



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



**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT
ON THE PRIMARY SCHOOL LEAVING EXAMINATION
(PSLE) 2022**

MATHEMATICS



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04E MATHEMATICS

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FOREWORD

The Candidates' Response Analysis Report on Primary School Leaving Examination (PSLE) 2022 in Mathematics subject was prepared in order to provide feedback to pupils, teachers and other education 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. Although the individual competencies had weak performance, the overall candidates' performance was average.

The analysis shows that the candidates' poor performance was caused by several factors such as candidates' failure to perform correctly mathematical operations, apply formulae for finding areas, circumference and volume of different figures; and formulate mathematical expressions or equations from word problems as well as converting different metric units of measurements.

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

The Council would like to thank all the examination officers and other experts for their participation in preparing this report.



Dr. Said A. Mohamed
EXECUTIVE SECRETARY

1.0 INTRODUCTION

The Primary School Leaving Examination for Mathematics paper was held on 5th October, 2022. In that sitting, a total of 1,384,186 candidates sat for the paper. The analysis of the examination results shows that 718,273 (59.29%) candidates passed. In 2021, a total of 638,127 (57.63%) candidates passed. Thus, the candidates' performance in PSLE 2022 increased by 1.66 per cent when compared to that of 2021. The comparison of the candidates' performance in each grade for the year 2021 and 2022 is shown in Figure 1.

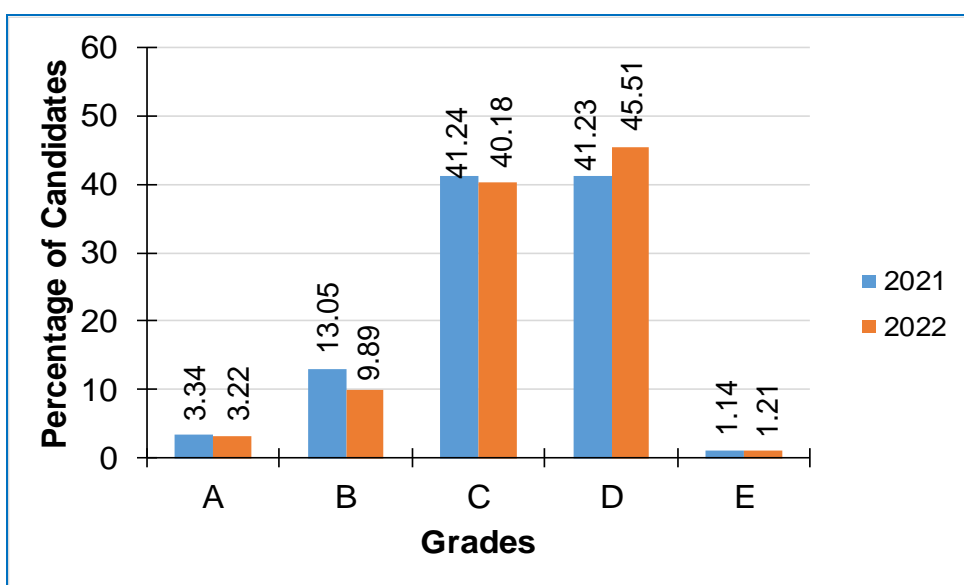


Figure 1: Comparison of the candidates' performance grades for 2021 and 2022 examinations.

The Mathematics subject paper consisted of Sections A and B, with a total of 45 questions. The candidates were required to answer all questions. The questions assessed the competencies of mathematical operations, figures and word problems. Section A had 40 multiple choice questions each carrying 01 mark. The candidates were instructed to answer all questions in both sections. Section B had 5 short answer questions each carrying 02 marks. In Section A, the candidates were required to work out the answer in each question and shade the letter of the correct answer on the Optical Mark Reader (OMR) forms. In Section B, the candidates were

required to work out the answer on 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 per cent is categorised as good performance, 40 - 59 per cent as average performance and 0 - 39 per cent 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 figures are included to illustrate the candidates' performance statistics. In tables and figures, 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 Tables and Figures, the green, yellow and red colours represent good, average and poor performance, respectively.

Finally, the report shows the comparison of candidates' performance per topic in 2021 and 2022, and provides recommendations for the improvement of candidates' performance in future.

2.0 ANALYSIS OF THE CANDIDATES' RESPONSES ON EACH QUESTION

The analysis was done to identify the candidates' strengths and weaknesses in responding to the examination questions. The analysis in Section A which involved multiple choice questions from question, 1 to 40, based on the candidates' competency in working out and choosing the correct option, and the factors which contributed to choosing the distractors. Also, the analysis in this section involves tables which show the number and percentage of candidates for each option that they chose. In Section B, that comprised short answer questions, from question 41 to 45, the analysis shows the reasons for candidates' ability or failure to demonstrate their competencies in the examined concepts. The analysis in this section also shows the sample responses of the

candidates who were able and those who were unable to answer the questions correctly.

2.1 Section A: Multiple Choice Questions

Question 1: What is the place value of underlined digit in the number 504251?

- A Tens
B Thousands
C Hundred thousands
D Hundreds
E Ten thousands.

This question assessed the candidates' competency in the place value of a digit in a number. A total of 1,350,784 candidates attempted this question. The candidates' performance on this question was good because 886,597 (65.64%) candidates chose the correct option 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	80,738	112,047	207,133	50,724	886,597	13,545
Percentage	5.98	8.29	15.33	3.76	65.64	1.00

The analysis shows that, the candidates who chose the correct option E "Ten thousands" had adequate knowledge on identifying the place value of a digit in a number. The candidates were able to identify the value of the digit '0' (underlined) by counting the position of that digit from right to left. By using that method, they found that '0' is the fifth digit in the number 504251 whose place value is ten thousands.

On the other hand, 450,642 (33.39%) candidates chose incorrect options A, B, C and D. The candidates who chose distractors A "Tens" were not aware that the tens place value in the number 504251 is the second digit from right, 5. Among them, there were candidates who wrongly counted the place value of the underlined digit from the left to the right hand side instead of counting from the right to the left. The candidates who chose distractors B, C and D failed to correctly count the place value of the digits of the given number. Those candidates lacked knowledge of identifying the place value of digits of a number.

Question 2: The following table shows the sales of petrol in litres for five days of a week. Which day has the highest number of litres of petrol sold?

Days	Monday	Tuesday	Wednesday	Thursday	Friday
Litres	XLII	LXIX	XLIX	LXIV	XLIX

- A Monday B Tuesday C Wednesday
D Thursday E Friday

The question tested the candidates' competency on reading Roman numbers. A total of 1,350,784 attempted this question. The candidates' performance on this question was good since 953,934 (70.62%) candidates opted for the correct option as shown in Table 2.

Table 2: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	63,813	953,934	123,015	110,432	85,974	13,616
Percentage	4.72	70.62	9.11	8.18	6.36	1.01

The analysis of candidates' responses shows that the candidates who chose the correct option B "Tuesday" perceived that, from the list of Roman numbers XLII, LXIX, XLIX, LXIV and XLIX, the largest number is LXIX. The candidates recognized that the highest number of litres of petrol, that is LXIX equivalent to 69, was sold on Tuesday.

On the contrary, the analysis shows that the candidates who opted for distractor A and D lacked knowledge of reading and comparing Roman numbers. Also, the candidates who chose distractors C and E lacked knowledge of place values of L and X, hence they failed to identify the greater number between XLIX and LXIX, which is LXIX.

Question 3: Which of the fractions $\frac{13}{14}$, $\frac{15}{14}$, $\frac{12}{13}$, $\frac{16}{17}$ and $\frac{19}{20}$ is an improper fraction?

- A $\frac{13}{14}$ B $\frac{15}{14}$ C $\frac{12}{13}$
 D $\frac{16}{17}$ E $\frac{19}{20}$

This question assessed the candidates' understanding about the types of fractions. A total of 1,350,784 attempted this question. The candidates' performance on this question was weak since 539,092 (39.91%) candidates chose the correct answer as shown in Table 3.

