 and 17. They added up 43 and 17 and divided the answer by 2 to get the average, 30. This average means that for equal distribution of mangoes, everyone (Asha and Ashura) should get 30 mangoes. However, Asha has 17 mangoes implying shortage of 13 mangoes while Ashura has excess of 13 mangoes. Therefore, the difference (shortage and excess) could be eradicated by taking 13 mangoes from Ashura to Asha.

On the other hand, 467,230 (42.18%) candidates chose incorrect options. Most of these candidates failed to apply the concept of average. Some candidates subtracted 17 from 43 to get 26 and chose the distractor A "26". The candidates who chose the distractor C "60" added 43 and 17 while those who chose the distractor E "43" simply considered the larger number after comparing the two numbers, 43 and 17. Furthermore, the candidates who chose

distractor D “30” computed average of 43 and 17 correctly, but they did not work out to find the number of mangoes that must be added to Asha so as to have 30 mangoes.

Question 18: Jerry has 208 workers in his industry. If each worker is paid sh 55,460 a day, how much money does Jerry use to pay all his workers in a day?

- A sh 11,435,680 B sh 10,435,680
 C sh 55,252 D sh 55,668
 E sh 11,535,680

The question tested the candidates’ ability to solve word problems related to multiplication. A total of 511,736 (46.19%) candidates chose the correct answer. Thus, the overall performance in this question was good as shown in Table 12.

Table 12: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	96,406	84,532	140,953	257,037	511,736	17,124
Percentage of Candidates	8.70	7.63	12.72	23.20	46.19	1.55

Competent candidates chose the correct answer E “sh 11,535,680” after multiplying sh 55,460 by 208.

The data show further that 578,928 (52.26%) candidates chose the incorrect options. Amongst, some candidates chose either A “11,435,680” or B “10,435,680” indicating failure in multiplication. For example, those who chose distractor B “10,435,680” failed to carry 1 to both hundred thousands and millions. The candidates who chose distractor C “55,252” subtracted 208 from 55,460 while others chose distractor D “55,668” after adding 208 and 55,460. These candidates failed to identify that the appropriate basic operation for the particular word problem is multiplication (neither addition nor subtraction).

Question 19: Five children were asked to find the difference between 998,999 and 819,937 votes. Which among the following is the correct difference of the votes?

- A 1,818,936 B 181,062
C 179,062 D 189,062
E 1,708,936

The question assessed the candidates' ability to solve word problems involving subtraction. The performance of candidates in this question is shown in Table 13.

Table 13: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	132,301	86,037	728,229	95,986	52,188	13,047
Percentage of Candidates	11.94	7.77	65.74	8.66	4.71	1.18

As Table 13 shows, 728,229 (65.74%) candidates chose the correct answer C "179,062". These candidates realized that the term 'difference' implies subtraction of smaller number from greater number. They correctly subtracted 819,937 from 998,999 indicating that they were also knowledgeable and skilful about subtraction with regrouping.

However, 366,512 (33.09%) candidates chose distractors. Most candidates were conversant with the word 'difference' by subtracting 819,937 from 998,999. But, they got incorrect answers, B "181,062" or D "189,062" because they failed to perform subtraction with regrouping. For instance, 189,062 is a result of failure to reduce 1 in ten thousands of 998,999 after taking it to thousands. Some candidates added 819,937 and 998,999 ending up with the distractor A "1,818,936". Furthermore, some candidates had the idea of adding 819,937 and 998,999 however, they failed to perform addition by regrouping and thus chose the distractor E "1,708,936".

Question 20: At Maendeleo primary school there are 480 pupils in Grade Seven. If $\frac{7}{12}$ of the pupils are girls, what is the difference between the number of girls and boys?

- A 280 B 760 C 40
D 80 E 200

The question tested the candidates' competency in performing basic operations on fractions. The performance of candidates in this question was generally weak as 178,378 (16.10%) candidates chose the correct answer D "80". The performance of Candidates in this is summarised in Table 14.

Table 14: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	330,550	159,774	192,983	227,173	178,387	18,921
Percentage of Candidates	29.84	14.42	17.42	20.51	16.10	1.71

Further, 910,480 (82.19%) candidates chose incorrect answers. The candidates who chose distractor A "280" computed the number of girls while those who chose distractor E "200" the computed number of boys. These candidates were supposed to complete the task by calculating the difference of number of boys and girls. Furthermore, some candidates chose the distractor B "760" after determining the number of girls (280) and adding it to the number of pupils (480) ending up with 760. This order of thinking is inappropriate because it doubles the number of girls.

The candidates who chose the correct answer D "80" correctly identified the number of girls (280) after multiplying fraction representing girls $\left(\frac{7}{12}\right)$ by the number of pupils of Grade Seven (480). Then, they subtracted 280 from 480 and got the number of boys, 200. Finally, they subtracted 200 from 280 to get 80 which is the difference of girls and boys.

Question 21: Mr. Majuto distributed 3,600,000 shillings to his three children; Juma, Ally and Rehema. Juma received $\frac{1}{5}$ of the money, Ally got $\frac{4}{9}$ of the money and Rehema received the remaining amount of money. What was the highest amount given among those children?

- A 2,320,000 shillings B 1,280,000 shillings
 C 7,200,000 shillings D 1,600,000 shillings
 E 2,880,000 shillings

This question tested the candidates' ability to solve word problems related to fractions. A total of 1,094,395 (98.8%) candidates responded to this question, of which 268,264 (24.22%) chose a correct answer D "1,600,000". Therefore, performance of the candidates in this question was generally weak as shown in Table 15.

Table 15: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	146,627	246,999	290,201	268,264	134,356	21,341
Percentage of Candidates	13.24	22.30	26.20	24.22	12.13	1.93

As Table 15 shows, 818,183 (73.86%) candidates chose incorrect options. This indicates that the candidates correctly determined the amounts of Juma, Ally and Rehema, but they performed inappropriate operations instead of comparing the amounts. One of the common mistakes was that of adding amount of two children. In particular, the candidates who chose distractor A "2,320,000 shillings" performed addition of the amounts of Juma (720,000 shillings) and Ally (1,600,000 shillings) while those who chose E "2,880,000 shillings" added up the amounts of Ally and Rehema. Some candidates considered only the amount received by Rehema and chose distractor B "1,280,000 shillings". Furthermore, other candidates multiplied 3,600,000 shillings by 2 and got 7,200,000 shillings that led to option C.

On the other hand, competent candidates multiplied $\frac{1}{5}$ and $\frac{4}{9}$ by 3,600,000 shillings and got 720,000 shillings and 1,600,000 shillings as the amounts of Juma and Ally respectively. Then, they subtracted the amounts of Juma and Ally from 3,600,000 shillings and got the amount received by Rehema which is 1,280,000 shillings. Furthermore, these candidates correctly compared the amounts of Juma, Ally and Rehema; and realized that the largest amount was 1,600,000 shillings of option D.

Question 22: Mr. Mahenge has a total of 1,560 cattle whereby 35 percent are calves, 10 percent are bulls and the remaining are cows. How many cows does he have?

- | | | | | | |
|---|-----|---|-----|---|-----|
| A | 858 | B | 156 | C | 546 |
| D | 702 | E | 390 | | |

Candidates' performance in this question was weak because only 254,458 (22.97%) out of 1,084,521 (97.90%) candidates who responded to the question chose the correct answer. Also 23,267 (2.10%) candidates skipped this question as shown in Figure 7.

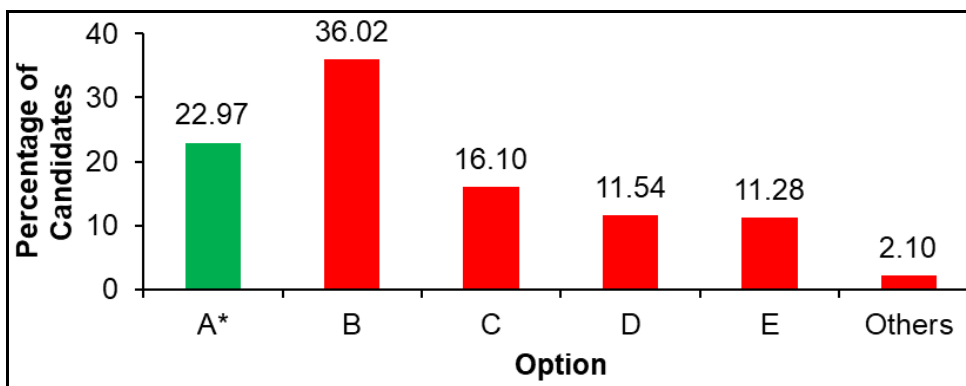


Figure 7: Percentage of Candidates for each Option in Question 22

The question required the candidates to identify the number of calves and that of bulls and subtracting them from given number of cattle so as to get the number of cows. However, most of these candidates worked on number of bulls or calves only. The candidates who chose distractor B “156” considered number of bulls by computing 10 percent of 1,560; those who chose C “546” considered number of calves by computing 35 percent of 1,560; and the candidates who chose D “702” computed the total number of

both bulls and calves. Other candidates chose the distractor E “390” which is the difference of number of calves “546” and that of bulls “156”.

The candidates who chose the correct answer A “858” were competent about the concept of percentages and correctly performed basic operations on numbers. These candidates determined number of calves (546) and bulls (156) by calculating 35 per cent and 10 per cent of 1,560 respectively. Then, they subtracted both 546 and 156 from 1560 and got number of cows, 858.

Question 23: Farida had sh 550,000. She bought 1 television set for sh 162,000, 1 camera for sh 45,700, 1 set of couches for sh 87,900, 1 ring for sh 68,500 and 3 pairs of shoes for sh 20,000 each. How much money did she remain with?

- | | |
|--------------------|--------------------|
| A 424,100 shilings | B 135,900 shilings |
| C 384,100 shilings | D 165,900 shilings |
| E 125,900 shilings | |

This question assessed candidates’ competency in solving word problems involving Tanzanian currency. About 29.47 per cent, equivalent to 326,426 candidates chose the correct answer, E “125,900 shillings”. Hence, the overall performance of candidates in this question was weak as shown in Figure 8.

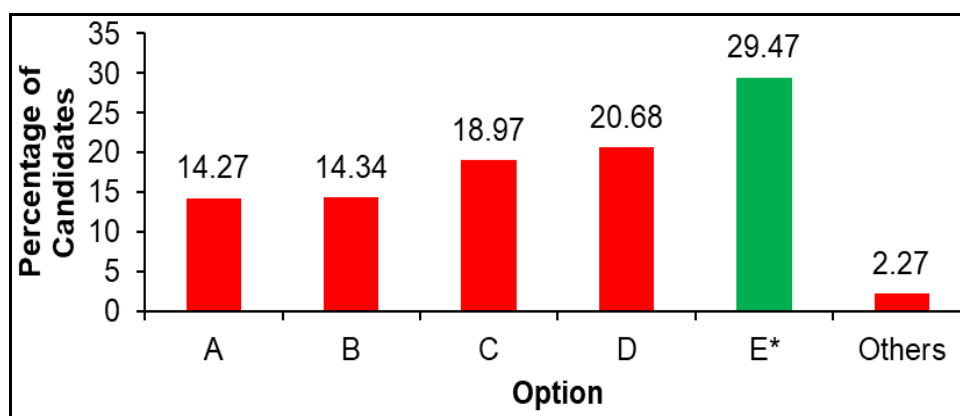


Figure 8: Percentage of Candidates for each Option in Question 23

In this question, a total of 756,232 (68.27%) chose the distractors. The candidates were supposed to calculate the cost of all

expenditures and subtract it from amount owned by Farida. Most candidates assumed that sh 20,000 is the cost of all three pairs of shoes while it was the cost of one pair. With this misinterpretation, the candidates who only considered the amount spent for shopping chose the distractor C “384,100 shillings” while those who worked for the amount that remained with Farida chose the distractor D “165,900 shillings”. Some candidates correctly determined that sh 60,000 is the cost of three pairs of shoes, however they computed the amount spent in shopping instead of the amount remained after shopping resulting to 424,100 shillings given to the distractor A. Furthermore, the candidates who selected the distractor B “135,000 shillings” failed to perform subtraction with regrouping.

On the other hand, competent candidates correctly got the cost of the three pairs of shoes (sh 60,000) after multiplying sh 20,000 by 3. Then, they added up the cost of all commodities and got sh 424,100. Moreover, they subtracted the cost from the amount of Farida (sh 550,000) and selected E “125,900 shillings”, which is the amount that Farida remained with.

Question 24: A baby slept at 7:40 a.m. for seven hours. At what time did he wake up?

- | | | | |
|---|-----------|---|----------|
| A | 2:40 p.m | B | 1:40 p.m |
| C | 11:20 a.m | D | 2:40 a.m |
| E | 11:20 p.m | | |

The question assessed the candidates’ competency in solving word problems involving time. The candidates’ performance in this question was average as shown in Table 16.

Table 16: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	549,624	323,681	104,601	78,447	35,583	15,852
Percentage of Candidates	49.61	29.22	9.44	7.08	3.21	1.43

The candidates who chose the correct answer A “2:40 p.m” correctly added duration of 7 hours to the given time, 7:40 a.m.

More than half (50.39%) of the candidates failed to demonstrate competency in reading and adding time expressed in 12-hours format. Some candidates were not conversant with the difference of duration and time. The candidates who chose distractor C “11:20 a.m” or E “11:20 p.m” misinterpreted 7:40 a.m as the duration of 1 hour and 40 minutes. Therefore, they subtracted 1 hour and 40 minutes from 7 hours and zero minutes. These candidates got 5 hours and 20 minutes which was then interpreted as 5:20 and consequently 11:20 a.m or 11:20 p.m. The candidates who chose distractor B “1:40 p.m” also interpreted the given time in Swahili. Other candidates chose distractor D “2:40 a.m” instead of 2:40 p.m showing lack of knowledge about the periods, a.m and p.m.

Question 25: The Standard Five and Six pupils started playing football at 9:45 a.m. How is that time written in 24 hours system?

- | | | | |
|---|------------|---|-------------|
| A | 2145 hours | B | 0345 hours |
| C | 0945 hours | D | 02145 hours |
| E | 3:45 hours | | |

A total of 1,100,219 (99.32%) candidates attempted this question, of which, 607,318 (54.82%) candidates chose the correct option. Thus, the performance of candidates in this question was average. Table 17 summarises the performance of the candidates in this question.

Table 17: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	178,121	155,687	607,318	57,004	93,124	16,534
Percentage of Candidates	16.08	14.05	54.82	5.15	8.41	1.49

Competent candidates chose the option C “0945 hours”. This implies that the candidates were competent in changing 12-hour format to 24-hour format. These candidates correctly interpreted time and period of 9:45 a.m and therefore, they rewrote it in 24-hour format, 0945 hours.

On the other hand, 483,936 (43.68%) candidates chose the distractors. Some candidates misinterpreted the period of 9:45 a.m as night instead of morning. These candidates chose distractor A

“2145 hours”. Together with this mistake, some candidates were not knowledgeable about structure of 24-hour format as they chose distractor D “02145 hours” whose time is composed of five digits instead of four. Other candidates interpreted the given time in Kiswahili. They chose either B “0345 hours” or E “3:45 hours”.

Question 26: Lusajo visited his sister Chaupele and stayed with her for 840 hours. How many days are equivalent to those hours?

- A 70 B 28 C 120
D 14 E 35

This question tested the candidates in converting units of time. A total of 1,086,909 (90.00%) attempted this question. Amongst, 356,463 (32.18%) candidates chose the correct answer while 730,466 (65.94%) chose the incorrect answers. Therefore, the candidates’ performance was good as shown in Table 18.

Table 18: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	102,796	157,044	221,696	248,910	356,463	20,879
Percentage of Candidates	9.28	14.18	20.01	22.47	32.18	1.88

In this question, the candidates were supposed to divide 840 hours by 24 hours of a day. But, many candidates failed to recall the number of hours in a day. For example, some candidates chose distractor A “70” after dividing the given duration (840 hours) by hours of half a day (12 hours). In addition, the candidates who chose distractor B “28” indicate that they divided 840 by 30 (number of days in a month) while those who chose C “120” divided 840 by 7 (number of days in a week). Furthermore, the candidates who opted for D “14” divided 840 by 60 (number of minutes in an hour).

As Table 18 shows, 356,463 (32.18%) candidates opted for the correct answer E “35”. These candidates were aware of the fact that one day is equivalent to 24 hours. Therefore, they divided 840 hours by 24 hours to get 35 days.

Question 27: Yusufu arrived at school at 8:30 in the morning being late for 30 minutes. At what time was he supposed to arrive at school?

- A 9:00 a.m B 8:30 a.m
C 2:00 p.m D 8:00 a.m
E 8:60 a.m

In this question, 833,277 (75.22%) candidates chose the correct answer indicating good performance. The performance of candidates is presented in Table 19.

Table 19: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	82,927	52,096	53,547	833,277	72,645	13,296
Percentage of Candidates	7.49	4.70	4.83	75.22	6.56	1.20

Competent candidates chose the correct answer D “8:00 a.m” after subtracting 30 minutes from 8:30 a.m.

In spite of good performance, some candidates opted for the distractors A “9.00 a.m” or E “8.60 a.m” after adding 30 minutes to 8:30 a.m. Those who chose distractor B “8:30 a.m” simply rewrote the word “morning” using mathematical language a.m while ignoring the duration of 30 minutes. Other candidates chose distractor C “2:00 p.m” after reading the time in Kiswahili.

Question 28: NMB bank divided the profit to its three customers John, Anna and Suzan. John got sh 30,000, Anna got sh 60,000 and Suzan got sh 90,000. If each customer gave $\frac{1}{3}$ of the profit to the hospital, how much money was sent to the hospital?

- A sh 60,000 B sh 30,000
C sh 40,000 D sh 10,000
E sh 50,000

A total of 1,088,916 (98.30%) attempted this question. The distribution of candidates for each option is shown in Table 20.

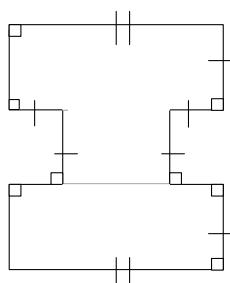
Table 20: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	518,849	215,481	125,847	148,071	80,668	18,872
Percentage of Candidates	46.84	19.45	11.36	13.37	7.28	1.70

As Table 20 shows, the performance of candidates was average. The candidates who opted for the correct choice A “sh 60,000” were knowledgeable about fractions. These candidates correctly calculated one-thirds of sh 30,000, sh 60,000 and sh 90,000 and got sh 10,000, sh 20,000 and sh 30,000 respectively. Then, they summed up the three one-thirds to get sh 60,000.