Table 3: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	123,315	539,092	295,593	113,052	250,851	28,881
Percentage	9.13	39.91	21.88	8.37	18.57	2.14

The analysis of candidates' responses shows that, 782,811 (57.95%) candidates were not familiar with the meaning of improper fractions. So, they chose distractors A, C, D and E which are simple fractions. They were not aware that, a proper fraction is a type of fraction in which the denominator must be greater than the numerator.

On the other hand, candidates who chose the correct option B " $\frac{15}{14}$ " were conversant with the improper fractions. The candidates were aware that, for a fraction to be improper, the numerator must be greater than the denominator.

Question 4: The performance of a Standard Seven pupil in five subjects was as follows: the pupil scored $\frac{14}{25}$ in Mathematics, $\frac{5}{8}$ in Kiswahili, $\frac{1}{2}$ in English Language, $\frac{3}{5}$ in Social Studies and Vocational Skills and $\frac{31}{50}$ in

Civic and Moral Education. Which subject did the pupil score the lowest mark?

- A Mathematics
- B Kiswahili
- C English Language
- D Social Studies and Vocational Skills
- E Civic and Moral Education

This question assessed the candidates' competency on fractions. It tested candidates' ability on comparing sizes of fractions. A total of 1,350,784 candidates attempted this question. The performance on this question was good as 898,311 (66.50%) candidates chose the correct answer. Table 4 indicates the number and percentage of candidates in each option.

Table 4: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	79,924	95,285	898,311	102,176	160,580	14,508
Percentage	5.92	7.05	66.50	7.56	11.89	1.07

The analysis of the candidates' responses reveals that, the candidates who chose the correct option C "English Language" managed to correctly convert $\frac{14}{25}$, $\frac{5}{8}$, $\frac{1}{2}$, $\frac{3}{5}$ and $\frac{31}{50}$ into percentage, that is 56%, 62.5%, 50%, 60% and 62% or decimals, that is 0.56, 0.625, 0.5, 0.6 and 0.62 respectively. Upon the comparison of the magnitude of the percentages or decimals obtained, they realized that the smallest number was 50% or 0.5, which is equivalent to $\frac{1}{2}$, hence they chose the correct option, C.

Although the performance was good, a total of 437,965 (32.42%) candidates opted for distractors A, B, D and E. Those candidates failed to identify the smallest fraction from the given list of fractions.

Question 5: A gas can has a capacity of 10 litres. If 1.5 litres have been used, what fraction of the volume has remained?

- A $\frac{17}{2}$ B $\frac{21}{20}$ C $\frac{17}{20}$
 D $\frac{3}{2}$ E $\frac{3}{20}$

The question assessed the candidates' competency in solving word problems related to whole numbers, fractions and decimals. A total of 1,350,784 candidates attempted this question. The data analysis shows that 339,920 (25.16%) candidates chose the correct answer. Thus, the candidates' performance on this question was weak. The candidates' performance on question 5 is summarized in Table 5.

Table 5: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	202,818	144,023	339,920	406,072	232,142	346,841
Percentage	15.01	10.66	25.16	30.06	17.19	1.91

The analysis of the candidates' response shows that, a total of 985,055 candidates, equivalent to 72.92 per cent, opted for incorrect options. The candidates who chose distractor A converted the given 8.5 litres to fraction instead of expressing 8.5 litres as a part of 10 litres. The candidates who picked distractor B performed a wrong subtraction, that is $10 - 1.5 = 10.5$, then they changed 10.5 into fraction, that is $10.5 = \frac{10.5}{10} = \frac{105}{100} = \frac{21}{20}$. Those candidates lacked

knowledge of subtracting decimals from whole numbers. Those who opted for distractor D converted 1.5 litre to fraction, that is $1.5 = \frac{15}{10} = \frac{3}{2}$. The candidates who opted for distractor E converted

1.5 litre of used gas to fraction, that is $\frac{1.5}{10} = \frac{15}{100} = \frac{3}{20}$ instead of

expressing the remaining volume of gas as a fraction. The candidates did not comply with the requirements of the question.

Nevertheless, the candidates who chose the correct option C “ $\frac{17}{20}$ ” correctly managed to subtract 1.5 litres from 10 litres to obtain 8.5 litres. The candidates then converted 8.5 litres to fraction by writing $\frac{8.5}{10}$ as a fraction and simplifying it to get $\frac{17}{20}$.

Question 6: Upendo gave 0.1 kilograms of sugar to his sister and $\frac{1}{5}$ of it to his aunt. If he was left with 35 kilograms, what was the total number of kilograms that he had before?

A 500 kg B 50 kg C 35.3 kg
D 38 kg E 45 kg

This question assessed the candidates’ ability in converting decimal to fraction or vice versa and its application in solving real life problems. In addition, the question assessed candidates’ ability to apply the given information to form an equation which in this case could be helpful in finding the amount of sugar Upendo possessed before any distribution.

A total of 1,350,784 candidates attempted this question. The analysis of data shows that 368,644 (27.29%) candidates chose the correct answer; thus the question was performed poorly. The summary of candidates’ performance and their options is shown in Table 6.

Table 6: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	141,806	368,644	436,721	176,215	204,205	23,193
Percentage	10.50	27.29	32.33	13.05	15.12	1.72

The analysis of the candidates’ responses shows that the candidates who chose incorrect options lacked knowledge of computing correctly whole numbers, decimals and fractions. For example, the candidates who chose distractor C “35.3 Kg” converted $\frac{1}{5}$ into 0.2 and added the numbers 0.1, 0.2 and 35 to get 35.3. The candidates who chose distractor D “38 Kg”, added the digits without

considering the decimal point, after changing the fraction into decimal, $\frac{1}{5} = 0.2$, that is $0.1 + 0.2 + 35 = 1 + 2 + 35 = 38$. Those who chose distractor A “500 kg” committed mistakes in the mathematical operation by writing $\frac{35}{0.7} \times 10$ and got 500 instead of writing $\frac{35}{0.7} \times \frac{10}{10}$ or $\frac{350}{7}$ and simplifying to obtain 50.

Conversely, the candidates who chose the correct answer B “50 kg” were able to convert 0.1 kg into fraction as $\frac{1}{10}$ kg or convert $\frac{1}{5}$ kg into decimal to get 0.2 kg. Then, they formulated the equation $x - \left(\frac{1}{10}x + \frac{1}{5}x \right) = 35$ or $x - (0.1x + 0.2x) = 35$ and solved it to obtain $x = 50$ kg which was the required total number of kilograms.

Question 7: Mwenge Primary school has a total of 560 pupils, whereby $\frac{5}{8}$ are scout members. If only $\frac{3}{5}$ of the scout members paid the school fee in the school, what is the percentage of all pupils in the school who did not pay the fee?

- | | | | | | |
|---|-------|---|-----|---|-------|
| A | 60% | B | 25% | C | 37.5% |
| D | 62.5% | E | 40% | | |

The question tested the candidates’ ability to apply the concept of whole numbers, fractions and percentages in solving real life problems. A total of 1,350,784 candidates attempted this question. The analysis shows that 207,840 (15.39%) candidates chose the correct answer, hence the performance was weak. Table 7 shows the number and percentage of candidates for each option.

Table 7: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	280,504	389,765	207,917	207,840	236,111	28,647
Percentage	20.77	28.85	15.39	15.39	17.48	2.12

The analysis shows that, 1,114,297 (82.49%) candidates failed to answer this question correctly, as they chose the distractors A, B, C and E. Those candidates did not abide by the demand of the question which required them to find the percentage of pupils who did not pay school fees. The candidates who chose distractor A converted the fraction of scout members who paid the fee into percentage based on the number of scout members, that is $\frac{3}{5} \times 100$ and got 60% instead of considering the number of all pupils. The candidates who opted for distractor B calculated the percentage of scout members who did not pay the fee, that is $\frac{140}{560} \times 100$ and got 25%. Also, the candidates who chose distractor C computed the percentage of the scout members who paid the fee as $\frac{210}{560} \times 100$ and got 37.5%. The candidates who chose distractor E changed the fraction representing the number of pupils who were not scout members into percentage, that is $\frac{2}{5} \times 100 = 40\%$. Generally, the candidates who chose the distractors faced a problem of interpreting the given information in order to understand the demands of the question.