On the other hand, some candidates computed one-third of one person. In particular, the candidates who chose the distractor B “sh 30,000” and D “sh 10,000” computed one-third of the profits of Suzan and John respectively. Other candidates chose the distractors C “sh 40,000” after computing the sum of one-thirds of profits of John and Suzan while those who chose E “sh 50,000” computed the sum of one-thirds of the profits of Anna and Suzan.

Question 29: A pupil drew the following figure and indicated the lines of symmetry.



How many lines of symmetry did the pupil get?

- | | | | | | |
|---|---|---|---|---|---|
| A | 6 | B | 2 | C | 4 |
| D | 5 | E | 3 | | |

In this question, the candidates were required to identify lines of symmetry for the given figure. The lines of symmetry are the ones that divide a figure into two equal parts. The candidates' performance was generally weak as shown in Table 21.

Table 21: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	300,795	372,534	253,071	93,123	72,407	15,858
Percentage of Candidates	27.15	33.63	22.84	8.41	6.54	1.43

In this question, 719,396 (64.94%) candidates chose the incorrect options. Some of these candidates chose distractor A “6” after counting equal line segments. The candidates who chose distractor C “4” counted the equal figures formed after correctly drawing lines of symmetry. Furthermore, other candidates drew the lines of symmetry incorrectly resulting in either D “5” or E “3”.

Despite the weak performance, 372,534 (33.63%) candidates chose the correct answer. The candidates identified that the figure has two (2) lines of symmetry; therefore, they chose the correct answer which is B “2”.

Question 30: The volume of a cubic water well is 64m^3 . What is the length of one side of the water well?

- A 8 m B 4 m C 16 m
D 32 m E 60 m

The question tested the candidates’ ability to calculate the volume of the cube. The performance of the candidates in this question was weak as shown in Table 22.

Table 22: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	334,651	215,123	200,996	214,016	122,211	20,791
Percentage of Candidates	30.21	19.42	18.14	19.32	11.03	1.88

As Table 22 shows, majority (78.70%) chose the distractors. These candidates applied inappropriate knowledge. For example, the candidates who chose distractor A “8m” applied formula for area of a square $64 = s^2$ and consequently $s = 8$. Some candidates applied the concept of perimeter of a square to get $s = 16$ from the equation $4s = 64$.

Despite the weak performance, 215,125 (19.42%) candidates chose the correct answer, B “4m”. They applied appropriate formula for calculating volume of a cube, $64 \text{ m}^3 = (\text{length})^3$ and consequently, they got the length of one side of the cube to be 4 m.

Question 31: A car tyre has a diameter of 100 centimetres. How many complete rounds will the tyre turn in moving a distance of 471 metres? (Use $\pi = 3.14$).

- | | | | | | |
|---|-----|---|------|---|-------|
| A | 1.5 | B | 4.71 | C | 14.79 |
| D | 150 | E | 75 | | |

This question tested the candidates’ competency of applying skills, reasoning and proof in real life contexts and applying the concepts of shapes and figures to solve problems in different mathematics context. They were required to have knowledge of diameter and circumference of a circle as well as the relationship between metric units. The candidates were required to apply formula to calculate the circumference of a circle whose diameter was given. In this question, 151,375 candidates, equivalent to 13.66 per cent chose the correct answer D “150”, thus, the performance was weak as shown in Figure 9.

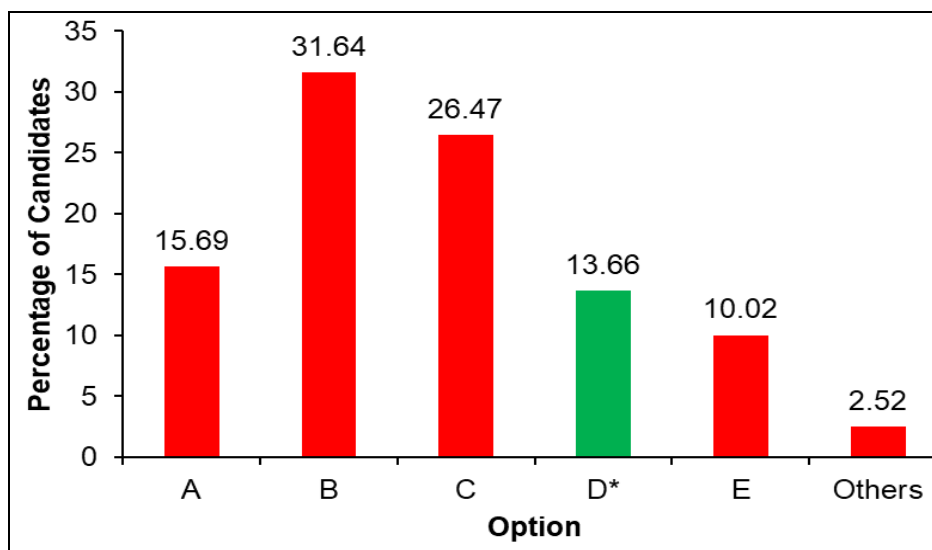


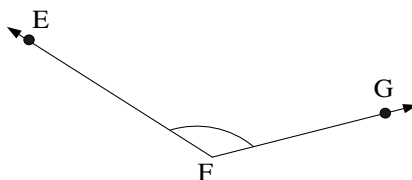
Figure 9: Percentages of Candidates for each Option in Question 31

The data analysis shows that candidates who chose the correct answer D “150” had knowledge of solving word problems in different contexts. Consequently, the candidates identified the diameter of a circle, circumference of a circle and converted correctly the metric units of measurement into either metre or centimetre. The candidates were able to know that, Mathematical operations that were required to be used were multiplication and division. Thus, they calculated as follows:

number of rotation = $\frac{\text{distance}}{\text{circumference}} = \frac{471}{3.14} = 150$ which was the required answer.

On the other hand, the statistics shows that, 928,482 (86.34%) candidates chose the incorrect answers of the question. The candidates who chose distractor A “1.5” calculated the circumference of a circle without converting the metric units, then divided the distance by the circumference of a circle. The candidates who chose distractor B “4.71” divided the distance by diameter of one hundred centimetres without converting to metres. In addition, those who chose the distractor C “14.79” multiplied the distance by π and divided it by the given diameter. The candidates who chose distractor E “75” calculated the circumference by using wrong formula which included 2π instead of $2\pi r$ or πD and divided the distance by the circumference. The candidates who chose distractors A “1.5”, B “4.71”, C “14.79” and E “75” had no knowledge of solving word problems in different mathematical contexts. Moreover, they lacked the concept of converting metric measurements.

Question 32: Angle EFG in the following figure represents one of the angles of the roof of Mr. Nzige’s house.



What type of angle is this?

- | | | | |
|---|----------------|---|--------------|
| A | Acute angle | B | Obtuse angle |
| C | Reflex angle | D | Right angle |
| E | Straight angle | | |

This question assessed candidates’ competency of applying skills, reasoning and proof in real life contexts and applying the concepts of shapes and figures to solve problems in mathematical contexts. Also, this question tested the candidates’ ability to identify the types of angles and their values, to apply knowledge and skills of comparing the values of angles. The statistics shows that 431,888 (39.99%) candidates chose the correct answer B “Obtuse angle”, thus the performance was weak as shown in Table 23.

Table 23: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	269,974	431,888	144,369	90,605	151,150	19,802
Percentage of Candidates	24.37	38.99	13.03	8.18	13.64	1.79

The analysis shows that, the candidates who chose the correct answer B “Obtuse angle” had enough knowledge of identifying the types of angles. They were aware of the fact that, an obtuse angle is larger than an acute angle, whereas an acute angle is smaller than right angle.

The candidates who chose distractors A “Acute angle”; C “Reflex angle”; D “Right angle” and E “Straight angle” had inadequate skills of identifying the types of angles. Moreover, they lacked skills of comparing the values of angles. For example, they did not know that an acute angle is smaller than a right angle; reflex angle is less than full angle but it is larger than a straight angle. A right angle is small

than obtuse angle and it is larger than acute angle; a straight angle is small than reflex angle and it is larger than obtuse angle. These candidates failed to differentiate the characteristics of one angle to another, which led them to choose the incorrect answers.

Question 33: Mwanjaa climbed Mount Kilimanjaro whose height is 5,895 metres above sea level. When she reached the height of 3,955 metres above sea level, she failed to continue due to health problems. How many metres remained to reach the top of the mountain?

- | | | | |
|---|-------|---|-------|
| A | 1,940 | B | 2,140 |
| C | 1,840 | D | 9,850 |
| E | 9,840 | | |

This question tested the candidates' ability to solve problems in different contexts and to apply mathematical operations in solving different problems. The question tested candidates' competency in solving word problems involving subtraction of whole numbers. The candidates were required to subtract operation regarding the place values of the given digits. The statistics shows that 640,644 (57.83%) candidates chose the correct answer hence the performance was average as shown in Table 24.

Table 24: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	640,644	141,191	95,592	159,398	55,896	15,067
Percentage of Candidates	57.83	12.75	8.63	14.39	5.05	1.36

The statistics shows that, the candidates who chose the correct answer A "1,940" were competent in solving word problems involving whole numbers by applying correctly the subtraction operation by carrying.