On the other hand, the candidates who chose the correct answer D “15.39%” were able to apply the concept of whole numbers, fractions and percentages to get the number of pupils who did not pay school fee. The candidates were competent in performing the operation of multiplication, that is $\frac{5}{8} \times 560$ to get 350 scout members. Then, they calculated the number of scout members who paid the school fees,

that is $\frac{3}{5} \times 350$ which is equal to 210. Thereafter, they calculated the number of pupils who did not pay the fee, that is $560 - 210 = 350$ and lastly changed 350 into percentage, that is $\frac{350}{560} \times 100 = 62.5\%$ or $100\% - 37.5\% = 62.5\%$.

Question 8: Mpeli was assigned a task to arrange all whole numbers between 22 and 55 that are multiple of 9. Which is the correct order of those numbers if he started with the smallest number?

- A 27, 35, 49, 54 B 27, 42, 51, 54
 C 27, 45, 51, 54 D 27, 36, 45, 54
 E 27, 32, 45, 54.

This question assessed the candidates' competency in identifying the multiples of a number and arranging them in an increasing sequence. A total of 1,350,784 candidates attempted this question. The performance on this question was average because 735,134 (54.42%) candidates chose the correct answer 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	176,416	107,485	132,764	735,134	180,949	18,036
Percentage	13.06	7.96	9.83	54.42	13.40	1.34

The analysis of candidates' responses shows that the candidates who chose the correct answer D "27, 36, 45 and 54" listed all the numbers between 22 and 55 which are 23, 24, 25, ..., up to 54. Lastly, they chose the numbers which are exactly divisible by 9 from the obtained list.

On the other hand, the candidates who chose incorrect options A, B, C and E failed to identify the numbers which are not exactly divisible by 9. For example, the candidates who chose incorrect option A failed to recognize that 35 and 49 are not exactly divisible by 9. Also, the candidates who chose distractors B and C failed to identify that 42 and 51 are not exactly divisible by 9. Those who opted for distractor E were not aware that 32 is not exactly divisible by 9. This

shows that the candidates were incompetent in identifying the multiples of a number.

Question 9: A farmer planted orange trees in six rows according to the following sequence: 90, 81, 72, ____, ____, 45. The orange trees in the fourth and fifth rows did not germinate. What is the total number of orange trees that did not germinate?

- A 141 B 147 C 93
D 87 E 117

This question assessed the candidates' ability to identify the missing number in a sequence in real life problems. A total of 1,350,784 candidates attempted this question. The data analysis shows that; the candidates' performance was average because 753,221 (55.76 %) candidates chose the correct answer 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	89,639	140,490	181,807	160,106	753,221	25,521
Percentage	6.64	10.40	13.46	11.85	55.76	1.89

The analysis shows that, 753,221 (55.76%) candidates chose the correct answer E "117". The candidates managed to identify that the given sequence decreases by 9. So, they identified the number of orange trees in the fourth and fifth rows by calculating $72-9 = 63$ and $63-9 = 54$ respectively, whose sum is 117.

However, 597,614 (44.35%) candidates failed to get the correct answer on this question. Those candidates were unable to identify the common difference of the given sequence, whereby the majority stated the incorrect common difference of 1 instead of 9. For instance, those who chose distractor A thought that the given sequence of numbers decreases by 1. Thus, they wrote the missing consecutive numbers as 71 and 70 and finally found the total which is 141. Also, the candidates who chose distractor B thought that the given sequence involves numbers which are in ascending order. For example, they added 1 to each preceding number, thus they got 73

and 74 which adds up to 147. The candidates who chose distractor C and D had no knowledge about sequence of numbers.

Question 10: Maria asked her brother to help her to re-arrange the numbers XC, IV, LV, CI or VI in a descending order.

Which order is correct?

- A CI, XC, LV, VI, IV B XC, CI, LV, IV, VI
 C CI, XC, VI, IV, LV D XC, LV, CI, IV, VI
 E CI, XC, LV, IV, VI

This question required to assess the candidates' competency on rearranging the Roman numbers in descending order. A total of 1,350,784 candidates attempted this question. According to data analysis, the candidates' performance on this question was good because 849,922 (62.92%) candidates chose the correct answer 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	849,922	159,761	90,564	117,399	115,003	18,135
Percentage	62.92	11.83	6.70	8.69	8.51	1.34

The analysis of the candidates' responses shows that, the candidates who chose the correct answer A "CI, XC, LV, VI, IV" had an adequate understanding of Roman numbers. They had the knowledge that C = 100, L = 50, X = 10, I = 1 and V = 5, so XC, IV, LV, CI and VI are equal to 90, 4, 55, 101 and 6 respectively. Thus, the candidates were able to arrange Roman numbers in descending order.

Contrarily, the candidates who chose the distractors B, C, D and E lacked knowledge of reading the Roman numbers. In most cases, the majority failed to identify the larger number between VI and IV; or CI and XC, which was one of the important steps in determining the correct order of the given numbers.

Question 11: Five pupils were given a task to list the multiples of 6 between 30 and 60. Which list is correct?

- A 36, 48, 54, 56 B 36, 48, 54, 60
 C 36, 42, 54, 60 D 36, 42, 48, 54
 E 36, 40, 42, 48

This question tested the candidates' competency in identifying multiples of numbers. A total of 1,350,784 candidates attempted this question. Therefore, the candidates' performance was average because 728,781 (53.95%) chose the correct option as shown in Table 11.

Table 11: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	124,744	220,552	186,171	728,781	71,959	18,577
Percentage	9.23	16.33	13.78	53.95	5.33	1.38

The analysis of the candidates' responses shows that the candidates who chose the correct option D "36, 42, 48, 54" were able to determine the multiples of 6, that is the numbers that are exactly divisible by 6 existing between 30 and 60. The candidates listed those multiples which are 36, 42, 48, 54 and 60.

On the other hand, 603,426 candidates equivalent to 44.67 per cent chose incorrect options. The candidates were not aware of the multiples of 6, thus, they failed to recognize the numbers that are not exactly divisible by 6 that were included in the distractors A, B, C and E. For example, those who chose distractors A and E did not understand that 56 and 40 are not the multiples of 6 because 56 and 40 give the remainder of 2 and 4 respectively when they are divided by 6. Also, the candidates who chose distractors B and C did not understand that 60 is a factor of 6 but it is not included in the required list of multiples between 30 and 60. Those candidates did not adhere to the requirements of the question.

Question 12: Five pupils listed the first three common multiples of 4 and 6 between 10 and 40. Which list is correct?

- | | | | |
|---|------------|---|------------|
| A | 16, 24, 36 | B | 12, 24, 36 |
| C | 12, 18, 36 | D | 16, 28, 36 |
| E | 12, 30, 36 | | |

This question tested candidates' understanding on the concept of multiples of a number. A total of 1,350,784 candidates attempted this question. The data analysis shows that 611,374 (45.26%) candidates opted for the correct answer. This shows that the

candidates had an average performance on this question. The number of candidates and their responses are shown in Table 12.

Table 12: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	248,862	611,374	232,842	142,159	93,309	22,238
Percentage	18.42	45.26	17.24	10.52	6.91	1.65

The analysis of the candidates' responses shows that the candidates who opted for correct answer B "12, 24, 36" were aware that the common multiples of sets of numbers are the multiples which are shared by each set of numbers. The candidates listed the multiples of 4 between 10 and 40 which are 12, 16, 24, 28, 32 and 36. Also, they listed the multiples of 6 between 10 and 40 which are 12, 18, 24, 30 and 36. Lastly, they identified the common multiples which are 12, 24 and 36 from the lists obtained.