The candidates who chose distractors B "2,140"; C "1,840"; D "9,850" and E "9,840" lacked arithmetic competency of solving word problems involving subtraction of whole numbers.

The candidates who chose distractor B "2,140" and C "1,840" subtracted wrongly in the hundreds place. The candidates who

chose distractors D “9,850” and E “9,840” added the given numbers contrary to the given instruction.

Question 34: Mama Shamba filled 200.25 litres of palm oil in 267 bottles. What was the capacity of each bottle?

- | | | | |
|---|------------------|---|-----------------|
| A | 1.33 litres | B | 7.5 litres |
| C | 1.33 millilitres | D | 750 millilitres |
| E | 75 millilitres | | |

This question tested candidates’ competency in applying reasoning, proofs and measurement skills in different contexts. Moreover, this question tested candidates’ competency in solving word problems involving metric units of measurement and to identify the relationship between the measurement of litres and millilitres. Also, the question required the candidates to identify mathematical operations of multiplication and division of decimals and whole numbers. The data shows that 187,305 candidates, equivalent to 16.91 per cent chose the correct answer, thus the performance was weak as illustrated in Figure 10.

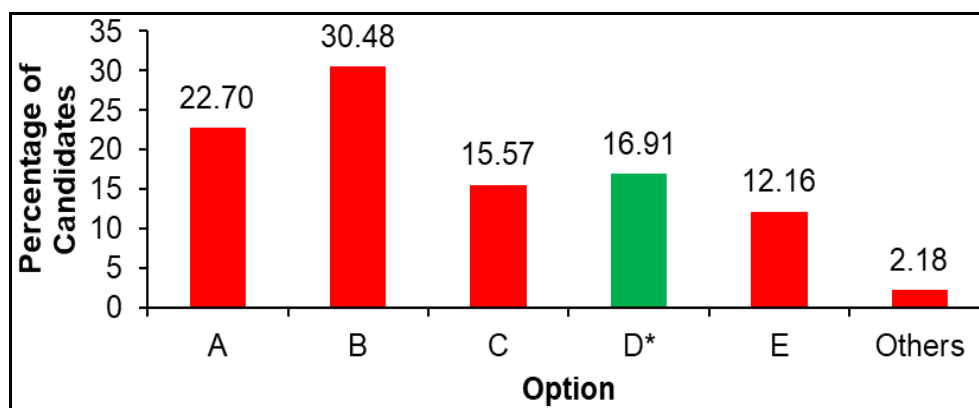


Figure 10: Percentages of Candidates for each Option in Question 34

The analysis shows that, the candidates who chose the correct answer D “750 millilitres” were able to apply measurement skills in different contexts. Moreover, those candidates were competent in solving word problems involving metric units of measurement and identifying the mathematical operation of division and multiplication of whole numbers. They did as follows:

1 litre = 1,000 millilitres,

Thus, 200.25 litres = 200,250 millilitres,

Then they divided 200,250 millilitres by the number of bottles, that is

$$\frac{200,250 \text{ millilitres}}{267 \text{ bottles}} = 750 \text{ millilitres}.$$

However, the candidates who chose distractor A “1.33 litres” divided the number of bottles (267) by 200.25 litres, which was against the requirement of the question. The candidates who chose distractor B “7.5 litres” and E “75 millilitres” committed an error in the conversion of metric units. Moreover, the candidates who chose distractor C 1.33 millilitres divided the number of bottles by 200.25 litres which was an incorrect approach. Those candidates were not able to apply the measurement skills in different contexts. Also, they were not competent in identifying the relation of metric units of measurement and solving word problems involving those metric units.

Question 35: Mpanda travelled a distance of 72 kilometres in 15 minutes. What was his speed in metres per second?

- | | | | |
|---|-----|---|-------|
| A | 80 | B | 480 |
| C | 800 | D | 1,200 |
| E | 20 | | |

This question assessed the candidates’ ability of applying skills, reasoning and proofs in real life contexts and applying metric units of measurement skills in different contexts. In addition, the question required the candidate to apply correct formula in determining the speed. The statistics shows that 311,489 candidates, equivalent to 28.12 per cent, chose the correct answer, hence the performance was weak as shown in Figure 11.

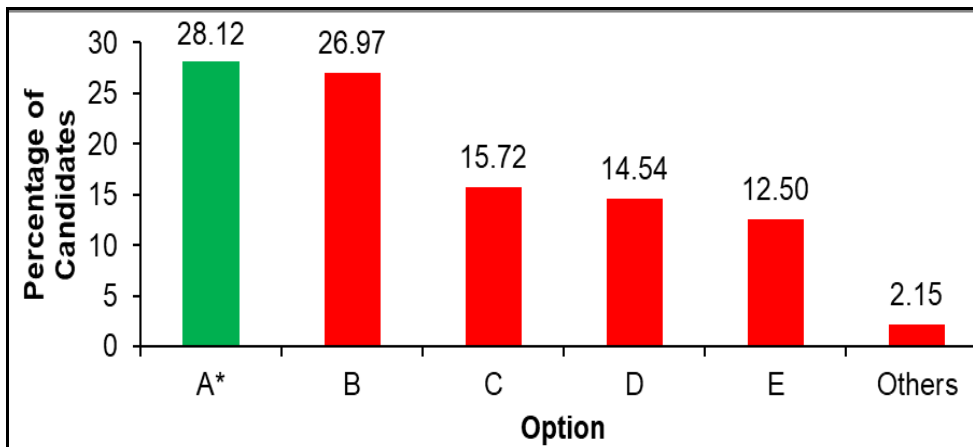


Figure 11: Percentages of Candidates for each Option in Question 35

The statistics shows that, the candidates who chose the correct answer A “80” were competent in applying the formula $\text{speed} = \frac{\text{distance}}{\text{time}}$ for finding the required speed. Firstly, they converted 15 minutes to 900 seconds and finally they performed the calculations as follows:

$$\text{speed} = \frac{72,000 \text{ metres}}{900 \text{ seconds}} = 80 \text{ metres per second.}$$

The candidates who chose distractor B “480” failed to convert kilometres into metres; and minutes into seconds correctly, as a result they got $\text{speed} = \frac{7200 \text{ metres}}{15 \text{ seconds}} = 480 \text{ metres per second.}$

The candidates who chose distractor C “800” made mistakes when converting minutes into seconds, whereby they wrote 15 minutes = 90 seconds, thus they got $\frac{72,000 \text{ metres}}{90 \text{ seconds}} = 800 \text{ metres per second.}$

The candidates who chose distractor D “1,200” were not able to change minutes into seconds correctly. They wrote; 15 minutes = 60 seconds instead of 900 seconds in calculating the speed, thus they got $\frac{72,000 \text{ metres}}{60 \text{ seconds}} = 1,200.$

Furthermore, the candidates who chose distractor E “20” did not use the 15 minutes provided, instead they used the concept of 1 hour by changing it into 360 seconds. Thus, they wrote $\frac{72,000 \text{ metres}}{3600 \text{ seconds}} = 20$.

Question 36: Mr. Chezo was given a task to arrange the medicine bottles with the masses 3,000 mg, 230 cg, 0.5 dg, 0.39 dag and 2.4 g according to their size. As a supervisor of the job, which set shows a correct arrangement?

- A 0.5 dg, 3,000 mg, 230 cg, 0.39 dag and 2.4 g
- B 3,000 mg, 230 cg, 2.4 g, 0.5 dg and 0.39 dag
- C 230 cg, 0.5 dg, 2.4 g, 3,000 mg and 0.39 dag
- D 0.39 dag, 3,000 mg, 2.4 g, 230 cg and 0.5 dg
- E 2.4 g, 0.39 dag, 3,000 mg, 0.5 dg and 230 cg

The question tested the ability of the candidates in applying skills and reasoning in real life contexts. It also tested the ability of candidates in relating the measurements of different units by arranging them in ascending or descending order. The statistics shows that 156,883 (14.16%) of the candidates chose the correct answer, thus the performance of the question was weak as it is illustrated in Figure 12.

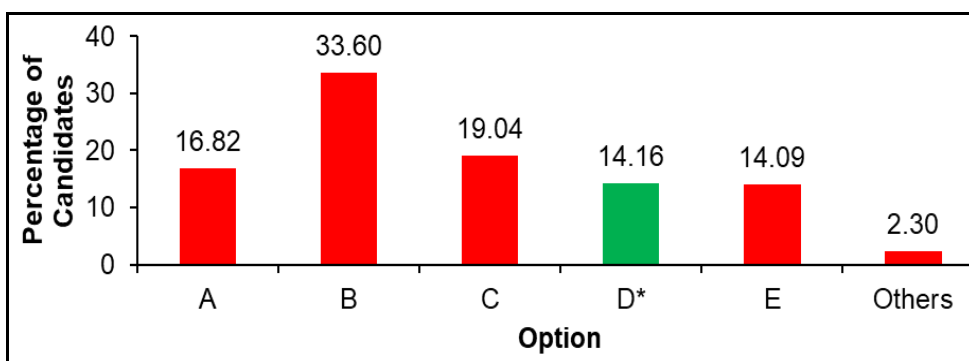


Figure 12: Percentages of Candidates for each Option in Question 36

The statistics show that, the candidates who chose the correct answer D “0.39 dag, 3,000 mg, 2.4 g, 230 cg and 0.5 dg” were able to apply the skills of measurements and techniques of comparing the units to get the correct sequence arranged from the smallest to

largest or vice versa. Those candidates used the following metric table chart during conversion:

kilogram	hectogram	decagram	gram	decigram	centigram	milligram
1	0	0	0	0	0	0
	1	0	0	0	0	0
		1	0	0	0	0
			1	0	0	0
				1	0	0
					1	0
						1

The candidates had adequate skills in converting one unit to another to make them uniform for easy comparison. They were able to use multiplication operation when converting the largest metric units into smallest metric units of length; and division operation when converting the small metric units into large metric units and arranged them as follows; 0.39 dag, 3,000 mg, 2.4 g, 230 cg and 0.5 dg. This method helped them to arrive at the correct answer.

On the other hand, the candidates who chose A “0.5 dg, 3000 mg, 230 cg, 0.39 dag and 2.4 g”; B “3000 mg, 230 cg, 2.4 g, 0.5 dg and 0.39 dag”; C “230 g, 0.5 dg, 2.4 g, 3000 mg and 0.39 dag” or E “2.4 g, 0.39 dag, 3000 mg, 0.5 dg and 230 cg” failed to recognize the correct technique used to convert metric units from the smallest to the largest, a step that could help them to obtain the required answer.

Question 37: Think of a number, then subtract nine from that number. The answer is equal to a quarter of that number. What is that number?

- A 12 B -12 C 33
D 39 E 5

The question tested the candidates' ability in applying the concepts of algebra to solve real life problems by using the correct

mathematical operations. The statistics show that 384,908 (34.75%) candidates opted for the correct answer, thus making the performance weak as it is shown in Figure 13.

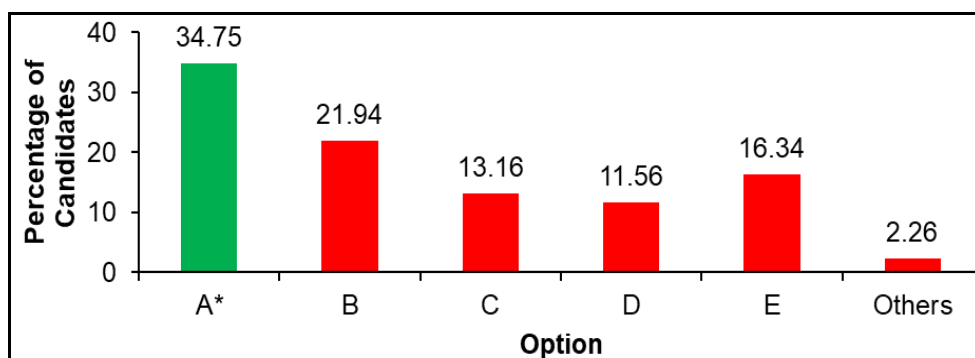


Figure 13: Percentages of Candidates for each Option in Question 37

The candidates who opted for the correct answer A “12” had the ability to solve the given word problem by using the correct operations. Firstly, they were able to form an algebraic equation, $y - 9 = \frac{1}{4}y$ and finally work out for the unknown value y to get 12.

The candidates who opted for incorrect choice B “- 12” formed the incorrect algebraic equation, $y + 9 = \frac{1}{4}y$. They added 9 to y instead of subtracting it. Those candidates added instead of subtracting 9, a situation that led to an incorrect answer. The candidates who chose C “33” subtracted 3 from the whole number 36 instead of dividing by 3. They did as follows: $3y = 36 \Rightarrow y = 36 - 3 \Rightarrow y = 33$.

The candidates who chose distractor D “39” just added instead of dividing by 3. They did as follows: $3y = 36 \Rightarrow y = 36 + 3 \Rightarrow y = 39$.

The candidates who chose distractor E “5” had insufficient knowledge concerning algebra on whole numbers and fractions. They just did as follows: $y + 4 = 9 \Rightarrow y + 4 - 4 = 9 - 4 \Rightarrow y = 5$.

Question 38: Simplify the expression $2(3m - 2n + 5m)$.

- | | | | |
|---|------------|---|--------------|
| A | $11m - 2n$ | B | $12 + m - n$ |
| C | $16m - 4n$ | D | $16m + 4n$ |
| E | $4m - 4n$ | | |

The question tested the candidates' competency in using mathematical language to present ideas or arguments in simplifying the expressions by opening the brackets so as to perform the mathematical operations like: multiplying, adding and subtracting. The statistics show that 382,535 (34.53%) candidates opted for the correct answer C "16m-4n" indicating that the performance was weak as it is seen in Table 25.

Table 25: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	146,266	257,066	382,535	153,791	146,988	21,142
Percentage of Candidates	13.20	23.21	34.53	13.88	13.27	1.91

The candidates who chose the correct answer C "16m-4n" were able to use the skills of algebra in opening the brackets by multiplying all the terms in the brackets by 2, that is $2(3m - 2n + 5m) = 6m - 4n + 10m$ and lastly added the like terms correctly to get 16m-4n.

On the other hand, 146,266 (13.20%) candidates chose distractor A "11m-2n" as they failed to open the brackets correctly by multiplying all the terms in the brackets. They just multiplied the first term (3m) in the bracket by 2 as follows:

$$2(3m - 2n + 5m) = 2 \times 3m - 2n + 5m$$

$$\Rightarrow 6m - 2n + 5m = 6m + 5m - 2n = \underline{11m - 2n}$$

The candidates (23.21%) who chose the incorrect response B "12+m-n" failed to open the brackets, instead they separated the coefficients and variables and lastly multiplied all the coefficients in the brackets by 2. They did as follows:

$$2(3m - 2n + 5m) = 2(3 - 2 + 5 + m - n)$$

$$\Rightarrow 2 \times 3 - 2 \times 2 + 2 \times 5 + 5 + m = 6 - 4 + 10 + m - n$$

$$\Rightarrow 16 - 4 + m - n = \underline{12 + m - n}$$

The candidates (13.88%) who opted for distractor D "16m+4n" added instead of subtracting the terms. They did as follows:

$$2(3m - 2n + 5m) = 2 \times 3m + 2 \times 2n + 2 \times 5m$$

$$\Rightarrow 6m + 4n + 10m = 6m + 10m + 4n = 16m + 4n$$

The candidates (13.27%) who opted for distractor E “4m-4n” just added the like terms in the brackets, then divided them by 2 and lastly subtracted $2n \times 2$ as follows:

$$2(3m - 2n + 5m) = \frac{3m + 5m}{2} - 2n \times 2 \Rightarrow \frac{8m}{2} - 4n = \underline{\underline{4m - 4n}}.$$

The candidates lacked knowledge and skills of formulating and simplifying algebraic expressions from the word problems.

Question 39: Mr. Sawe recorded the sales of his crops in decimals and fraction as follows: Cashewnuts 0.3, rice $\frac{2}{5}$, Maize 0.1 and Millet whose amount was not mentioned. If the crops are presented by using a pie chart, what will be the degree measure representing the Millet sales?

- A 0.2° B 0.8° C 2°
D 144° E 72°

The question tested the candidates' ability in applying statistical skills to present different information in a pie chart by changing fractions and decimals into degrees. In this question, 216,830 (19.57%) of the candidates managed to choose the correct answer, hence the performance was weak. The summary of performance is indicated in Figure 14.

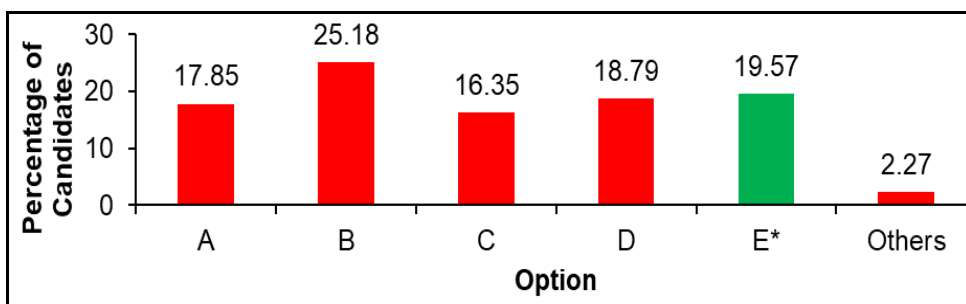


Figure 14: Percentages of Candidates for each Option in Question 39

The analysis of the candidates' responses shows that, the candidates who opted for the correct answer E “ 72° ” were competent in solving problems related to pie charts by first

converting the given fractions and decimals into degrees and later worked out the sum of the degrees of cashew nuts, rice and maize and lastly subtracted their sum from the total number of degrees of a circle to get the degrees of millet. They did as follows:

$$\text{Degrees representing cashew nut} = \frac{3}{10} \times 360^\circ = 108^\circ$$

$$\text{Degrees representing rice} = \frac{2}{5} \times 360^\circ = 144^\circ$$

$$\text{Degrees representing maize} = \frac{1}{10} \times 360^\circ = 36^\circ$$

Thus, the degrees representing millet will be

$$360^\circ - (108^\circ + 144^\circ + 36^\circ) = 360^\circ - 288^\circ = 72^\circ.$$

On the other hand, the analysis of the responses shows that, 78.16 per cent of the candidates chose the incorrect options. The candidates who chose A “0.2°” had no idea of a pie chart, they added the given values and subtracted from 1, that is $0.3+0.4+0.1=0.8$, then $1-0.8=0.2$. Others just subtracted decimals representing cashew nuts from that of maize and indicated the units of degrees, that is $0.3^\circ - 0.1^\circ = \underline{0.2^\circ}$.