On the contrary, 717,172 (53.09%) candidates incorrectly responded to this question. The candidates who chose distractor A did not realize that 16 is not a factor of 6 while those who chose distractor C were unable to identify that 18 is not a factor of 4. Also, the candidates who chose distractor D failed to identify that 28 is not a factor of 6 and those who chose distractor E did not recognize that 30 is not a factor of 4.

Question 13: Dotto has a total of sh 1,200,000. If $\frac{2}{3}$ of Dotto's money is equal to $\frac{1}{2}$ of the amount of Kulwa's money, how much money does a person with the bigger amount have?

- | | | | |
|---|--------------|---|--------------|
| A | sh 800,000 | B | sh 600,000 |
| C | sh 400,000 | D | sh 1,600,000 |
| E | sh 1,200,000 | | |

This question tested the candidates' ability to solve word problems involving currency. A total of 1,350,784 candidates attempted this question. The analysis shows that 388,272 (28.74%) candidates opted for the correct answer as shown in Table 13. Thus, the candidates' performance on this question was weak.

Table 13: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	357,285	202,029	157,991	388,272	220,798	24,409
Percentage	26.45	14.96	11.70	28.74	16.35	1.81

The analysis shows that, 938,103 (69.45%) candidates opted for incorrect option A, B, C and E. The candidates who chose distractor A attempted to calculate $\frac{2}{3}$ of Dotto's total amount money (sh 1,200,000) and obtained sh 800,000, which is a half of the total money. The candidates who chose distractor B calculated $\frac{1}{2}$ of total amount of Dottos' money (sh 1,200,000) and got sh 600,000. The candidates who chose distractor C calculated $\frac{1}{2}$ of two thirds of the amount of Dotto's money (sh 800,000) instead of multiplying that amount by 2. The candidates who opted for distractor E did not understand the requirements of the question, hence they regarded the given Dotto's money (sh 1,200,000) as the required answer.

However, 388,272 (28.74%) candidates answered the question correctly. Those candidates who chose the correct answer D "sh 1,600,000" managed to calculate $\frac{2}{3}$ of the amount of Dotto's money (sh 1,200,000) that is $\frac{2}{3} \times 1,200,000$ and got sh 800,000. Then, they realized that the obtained amount (sh 800,000) is half of the Kulwa's amount of money, hence they formulated and solved the equation $\frac{1}{2}x = 800,000$ and obtained sh 1,600,000 which is the amount of Kulwa's money. Lastly, they realized that Kulwa was the one who got the larger amount of money than others.

Question 14: In a certain national park, there is a total of 2,400,000 animals. If 0.3 of the animals are lions,

0.4 are antelopes, 0.2 are giraffes and 0.1 are elephants, what is the difference between the group with largest number of animals and the group with smallest number of animals?

- A 720,000 B 240,000 C 1,200,000
 D 480,000 E 960,000

The question assessed the candidates' ability to solve word problems involving decimals. A total of 1,350,784 candidates attempted this question. The analysis shows that, 301,748 (22.34%) candidates opted for the correct option as shown in Table 14. Thus, the performance on this question was weak.

Table 14: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	301,748	398,154	312,313	151,172	157,933	29,464
Percentage	22.34	29.48	23.12	11.19	11.69	2.18

The 1,019,572 (75.48%) candidates chose the incorrect options. Those candidates did not consider the requirements of the questions in which they were supposed to find the difference between the group with the largest number of animals and the group with the smallest number of animals. Instead, they calculated the number of animals in one of the groups. For instance, the candidate who opted for distractor B calculated the number of elephants. The candidate who chose distractor C calculated the sum of the largest number of animals and the smallest number of animals, that is, $960,000 + 240,000 = 1,200,000$. The candidates who chose distractor D calculated the number of giraffes while those who opted for distractor E calculated the number of antelopes. This indicates that the candidates did not adhere to the requirements of the question.

On the other hand, candidates who opted for correct option A "720,000" correctly calculated the difference between the group with largest number of animals and the group with smallest number of animals. The candidates calculated the number of animals of each group as follows;

$0.3 \times 2400,000 = 720,000$ which is the number of lions,

$0.4 \times 2400,000 = 960,000$ which is the number of antelopes,

$0.2 \times 2400,000 = 480,000$ which is the number of giraffes and

$0.1 \times 2400,000 = 240,000$ which is the number of elephants.

Then, they realized that the group with the largest number of animals is antelopes (960,000) and the group with smallest number of animals is elephants (240,000). Finally, they calculated the difference between the number of antelopes and elephants (960,000 – 240,000) and got 720,000.

Question 15: The weight of Zuhura is 70.5 kilograms and that of Hamis is 68.15 kilograms. What is the total of their weights?

- A 2.35 kg B 148.65 kg C 138.65 kg
D 1.35 kg E 138.2 kg

This question assessed the candidates' competency to add metric units of mass. A total of 1,350,784 candidates attempted this question. The analysis shows that 971,236 (71.90%) candidates chose the correct answer. This reveals that the candidates' performance on this question was good. Table 15 shows the summary of performance of candidates on this question.

Table 15: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	67,948	122,469	971,236	54,380	121,420	13,331
Percentage	5.03	9.07	71.90	4.03	8.99	0.99

According to analysis of responses, the candidates who chose the correct answer C “138.65 kg” managed to calculate the total mass as follows;

$$\begin{array}{r} 70.50 \\ 68.15 \\ \hline 138.65 \end{array}$$

This shows that the candidates competently added a number with one decimal place to a number with two decimal places correctly.

On the other hand, the candidates who chose the distractors lacked skills on addition. For instance, the candidates who chose distractor A calculated the difference between the mass of Zuhura and that of

distractors D and E made mistakes when adding the given number of oranges. For instance, those who chose distractor D, added the digits in the hundreds place without adding 1 which they carried over from the sum obtained in the tens place. Likewise, those who chose distractor E did not carry the required hundred thousands.

Question 17: A total of 834,223 cars were imported in the year 2020 from Japan and other countries. If 436,756 cars were imported from Japan, how many cars were imported from other countries?

- A 1,270,979 B 1,260,979 C 397,467
 D 4,085,757 E 402,533

This question assessed candidates' ability to subtract whole numbers. A total of 1,350,784 candidates attempted this question. The analysis of the candidates' response shows that 724,753 (53.65%) candidates chose the correct option, showing that the performance on the question was average as it is shown in Table 17.

Table 17: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	380,641	99,147	724,753	60,714	70,049	15,480
Percentage	28.18	7.34	53.65	4.49	5.19	1.15

The candidates who chose the correct answer C “397,467” were competent on subtracting whole numbers by borrowing. The candidates calculated the difference between 436,756 cars which were imported from Japan and 834,223 available cars and got 397,467 cars which were imported from other countries.

However, 610,551 (45.20%) candidates opted for incorrect options. The candidates who chose distractors A and B lacked knowledge of solving word problems related to the subtraction of numbers; as a result, they calculated the sum instead of the difference. For example, those who chose distractor B calculated the sum of 834,223 and 436,756 and obtained 1,270,979. The candidates who chose distractor E lacked the skills of performing subtraction by borrowing. In most cases, they subtracted every small digit from the corresponding large digit contrary to the requirements of the

question. The candidates who chose distractor D lacked knowledge and skills of performing the addition and subtraction of numbers.

Question 18: A dairy farm produces 254,567 litres of milk per day. How many litres of milk will be produced for 43 days?

- A 10,947,381 litres B 10,846,381 litres
 C 254,524 litres D 254,610 litres
 E 10,946,381 litres

The question tested the candidates' competency in solving word problems involving the multiplication of metric units of volume. A total of 1,350,784 candidates attempted this question. Therefore the candidates' performance was average because 575,047 (42.57%) candidates chose the correct option 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	154,923	208,996	156,489	234,916	575,047	20,413
Percentage	11.47	15.47	11.59	17.39	42.57	1.51

The analysis shows that, the candidates who chose the correct answer E "10,946,381 litres" calculated the product of 254,223 litres of milk produced per day and 43 days of milk production and obtained 10,946,381 litres of milk.

On the other hand, the candidates who chose distractors A and B lacked knowledge of multiplying numbers involving addition with carrying. For example, those who chose distractor A performed wrong addition in the thousands place by adding 2 instead of 1 they carried from the hundreds place. The candidates calculated as follows;

$$\begin{array}{r}
 \\
 \\
 \times \\
 \hline
 1 \ 0 \ 1 \ 8 \ 2 \ 6 \ 8 \\
 + \\
 \hline
 1 \ 0 \ 9 \ 4 \ 7 \ 3 \ 8 \ 1
 \end{array}$$

The candidates who chose distractor C subtracted 43 days of milk production from 254,567 litres of milk produced per day and

obtained 254,524 litres instead of multiplying so as to get the number of litres produced for 43 days. The candidates who chose distractor D calculated the sum of 254,567 litres of milk produced per day and 43 days of production and got 254,610 litres.

Question 19: Tatu got 5,500 shillings from her business. If she used $\frac{2}{5}$ of it to buy fruits, how much money did she remain with?

- A sh 2,200 B sh 7,700 C sh 3,300
 D sh 1,100 E sh 4,400

The question assessed the candidates' competency in solving word problems related to multiplication of fractions by whole numbers. A total of 1,350,784 candidates attempted this question. Therefore, the candidates' performance was weak because 387,674 (28.70%) candidates chose the correct answer as shown in Table 19.

Table 19: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
Number of Candidates	387,791	164,246	387,674	174,515	213,688	22,870
Percentage	28.71	12.16	28.70	12.92	15.82	1.69

The analysis shows that, 940,240 (69.61%) candidates opted for incorrect options. The candidates who chose distractor A calculated the amount of money that was used to buy fruits by simplifying $\frac{2}{5} \times \text{sh } 5,500$ that gave sh 2,200. The candidates who chose distractor B determined the sum of the amount of money she had (sh 5,500) and the amount used to buy fruits (sh 2,200) and obtained sh 7,700.

Also, the candidates who opted for distractor D subtracted the amount of money used to buy fruits (sh 2,200) from the amount of money remaining after buying fruits (sh 3,300) to get sh 1,100. The candidates who chose option E lacked the skills of solving word problems involving multiplication of fractions by whole numbers.

In contrast, the candidates who chose the correct answer C "3,300" were competent in multiplication of fraction by whole numbers. The candidates managed to multiply the fraction representing the amount

requirements of the question while others were incompetent in applying mathematical operations.

Meanwhile, the candidates who chose the correct option D “sh 8,500” calculated the product of the amount of money spent to buy one trouser (sh 12,900) and the number of trousers (sh 12,900×3) and got sh 38,700. Then, they subtracted sh 38,700 from the amount of money available in the account (sh 47,200 – sh 38,700) and got sh 8,500.

Question 21: Amina used $\frac{1}{3}$ of her monthly salary for buying clothes and $\frac{1}{2}$ of the remaining amount for buying food. If she was left with sh 400,000 after that expenditure, what is her monthly salary?
 A sh 2,000,000 B sh 1,600,000
 C sh 1,200,000 D sh 2,400,000
 E sh 2,800,000

This question assessed the candidates’ competency in solving word problems related to fractions and whole numbers. A total of 1,350,784 candidates attempted this question. The analysis shows that 290,272 candidates, equivalent to 21.49 per cent, chose the correct answer, thus the performance was 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	250,399	261,460	290,272	328,123	195,375	25,155
Percentage	18.54	19.36	21.49	24.29	14.46	1.86

The analysis shows that, 1,035,357 (76.65%) candidates chose distractors A, B, D and E. The candidates who chose distractor A calculated the sum of $\frac{1}{2}$ and $\frac{1}{3}$ and got $\frac{5}{6}$ which is the fraction of the amount of money spent on clothes and food. Then, they subtracted $\frac{5}{6}$ from 1 to get $\frac{1}{6}$. Secondly, they formulated and solved

the equation $\frac{1}{6}x = 400,000$ and obtained the value “x” which is sh 2,400,000. Thirdly, they determined the difference between the amount of money left (sh 400,000) and the amount they calculated (sh 2,400,000) and got sh 200,000. The candidates who chose distractor B calculated the sum of Amina’s salary (sh 1,200,000) and the remaining amount of money (sh 400,000) and got sh 1,600,000. The candidates who opted for distractor D used the remaining fraction which is $\frac{1}{6}$ and amount of money left after expenses (sh 400,000) to formulate and solve the equation $\frac{1}{6}x = 400,000$ and obtain the value of “x” which is sh 2,400,000. The candidates who chose distractor E solved the obtained equation which is $\frac{1}{6}x = 400,000$ and got 2,400,000; then they added the remaining amount of money (sh 400,000) to obtain sh 2,800,000.

On the other hand, the candidates who chose the correct answer C “sh 1,200,000” were able to formulate and solve mathematical equation to obtain Amina’s monthly salary. These candidates computed the remaining fraction of the remaining salary after buying clothes by simplifying $1 - \frac{1}{3}$ that gave $\frac{2}{3}$. Then, the candidates were competent to calculate $\frac{1}{2}$ of $\frac{2}{3}$ by simplifying $\frac{1}{2} \times \frac{2}{3}$ that gave $\frac{1}{3}$. Lastly, the candidates realized that the remaining amount of money (sh 400,000) is $\frac{1}{3}$ of the whole salary. Thus, they formulated the equation $\frac{1}{3}x = 400,000$ and calculated the value of ‘x’ and obtained sh 1,200,000 which is Aminas’ monthly salary.

$\frac{3}{4}(2x+450)=x+450$ and got “ $x = 225$ ” which is the number of boys.

Question 23: Zaina used 4,800 shillings to send a telegram of 63 words. If 30 words were charged 50 shillings per word, how much money was charged for the remaining 33 words?

- A 3,300 shillings B 100 shillings
 C 1,500 shillings D 1,650 shillings
 E 110 shillings

This question tested the candidates’ competency on currency. A total of 1,350,784 candidates attempted this question. The analysis shows that 323,560 (23.95%) candidates chose the correct answer. Thus, the performance on this question 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	323,560	249,093	234,654	353,394	161,492	28,591
Percentage	23.95	18.44	17.37	26.16	11.96	2.12

The analysis show that, 998,633 (73.93%) candidates chose the distractors B, C, D and E. The candidates who chose distractor B divided the charge 3,300 shillings by the remaining 33 words and got 100 shillings. The candidates who chose distractor C calculated the product of 30 words by the charge of 50 shillings per word, hence they got 1,500 shillings. Those candidates were not aware that 1,500 shillings is the charge of the initial 30 words and not the charge of remaining 33 words. The candidates who opted for distractor D calculated the product of the remaining 33 words and the charge of 50 shillings per word and hence got 1,650 shillings. However, the candidates who chose distractor E divided the charge of the remaining 33 words (3,300 shillings) by the first 30 words and hence got 110 shillings.

On the other hand, the candidates who chose the correct answer A “3,300 shillings” were competent in calculating the cost of sending a telegram. The candidates calculated the product of 30 words and the charge of 50 shillings per word to get 1,500 shillings. Then, the

Question 25: How many years and months are there in 92 months?

- A 8 years 0 months B 9 years 2 months
- C 7 years 2 months D 9 years 8 months
- E 7 years 8 months

This question measured the candidates' competency in determining the relationship of measurements of time. A total of 1,350,784 candidates attempted this question. The analysis of data shows that 495,247 (36.66%) candidates chose the correct option, indicating that the performance was weak as shown in Table 25.