The candidates chose distractor B “0.8°” lacked knowledge of the concept of degrees, decimals and fractions. They just added all the given numbers regardless of the required steps as follows:

$$\frac{2}{5} + 0.3^\circ + 0.1^\circ = 0.4^\circ + 0.3^\circ + 0.1^\circ = 0.8.$$

The candidates who chose distractor C “2°” failed to understand the question’s requirement. So they calculated the degrees of rice and millet and later divided their degree as follows:

$$\text{Millet} = 1 - \left(0.3 + \frac{2}{5} + 0.1 \right) = 0.2 \Rightarrow 0.2 \times 360^\circ = 72^\circ. \text{ Then, they divided}$$

the degrees of rice by that of millet, that is, $\frac{144^\circ}{72^\circ} = 2^\circ$.

Others subtracted decimals representing cashew nuts from that of maize and indicated the required units of degrees, but they could not consider the decimal point.

Question 40: Four children shared a certain amount of money as follows: the first child got sh $4x$, the second got sh $2x$, the third got sh $3x$ and the fourth got sh x . If the third child got sh 28,800, what was the total amount of money before sharing?

- A sh 9,600 B sh 96,000 C sh 6,000
D sh 60,000 E sh 240,000

The question tested the ability of the candidates in formulating an algebraic expression and solving equation from the word problems. In this question, 34.32 per cent of the candidates opted for the correct answer B “96,000”, thus the performance was weak as shown in Figure 15.

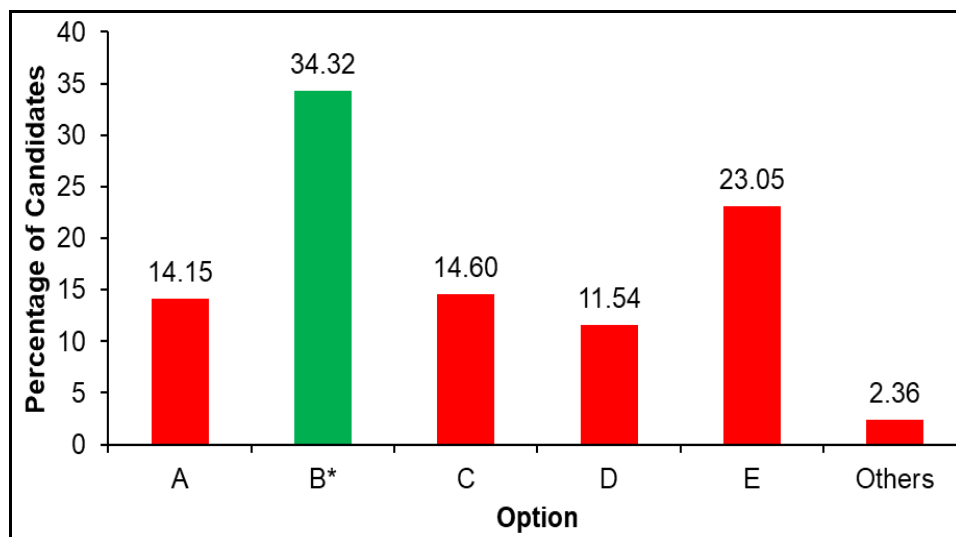


Figure 15: Percentages of Candidates for each Option in Question 40

The analysis of the candidates' responses shows that, the candidates who chose B “96,000” managed to form the expression $4x + 2x + 3x + x$ that represents the total amount of money and solved the equation $3x = 28,800$ to get the value of x which is 9,600. By using the value of x , they were able to work out the total amount correctly, that is $4(9,600) + 2(9,600) + 3(9,600) + 9,600 = 96,000$.

On the other hand, the candidates who opted for distractor A “sh 9600”, calculated the amount of the fourth child, that is $x = 9,600$ instead of calculating the total amount before sharing.

The candidates who chose distractor C “sh 6,000” formed an equation that was not correct that is $16x = 96,000$ and worked it out to get $x = 6,000$. They failed to know that from the expression $4x + 2x + 3x + x$ they were supposed to take the amount of the third child which was 28,000, that is $3x = 28,000$ a step that was important to obtain the value of x .

The candidates who chose distractor D “sh 60,000” formed the incorrect equation, that is $x = \frac{10}{16} \times 96,000$ and those who chose distractor E “sh 240,000” divided the total amount by the number of children and then multiplied by the number of expressions ($10x$), a situation that shows the candidates’ inability to solve word problems in algebra.

2.2 Section B: Short Answer Items

Question 41: A teacher provided an assignment to pupils to list the odd numbers that are also perfect squares between 0 and 50. Which are those numbers?

The question tested the candidates’ competency in applying the concepts of pattern to solve real life problems. It also tested the candidates’ ability in identifying odd numbers that are also perfect squares between 0 and 50. The data analysis shows that, 319,614 candidates equivalent to 28.85 per cent scored 1.0 to 2.0 mark(s), thus making the performance of the question weak. Figure 16 shows the summary of candidates’ performance in this question.

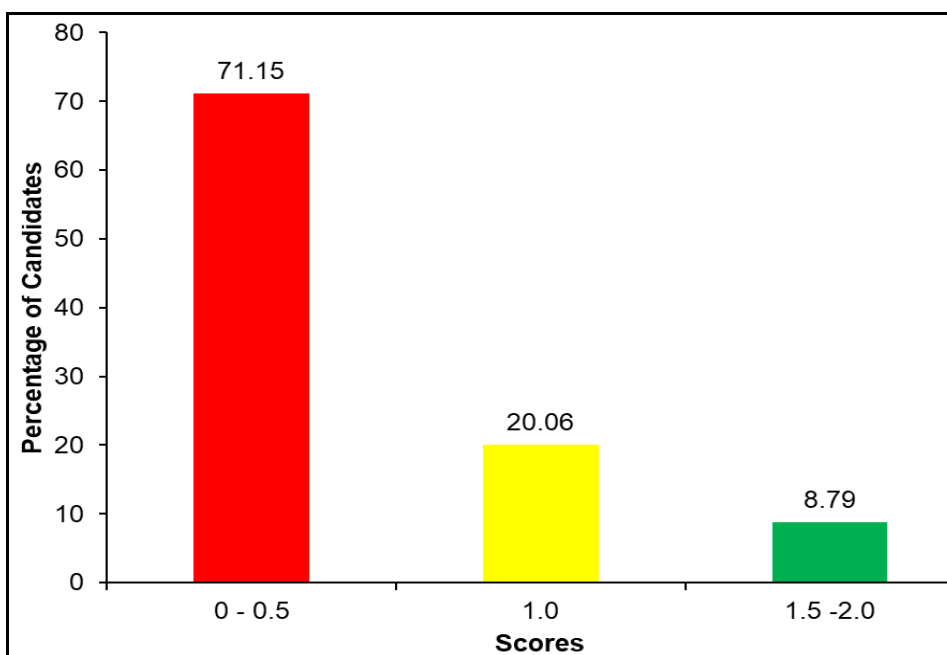


Figure 16: Candidates' Performance in Question 41

The candidates who scored all marks were competent in identifying the requirements of the question and solving it correctly. Those candidates were able to list all odd numbers between 0 and 50 that is 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47 and 49. They had adequate knowledge of numbers that are not exactly divisible by 2 (odd numbers). Then, they sorted out the odd numbers that are also perfect squares, that is 1, 9, 25 and 49. This shows that the candidates had sufficient knowledge of the products obtained by multiplying a number by itself, that is, $1 \times 1 = 1$, $3 \times 3 = 9$, $5 \times 5 = 25$ and $7 \times 7 = 49$ (perfect squares). Extract 41.1 indicates the sample of a correct answer.

QUESTION NO. 41	
Solution	
0 [1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49] 50	
= 1, 9, 25, 49	

Extract 41.1: Sample of a correct answer to question 41.

In Extract 41.1: the candidate showed to have the ability of recognizing the square numbers that are not exactly divisible by two.

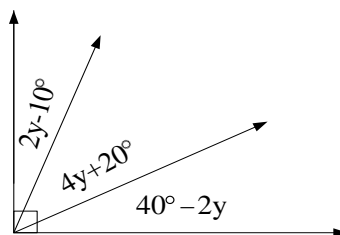
On the other hand, the statistics shows that, 788,174 candidates equivalent to 71.15 per cent scored low marks due to various reasons. Those candidates failed to identify the requirements of the question. Some of those candidates listed the even numbers (numbers which are exactly divisible by 2), thinking that they are the square numbers that are also odd numbers between 0 and 50, that is 2, 4, 6, ..., 50. They failed to distinguish between odd numbers and even numbers. In addition, there were candidates who listed the multiples of ten which are between 0 and 50 that is 10, 20, 30 and 40 thinking that are odd and square numbers. They were not aware that, the listed numbers are even numbers. Also, there are candidates who added the given numbers, that is; $0+50=50$ contrary to the given instructions. Moreover, there were those who listed some numbers which do not qualify to be odd and perfect squares between 0 and 50 for example; 5, 10 and 50. Extract 41.2 indicates the sample of the incorrect response of one of the candidates.

QUESTION NO. 41
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

Extract 41.2: Sample of the incorrect answer to question 41.