Table 25: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	140,052	252,581	220,700	215,126	495,247	27,078
Percentage	10.37	18.70	16.34	15.93	36.66	2.00

The analysis reveals that 828,459 (61.33%) candidates chose incorrect options. The candidates failed to realize that, one year has 12 months. As a result, they divided 92 months by numbers other than 12. For example, the candidates who chose incorrect option B divided 92 months by 10 months instead of 12, as a result they got 9 years and 2 months.

On the other hand, the candidates who chose the correct answer E "7 years 8 months" were aware of the fact that 12 months are equivalent to 1 year. The candidates divided the given 92 months by 12 months and got 7 years and 8 months.

Question 26: Jamali takes 50 days to prepare a vegetable garden. How can that period be written in weeks and days?

- A 7 weeks and 1 day B 4 weeks and 2 days
- C 8 weeks and 2 days D 7 weeks and 0 day
- E 1 week and 20 days

The question assessed the candidates' competency in solving word problems related to metric units of time. A total of 1,350,784 candidates attempted this question. The analysis shows that 610,308 (45.18%) candidates opted for the correct answer to this question, making the performance average as it is seen in Table 26.

Table 26: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	610,308	215,788	228,445	110,004	165,017	21,222
Percentage	45.18	15.98	16.91	8.14	12.22	1.57

The analysis shows that the candidates who opted for the correct option A “7 weeks and 1 day” were aware that, one week is equal to 7 days. So, they divided the given 50 days by 7 and got 7 weeks and 1 day.

However, a total of 719,254 candidates, equivalent to 53.25 per cent, chose the distractors B, C, D and E. The candidates failed to realize that, one week is equal to 7 days. As a result, they divided 50 days by numbers other than 7. For example, the candidates who chose distractor B divided 50 days by 12 and got 4 weeks and 2 days. The selection of distractors was an indication that the candidates were incompetent in relating days and weeks.

Question 27: What is the sum of the following amounts of money:
sh 5,707 ct 35, sh 2,983 ct 80 and sh 1,245 ct 40?
A sh 9,935 ct 55 B sh 9,935 ct 45
C sh 9,935 ct 65 D sh 9,936 ct 15
E sh 9,936 ct 55

The question tested the candidates’ ability to add Tanzanian currency. A total of 1,350,784 candidates attempted this question. The analysis shows that 525,326 (38.89%) of the candidates managed to opt for the correct answer, making the performance of the candidates weak as it is shown in Table 27.

Table 27: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	291,345	147,744	211,534	152,616	525,326	22,219
Percentage	21.57	10.94	15.66	11.30	38.89	1.64

The analysis of answers shows that, 803,239 (59.46%) candidates chose distractors A, B, C and D due to incorrect use of addition mathematical operation and the concept of carrying. For instance, the candidates who chose distractor A reduced 100 cents (equivalent to 1 shilling) from 155 cents but did not add it to the total

amount obtained in the shillings' column. As a result, they got 9,935 shillings and 55 cents. The candidates who chose distractor B committed mistakes when adding shillings or cents and got 145 instead of 155. Also, they did not carry sh 1 obtained from adding cents. Likewise, the candidates who chose distractor D, incorrectly added the cents.

On the other hand, the candidates who opted for the correct answer E "sh 9,936 ct 55" were able to add the amounts of money given to get the correct answer, that is,

$$\begin{array}{r}
 \text{shillings} \quad \text{cents} \\
 5,707 \quad 35 \\
 2,983 \quad 80 \\
 + \quad 1,245 \quad 40 \\
 \hline
 9,936 \quad 55
 \end{array}$$

The candidates were able to recall that 1 shilling is equivalent to 100 cents. In the column of cents, they got a total amount of 155 cents, out of which they wrote 55 cents and then converted 100 cents to 1 shilling and added it to the total amount obtained in the shillings' column and got 9,936 shillings.

Question 28: Mwajuma deposited 564,000 shillings in a bank which provides an interest rate of $5\frac{1}{2}\%$ per year.

What interest did she get after 6 months?

- A 31,020 shillings B 18,612 shillings
 C 60,040 shillings D 15,510 shillings
 E 186,120 shillings

The question tested the candidates' competency in simple interest. A total of 1,350,784 candidates attempted this question. The analysis shows that 263,700 (19.52%) candidates chose the correct option, thus their performance on this question was weak. Table 28 shows the candidates' performance on this question.

Table 28: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	217,239	264,155	298,663	263,700	284,373	22,654
Percentage	16.08	19.56	22.11	19.52	21.05	1.68

The analysis of the candidates' responses to this question shows that, 1,064,430 (78.80%) candidates chose the distractors due to misinterpretation of the requirements of the question and lack of knowledge of the required formula. For instance, the candidates who opted for distractor A applied the incorrect formula;

Interest = $\frac{\text{Principal} \times \text{Rate}}{100}$, then evaluated $\frac{564000 \times \frac{11}{2}}{100}$ to get

31,020. The candidates who chose distractors B and E did not realize that 6 months are equal to half a year. As a result, they substituted $T = 6$ in the formula instead of $T = \frac{6}{12} = \frac{1}{2}$. Also, the

candidates who chose distractor E divided the product of principal, rate and time by 1,000 instead of 100. Hence, they evaluated

$\frac{564000 \times \frac{11}{2} \times 6}{1000}$ and obtained 18,612. The candidates who chose C

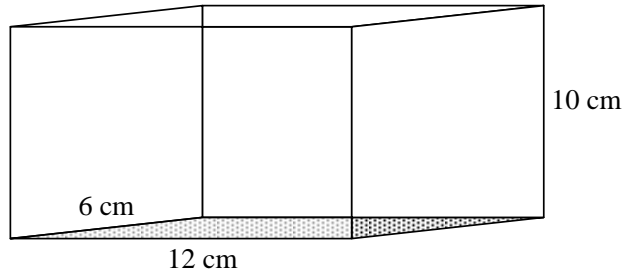
lacked knowledge and skills of solving word problems related to interest.

On the other hand, the candidates who opted for the correct option D "15,510 shillings" realized that, capital, rate and time are sh 564,000, $5\frac{1}{2}\%$ and 6 months respectively. Then, they applied

the formula, Interest = $\frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$, to calculate the

interest by writing, interest = $\frac{564000 \times 5.5 \times \frac{6}{12}}{100}$, and got sh 15,510.

Question 29: The following figure shows a suitcase which is rectangular in shape and closed on all sides.



What is the fraction of the area as part of the whole figure is shown by the shaded part?

- A $\frac{1}{10}$ B $\frac{1}{7}$ C $\frac{1}{6}$
 D $\frac{2}{7}$ E $\frac{5}{21}$

This question assessed candidates' competency in calculating the surface area of a rectangular prism. A total of 1,350,784 candidates attempted this question whereby 236,159 (17.48%) candidates chose the correct answer, thus the candidates' performance on this question was weak as shown in Table 29.

Table 29: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	199,269	236,159	428,561	251,051	211,095	24,649
Percentage	14.75	17.48	31.73	18.59	15.63	1.82

The candidates' responses show that, 1,089,976 (80.69%) candidates chose distractors A, C, D and E due to incorrect interpretation to the requirements of the question. The candidates who chose distractor A calculated the volume of the rectangular prism and got 720 cm^3 and then divided by the area of the shaded part (72 cm^2) and got $\frac{1}{10}$. The candidates who chose distractor C calculated the area of the face whose length is 12 cm and height is 10 cm to get 120 cm^2 . Then, they divided the face area (120 cm^2)

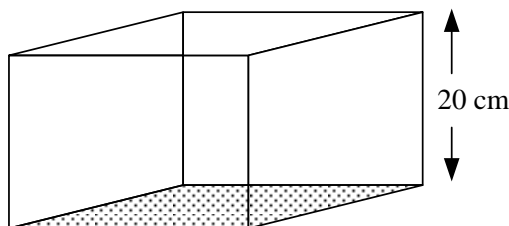
by the volume of the rectangular prism (720 cm^3) and got $\frac{1}{6}$. The candidates who chose distractor D multiplied the area of the shaded part by 2 to get 144 cm^2 and then divided 144 cm^2 by the area of the rectangular prism (504 cm^2) and got $\frac{2}{7}$. The candidates who chose distractor E divided the area of the face whose length is 12 cm and height is 10 cm by the area of the whole figure (504 cm^2) and got $\frac{5}{21}$. The selection of distractors indicates that, the candidates lacked knowledge of finding the area of rectangular prism.