In Extract 41.2, the candidate listed the even numbers from 2 to 50 instead of listing the odd numbers that are also perfect squares. The candidate did not know that, the product of two counting numbers is referred to as a multiple of the numbers and not an odd number.

Question 42: A pupil divided a right angle ABC into three angles as shown in the following figure:



Find the value of y .

This question tested the candidates' competency in applying the skills of reasoning and proof in real life situations, including using the concept of shapes and figures to solve different real life problems. Also, the candidates were supposed to have knowledge of the type of angles given and its total degrees. The data analysis shows that, 181,757 candidates equivalent to 16.41 per cent scored 1.0 to 2.0 mark(s). So, the performance was weak. Figure 17 shows the per cent of candidates for each mark.

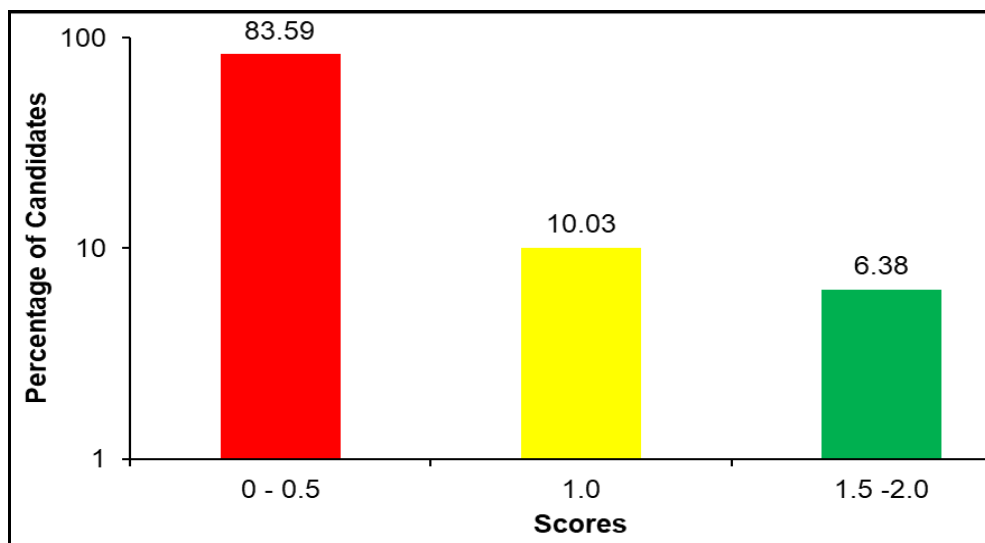


Figure 17: *Candidates' Performance in Question 42*

The candidates who scored all marks had adequate competency in working out with equations involving variables. Those candidates were able to recognize that, a right angle has a total of 90 degrees. Also, they were able to differentiate a right angle from other types of angles such as a straight angle (that has got a total of 180 degrees) and a full angle (with an angle that measures exactly 360 degrees). Later, they formulated an equation $2y - 10^\circ + 4y + 20^\circ + 40^\circ - 2y = 90^\circ$. The candidates solved the equation by adding the terms correctly, a step that enabled them to obtain the correct answer. Extract 42.1 indicates the sample of the correct response.

QUESTION NO. 42 ANGLES

$$\begin{aligned}
 &= 2y - 10 + 4y + 20 + 40 - 2y = 90 \\
 &= 4y + 50 = 90 \\
 &= 4y = 90 - 50 \\
 &= 4y = 40 \\
 &\quad \underline{\quad \quad} \quad \underline{\quad \quad} \\
 &\quad \quad 4 \quad \quad 4
 \end{aligned}$$

$\therefore y = 10^\circ$

Extract 42.1: Sample of the correct answer to question 42.

In Extract 42.1, the candidate showed the competency of recognizing the type of angle given as a right angle with a total of 90 degrees.

On the other hand, the data analysis shows that, 926,031 candidates equivalent to 83.59 per cent scored zero or low mark(s) due to various reasons. The candidates misconceived the concepts of a right angle with a total of 90 degrees instead they wrote the total degrees of a straight angle (180). Some candidates who used a total degree of a full angle (360) thinking that a right angle has a total of 360 degrees. Generally, those candidates lacked knowledge and skills of different types of angles. Extract 42.2 indicates the sample of the incorrect answer from one of the candidates.

QUESTION NO. 42

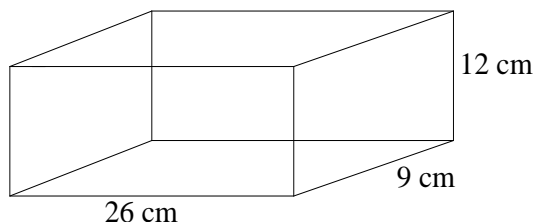
$$\begin{aligned}
 &2y - 10 + 4y + 20 + 40 - 2y = 180 \\
 &2y + 4y + 2y = 180 - 20 + 40 + 10 \\
 &6y + 2y = 230 - 20 \\
 &8y = 210 \\
 &\quad \underline{\quad \quad} \quad \underline{\quad \quad} \\
 &\quad \quad 8 \quad \quad 8
 \end{aligned}$$

$y = 26.25$

Extract 42.2: Sample of the incorrect answer to question 42.

Extract 42.2 shows that, the candidate lacked competency of differentiating the concepts of type of angles and their values, a step that led to getting the incorrect answer.

Question 43: The following figure shows a box for keeping books:



Find its volume.

This question tested the candidates' competency in using the concept of shapes and figures to solve different real life problems. The data analysis shows that, 262,230 candidates equivalent to 13.67 per cent scored 1.0 to 2.0 mark(s). So, the performance was weak. Figure 18 shows a summary of the candidates' performance.

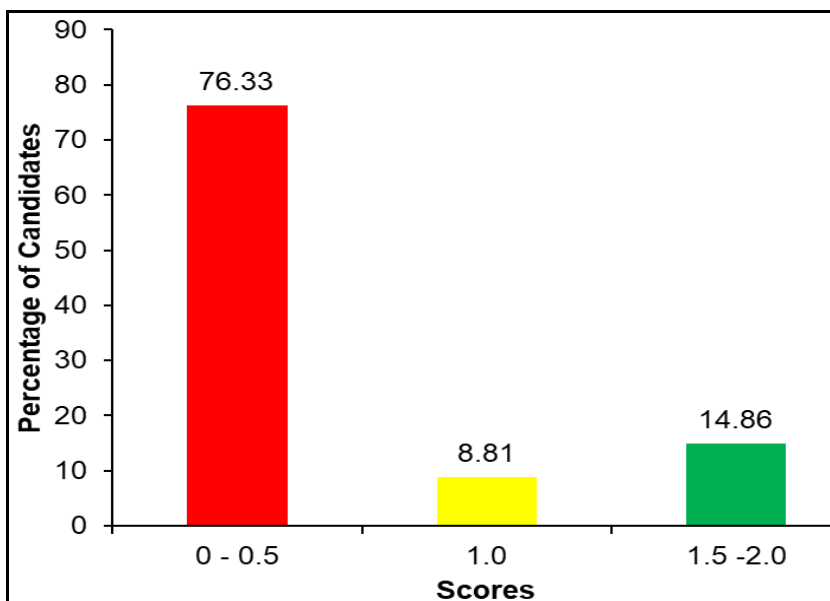


Figure 18: Candidates' Performance in Question 43

Those candidates were competent in finding the volume of the rectangular prism by multiplying correctly its base area by height given, a step that enabled them to get the correct answer. They did as follows:

$$\begin{aligned}
 \text{Volume of rectangular prism} &= \text{Base area} \times \text{height} \\
 &= (\text{length} \times \text{width}) \times \text{height} \\
 &= (26\text{cm} \times 9\text{cm}) \times 12\text{cm} \\
 \text{Volume} &= 2808\text{cm}^3
 \end{aligned}$$

Extract 43.1 shows the sample of the correct answer from one of the candidates.

QUESTION NO. 43

$$\begin{aligned}
 \text{Volume} &= \text{Length} \times \text{Width} \times \text{Height} \\
 &= 26\text{cm} \times 9\text{cm} \times 12\text{cm} \\
 \text{Volume} &= \underline{2808\text{cm}^3}
 \end{aligned}$$

Extract 43.1: Sample of the correct answer to question 43.

In Extract 43.1, the candidate showed the competency in recognizing the box used for keeping books that was a rectangular prism and applied the correct formula in calculating the volume of the box by multiplying the given measurements correctly.

On the other hand, the data analysis shows that, 845,558 candidates equivalent to 76.33 per cent had low marks due to various reasons. The candidates lacked skills of recognizing the question's requirements. For instance, there are those who added the given measurements of the box thinking that it was the volume of the box. Others applied the wrong formula as they found the surface area of the box instead of volume, that is; the surface area is equal to:

$(\text{length} \times \text{width}) \times 2 + (\text{length} \times \text{height}) \times 2 + (\text{width} \times \text{height}) \times 2$ contrary to question's instructions. Extract 43.2 shows the sample of incorrect answer from one of the candidates.

QUESTION NO. 43	
$2(L \times W) + 2(H \times W) + 2(L \times H)$	
$2(26 \times 9) + 2(12 \times 9) + 2(26 \times 12)$	1308cm ³
$(52 \times 9) + (24 \times 9) + (52 \times 12)$	
$468 + 216 + 624 = 1308$	

Extract 43.2: Sample of the incorrect answer to question 43.