Conversely, the candidates who opted for distractor B " $\frac{1}{7}$ ", were competent in finding the surface area of a rectangular prism. The candidates were aware that, the given rectangular prism has the length of 12 cm, width of 6 cm and height of 10 cm. So, they applied the formula for finding the surface area of the rectangular prism which is,

$$\text{Area} = (\text{length} \times \text{width}) \times 2 + (\text{length} \times \text{height}) \times 2 + (\text{width} \times \text{height}) \times 2$$

and evaluated $(30 \times 20) \times 2 + (30 \times 15) \times 2 + (15 \times 20)$ and got 504 cm^2 . Also, they calculated the area of the shaded region which was $12 \text{ cm} \times 6 \text{ cm} = 72 \text{ cm}^2$. Finally, they divided the area of the shaded part (72 cm^2) by the total surface area (504 cm^2) and got $\frac{1}{7}$ which is the fraction of the area of the whole figure.

Question 30: How many litres of milk are needed to fill the following cuboid container if 1litre = 1,000 cm³?



- A 8.0 B 80 C 800
D 0.8 E 2.4

The question assessed the candidates' competency in finding the volume of a cube. A total of 1,350,784 candidates attempted this question. The analysis shows that 193,871 candidates, equivalent to 14.35 per cent chose the correct answer, thus the candidates' performance was weak as shown in Table 30.

Table 30: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	193,871	391,805	378,140	189,047	171,,455	26,466
Percentage	14.35	29.01	27.99	14.00	12.69	1.96

The analysis shows that 1,130,447 (83.69%) candidates chose distractors B, C, D and E. The candidates who chose distractors B, C, D and E were not aware that 1 litre is equal to 1,000 cm³. Thus, they divided the obtained volume by numbers other than 1,000. For example, the candidates who chose distractors B divided 8,000 cm³ by 100 and got 80 litres. Those who chose distractors C divided 8,000 cm³ by 10 and those who chose distractors D divided 8000 cm³ by 10,000. The candidates who chose distractors E calculated the area of the cube by evaluating 20 cm × 20 cm × 6 that gave 240 cm². Lastly, they divided 240 cm² by 1,000 cm³ to get 2.4 litres.

On the other hand, competent candidates chose the correct option A "8.0". The candidates applied the correct formula volume=length x length x length to calculate the volume of the cuboid by simplifying

20 cm x 20 cm x 20 cm that gave $8,000 \text{ cm}^3$. Lastly, they divided $8,000 \text{ cm}^3$ by $1,000 \text{ cm}^3$ and got 8 litres.

Question 31: Juma cultivated 200 square metres of his farm which has a length of 20 metres and width of 14 metres. How many square metres were not cultivated in that farm?

- A 166 m^2 B 234 m^2 C 80 m^2
 D 280 m^2 E 480 m^2

This question assessed candidates' competency in the concept of area of rectangles. A total of 1,350,784 candidates attempted this question. The analysis shows that 411,271 (30.45%) candidates chose the correct answer, thus the candidates' performance on this question was weak as shown in Table 31.

Table 31: Number and Percentage of Candidates in each Option

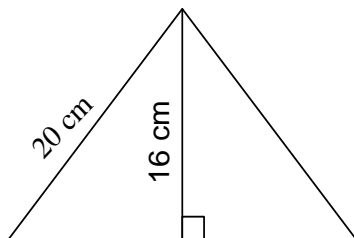
Option	A	B	C*	D	E	Others
Number of Candidates	212,018	311,837	411,271	253,268	141,157	21,233
Percentage	15.70	23.09	30.45	18.75	10.45	1.57

The analysis shows that 918,280 (67.98%) candidates were unable to answer this question correctly, so they opted for distractor A, B, D and E due to misinterpretation of the requirements of the question. For instance, the candidates who chose distractors A calculated the sum of the given length (20 m) and width (14 m) to get 34 m. Thereafter, they subtracted 34 m from the cultivated area of the farm (200 m^2) and got 166 m^2 . The candidates who chose distractors B calculated the sum of the cultivated area (200 m^2), length (20 m) and width (14 m) to get 234 m^2 . The candidates who opted for distractors D calculated the area of the whole farm by multiplying 20 m by 14 m and got 280 m^2 contrary to the demands of the question. The candidates who chose distractors E calculated the sum of the area of the whole farm (280 m^2) and the cultivated area in that farm (200 m^2) and got 480 m^2 .

Conversely, the candidates who chose the correct option C " 80 m^2 " correctly calculated the area of the whole farm by multiplying 20 m by 14 m to get 280 m^2 . Thereafter, they calculated the difference

between the area of the whole farm (280 m^2) and the area of the cultivated farm (200 m^2) and got 80 m^2 . Therefore, they concluded that 80 m^2 of the farm were not cultivated.

Question 32: The following figure shows an isosceles triangular nursery for tomatoes. If the perimeter of the nursery is 64 cm , find its area.



- A 100 cm^2 B 192 cm^2 C 56 cm^2
 D 320 cm^2 E 384 cm^2

The question assessed candidates' ability to calculate the area and perimeter of a triangle. A total of 1,350,784 candidates attempted this question. The analysis shows that 327,294 (24.23%) candidates chose the correct answer, thus the candidates' performance on this question was weak as shown in Table 32.

Table 32: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	190,101	327,294	287,114	383,588	137,059	25,628
Percentage	14.07	24.23	21.26	28.40	10.15	1.90

The analysis shows that, 997,862 (69.71%) candidates opted for distractors A, C, D and E. The candidates lacked knowledge on calculating the area of isosceles triangle by using the given perimeter. For instance, the candidates who opted for distractor A calculated the sum of all the numbers given in the question ($64 + 20 + 16$) and got 100. The candidates who opted for distractor C calculated the sum of the lengths of the hypotenuse and the base by writing $20 + 20 + 16$ that gave 56. The candidates who opted for distractor D calculated the product of hypotenuse and height (20×16) and got 320. The candidates who opted for distractor E calculated the product of the hypotenuse length and height (20×16)

and got 320 and then they evaluated the sum of 320 and 64 and got 384.

On the other hand, the candidates who chose the correct answer B “192 cm²” were competent in calculating the area of a triangle. The candidates recognized that the equal sides of the given triangle have a total length of 40 cm. So, they calculated the base length of the triangle by writing $[64 - (20 + 20)]\text{cm}$ and got 24 cm. By using the height of 16 cm and base of 24 cm, the candidates applied the formula $\text{area} = \frac{1}{2} \times \text{height} \times \text{base}$ to calculate the area of the triangle, and simplified $\frac{1}{2} \times 16 \times 24$ to get 192 cm².

Question 33: A bottle contains 350 ml of water. How many litres do 2 cartons have if each carton has 24 bottles?
 A 1.68 litres B 168 litres C 1,680 litres
 D 16.8 litres E 0.168 litres

The question tested the candidates’ competency metric in units of volume. A total of 1,350,784 candidates attempted this question. The analysis shows that 241,732 (17.90%) candidates chose the correct answer, hence the candidates’ performance on this question was weak as shown in Table 33:

Table 33: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	188,818	361,243	410,592	241,732	122,295	26,104
Percentage	13.98	26.74	30.40	17.90	9.05	1.93

The analysis shows that, 1,082,948 (80.17%) candidates chose distractors A, B, C and E. Those candidates failed to realize the correct relationship between a litre and millilitre. The majority of them divided 350 ml by numbers other than 1,000. For example, the candidates who chose distractor A divided 350 ml by 1,000 and got 0.035 litre and then calculated the product of 0.035 litre and 48 bottles and obtained a total of 1.68 litres. The candidates who chose distractor B divided 350 ml by 100 and got 3.5 litres and then calculated the product of 3.5 litres and 48 bottles and obtained 168

litres. Similarly, the candidates who chose distractor C divided 350 ml by 10 and got 35 litres and then calculated the product of 35 litres and 48 bottles and obtained 1,680 litres. Also, the candidates who chose distractor E divided 350 ml by 100,000 and got 0.0035 litre and then calculated the product of 0.0035 litre and 48 bottles and obtained 0.168 litres.