Extract 43.2 shows that, the candidate failed to recognize the correct formula of finding the volume of the given box.

Question 44: Mr. Kazimoto and his wife traveled from Mwanza to Singida by bus together with 8 children. The total fare for all of them was 48,000 shillings. If every child paid half the fare of an adult, find the fare for one child.

This question tested the candidates' competency in applying mathematical language to present ideas and using mathematical operations (addition, multiplication, subtraction and division) to solve the given word problem. The data analysis shows that, 28,730 candidates equivalent to 2.59 per cent scored 1.0 to 2.0 marks indicating that the performance was weak. Figure 19 shows the per cent of candidates for each mark.

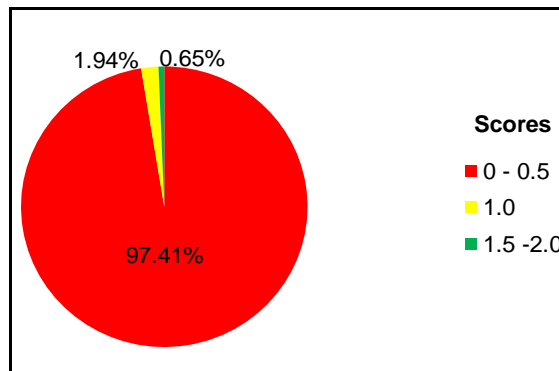


Figure 19: *Candidates' Performance in Question 44*

The candidates who scored all marks had adequate knowledge of the concept of algebraic equations in formulating an equation that led to the correct answer. Those candidates assumed that the fare of adults (Kazimoto and his wife) is $x + x = 2x$, meaning two parents paid the unknown amount ' x ' each. Also, the candidates were able to identify that the fare of a child is half the fare of an adult, then they formulated another term of 8 children's fare that is $\frac{1}{2}x \times 8$ which means 8 children paid $\frac{1}{2}$ of an adult's fare ' x '. The candidates managed to formulate an equation of two terms ($'2x'$ and $\frac{1}{2}x \times 8$) equating to the total amount paid for all people (sh 48,000) in their journey, that is; $2x + \frac{1}{2}x \times 8 = 48,000$. This step helped them to obtain the correct answer. This shows that, the candidates had the ability of solving the equation correctly. Extract 44.1 indicates the sample of the correct answer by one of the candidates.

QUESTION NO. 44		
Adult	Children	Child = $\frac{1}{2} \times 8000/=$
$2x$	$\frac{1}{2} \times 8$	<u>4000 shillings for one child</u>
$2x + 4x = 48,000/=$		
$\frac{6x}{6}$	$\frac{48,000}{6}$	$x = 8,000/=$ For one adult

Extract 44.1: Sample of the correct answer for question 44.

On the other hand, the data analysis shows that, 1,079,058 candidates equivalent to 97.41 per cent scored zero or low mark(s) due to various reasons as follows: the candidates were unaware of the given instructions; there were those who multiplied the total fare by number of children, that is $48,000 \times 8 = 384,000$ thinking that it was the fare paid for a child. Others divided the total fare by the number of children and others divided by the total number of all passengers (Mr. Kazimoto and his family), that is $48,000 \div 8 = 6,000$ and $48,000 \div 10 = 4,800$ respectively. Moreover, others subtracted the number of children from the total amount of fare paid that is; $48,000 - 8 = 47,992$. All these steps led the candidates to get incorrect answers. Extract 44.2 shows an example of an incorrect response from a candidate.

QUESTION NO. 44

$$\begin{array}{r} 6000 \\ 8 \overline{) 48000} \\ \underline{48} \\ 000 \\ \underline{000} \\ 000 \end{array}$$

$$= 6000 \text{ shillings}$$

Extract 44.2: shows that, the candidate lacked the skills of solving the word problem involving algebraic equations.

The question tested the candidates's competence in solving mathematical problems in different situations and ability to use mathematical operations to solve various mathematical problems. The question required the candidates to apply multiplication operation of whole number and decimals. The data analysis shows that, 387,735 candidates equivalent to 35.0 per cent scored 1.0 to 2

marks. Generally, the candidates' performance was weak. Figure 20 summarizes the candidates' performance in this question.

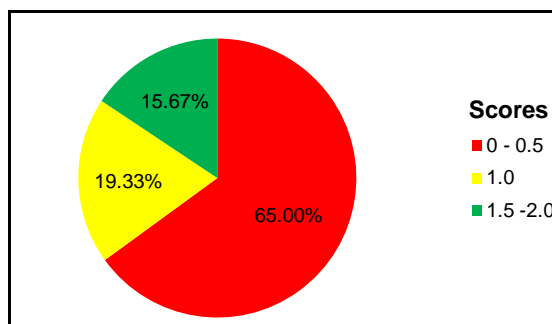


Figure 20: *Candidates' Performance in Question 45*

The candidates who scored all marks showed their competency by multiplying properly the number involving two decimal places by a whole number. Extract 45.1 is a sample of the correct answer from one of the candidates.

QUESTION NO. 45	
$ \begin{array}{r} 44665.35 \\ \times \quad 32 \\ \hline 8933070 \\ 13399605 \\ \hline 1429291.20 \end{array} $	$= 1429291.2 \text{ shillings.}$

Extract 45.1: Sample of the correct answer to question 45.

In the Extract 45.1, the candidate was able to multiply 44,665.35 by 32 correctly by using the appropriate method.

On the other hand, data analysis shows that 720,053 candidates equivalent to 65 per cent scored low marks due to different reasons. There are candidates who subtracted, added, multiplied and divided the amount of fees paid by all pupils thinking that they will get the total amount of fees collected by the school for one year. Extract 45.2 represents the incorrect answer provided by one of the candidates.

In Section B, all questions had weak performance. The analysis of the candidates' performance Competency-wise is shown in Appendix I.

The weak performance in both Sections A and B was contributed by failure of candidates to apply the appropriate techniques for formulating equations from word problems and geometrical figures. They also failed to apply appropriate formulae for finding the volume of a cylinder, to find the area of; triangles, rectangles, prism, parallelogram and cylinder. Similarly, they failed to find the perimeters of Isosceles triangles and the surface area of a rectangular prism, failure to find the volume of a cylinder and inability to change various units.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The analysis shows that the candidates had difficulties in solving the questions from some of the topics due to various reasons.

The candidates' failed to construct equations from word problems by using the formulae for finding the area of triangles, circles, squares, faces of rectangular prisms, volume of cylinder as well as converting various measurements.

Moreover, the candidates failed to read and record the data from the charts or graphs which were provided. Similarly, they failed to recognise how to use the actual values represented by those coordinates so as to respond to the asked question.

Furthermore, the candidates could not recognise the rules, formula and principles which could be used to determine the answer to the given problem.

4.2 Recommendations

In order to improve the candidates' performance in future examinations, teachers are supposed to apply participatory methods in teaching and learning of each competency and

guide the activities to be done by pupils by ensuring that each pupil is competent to:

- (a) apply the formulae correctly in forming and solving equations, circumference/perimeters, areas and volumes in their respective applications in life.
- (b) solve word problems correctly, simplify algebraic expressions and interpret information that is presented in different ways including pie charts and figures.
- (c) use mathematical operations to solve problems in different contexts, including in whole numbers, fractions, decimals and percentages.
- (d) use and show the relation between algebra/statistics/metric units of measurements and real things/objects in solving problems in different contexts.

APPENDIX I

Performance per Competency Examined in PSLE 2021

			Candidates' Performance in each Question		Average Performance %	Remarks
			Question Number	% Performance		
1	Applying Mathematics to solve problems in different contexts	To apply mathematical operations to solve problems	13	44.76	40.39	Average
			15	54.47		
			20	20.51		
			21	24.22		
			45	35.00		
		To apply number relations to solve problems in different contexts	16	26.74		
			23	29.47		
			24	49.61		
			25	54.82		
			26			

			Candidates' Performance in each Question		Average Performance %	Remarks
			Question Number	% Performance		
				32.18		
			27	75.22		
			28	46.84		
2	Using mathematical language to present ideas or arguments	To apply the concepts of numbers to communicate ideas in different contexts	1	25.20	36.82	Weak
			2	39.64		
			3	62.05		
			6	33.46		
			7	34.71		
			14	47.55		
			18	46.19		
			19	65.74		

			Candidates' Performance in each Question		Average Performance %	Remarks
			Question Number	% Performance		
		To apply the concepts of algebra to solve real life problems	33	57.83		
			37	34.75		
			38	34.53		
			40	34.32		
			44	2.60		
		To apply statistical skills to present different information	17	56.59		
			39	19.57		
3	Applying skills of reasoning and proofs in real life contexts	To apply the concepts of patterns to solve real life problems.	5	30.64	30.92	Weak
			8	45.54		
			9	81.48		
			10	10.11		

			Candidates' Performance in each Question		Average Performance %	Remarks
			Question Number	% Performance		
			11	74.91		
			12	76.30		
			22	22.97		
			41	28.90		
		To apply the concepts of shapes and figures to solve different problems	29	33.63		
			30	19.42		
			31	13.66		
			32	38.99		
			42	16.40		
			43	23.70		
		To apply measurements in	4	29.24		

			Candidates' Performance in each Question		Average Performance %	Remarks
			Question Number	% Performance		
		different contexts	34	16.91		life
			35	28.12		
			36	14.16		