On the other hand, the candidates who chose the correct answer D “16.8 litres” were aware that, 1 litre is equal to 1,000 millilitres. Thus, they divided 350 ml by 1,000 and got 0.35 litres. Also, the candidates were aware that, if 1 carton has 24 bottles, then 2 cartons will have 48 bottles. So, they calculated the product of 0.35 litres and 48 to get a total of 16.8 litres.

Question 34: Mzedema gave five children 8.06 litres, 80.6 litres, 0.86 litres, 8.6 litres and 0.806 litres of milk and arranged them in ascending order according to the volumes of milk they received. Which amount of milk in litres was given to the third child in that order?
 A 8.06 litres B 80.6 litres C 0.86 litres
 D 8.6 litres E 0.806 litres

This question assessed candidates’ competency in metric units of volumes. A total of 1,350,784 candidates attempted this question. The analysis shows that 248,926 (18.43%) candidates chose the correct answer, thus the candidates’ performances on this question was weak as shown in Table 34.

Table 34: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	248,926	188,427	493,495	225,000	172,675	22,261
Percentage	18.43	13.95	36.53	16.66	12.78	1.65

The analysis shows that 1,079,597 (79.92%) candidates chose distractors B, C, D and E. The majority of candidates failed to identify the size of decimals. For example, the candidates who chose distractor B failed to identify that 80.6 is the highest decimal in the sequence of the given decimals. Therefore, 80.6 litres were not the amount of milk given to the third child. The candidates who chose distractor C failed to identify that 0.86 is the second number in

the sequence of the given decimals. Therefore, 0.86 litres were not the amount of milk given to the third child. Similarly, those who chose distractor D failed to identify that 8.6 is the fourth decimal in the sequence of the given decimals, thus 8.6 litres were not the amount of milk given to the third child. Also, the candidates who chose distractor E failed to identify that 0.806 is the lowest in that arrangement, so 0.806 litres were not the amount of milk given to the third child.

On the other hand, the candidates who chose the correct answer A “8.06 litres” managed to rearrange the given litres of milk in ascending order (0.806 litre, 0.86 litre, 8.06 litres, 8.6 litres and 80.6 litres). Then, they identified that the amount of milk which was given to the third child is 8.06 litres.

Question 35: Damasi has a rope which is 6 km 1 cm long. If Ron’s rope is less than Damasi’s rope by 2 km 8 m 4 cm, find the length of Ron’s rope.

- A 3 km 1 m 7 cm B 3 km 1 m 97 cm
 C 3 km 91 m 97 cm D 3 km 991 m 7 cm
 E 3 km 991 m 97 cm

The question assessed the candidates’ competency in metric units of length. A total of 1,350,784 candidates attempted this question. The analysis shows that 197,898 (14.65%) candidates chose the correct answer, hence the candidates’ performance was weak as shown in Table 35.

Table 35: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
Number of Candidates	383,966	263,164	294,673	180,427	197,898	30,656
Percentage	28.43	19.48	21.81	13.36	14.65	2.27

The analysis shows that, 1,122,230 (83.08%) candidates chose distractors A, B, C and D. Most of the candidates mistakenly changed the given metric units of length when borrowing from the column of metres or kilometres. For example, the candidates who chose distractor A borrowed 1 km from 6 km and mistakenly

changed it to 10 m, which led them to the wrong answer, 3 km 1 m 7 cm.

On the other hand, the candidates who chose the correct answer E “3 km 991 m 97 cm” were competent in using the relationship between the metric units of length, 1 km = 1000 m and 1 m = 100 cm to calculate the difference between 6 km 1 cm and 2 km 8 m 4 cm. First, they borrowed 1 km, which is equal to 1000 m, from 6 km and added it to the column of metres, then borrowed 1 metre and added to 1 cm to get 101 cm. Second, they calculated the difference between 101 cm and 4 cm and got 97 cm. Then, they determined that, in the column of metres, there were 999 m left, so, they subtracted 8 m from 999 m and got 991 m. In the column of kilometres, they realized that there were 5 km left, thus, they subtracted 2 km from 5 km and got 3 km. As a result, they obtained 3 km 991 m 97 cm.

Question 36: Nahodha sailed at a speed of 24 km per hour. What distance did he travel in 2 hours and 30 minutes?

- A 60 km B 3,600 km C 720 km
D 768 km E 48 km

This question assessed the candidates’ competency in solving word problems which are related to speed. A total of 1,350,784 candidates attempted this question. The analysis shows that 367,626 (27.22%) candidates chose the correct answer, thus the candidates’ performance in the question was weak as illustrated on Table 36.

Table 36: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	367,626	216,342	271,592	106,003	361,589	27,632
Percentage	27.22	16.02	20.11	7.85	26.77	2.05

The analysis of the candidates’ responses shows that, 955,526 (70.74%) candidates chose distractors B, C, D and E. The candidates who chose distractor B changed the given time of 2 hours and 30 minutes into 150 minutes. Then, they calculated the product of 150 minutes and the speed of 24 km per hour and got

3,600 km. The candidates who chose distractor C calculated the product of the speed of 24 km per hour and 30 minutes and got 720 km. Other candidates were not conversant with the relation between hours and minutes, as a result, they added 2 hours to 30 minutes and got 32 hours. Then, they calculated the product of 32 hours and the speed of 24 km per hour and got km 768, so they chose distractor D. the candidates who chose distractor E calculated the product of 24 km per hour and 2 and got 48 km.

On the other hand, the candidates who chose the correct answer A “60 km” applied the appropriate formula, Distance = Speed × Time to calculate the distance. Those candidates calculated the product of the speed of 24 km per hour and time ($2\frac{1}{2}$ hours) and obtained the distance of 60 km.

Question 37: Which number is represented by the letter y in the

$$\text{equation } \frac{2}{y} + \frac{3}{y} = \frac{5}{8} ?$$

- A 5 B 8 C 1
D 3 E 2

This question assessed the candidates’ competency in algebra, especially solving linear equations. A total of 1,350,784 candidates attempted this question. The analysis shows that 631,582 (46.76%) candidates opted for the correct answer, thus the candidates’ performance on the question was average as shown in Table 37.

Table 37: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	192,228	631,582	244,142	117,196	142,554	23,082
Percentage	14.23	46.76	18.07	8.68	10.55	1.71

The candidates who opted for the correct answer B “8” managed to correctly add $\frac{2}{y}$ and $\frac{3}{y}$ and got $\frac{2+3}{y}$ which is equal to $\frac{5}{y}$. Then, they equated $\frac{5}{y}$ to $\frac{5}{8}$ and obtained $y = 8$.

On the other hand, 696,120 (51.53%) candidates chose distractors A, C, D and E. Those candidates were unable to perform the addition of fractions with the same denominator. The candidates who opted for distractors A, D and E assigned letter y with one of the numerical values used in the equation $\frac{2}{y} + \frac{3}{y} = \frac{5}{8}$. For example, the candidates who chose distractor A got $y=5$, those who chose distractor D got $y=3$ and those who chose distractor E got $y=2$.

Question 38: If $2n^2 - 128 = 0$, find the value of n.

- A 64 B 8 C 32
D -64 E -32

The question tested the candidates' competency in the concept of squares and square roots of numbers. A total of 1,350,784 candidates attempted this question. The analysis shows that, 357,842 (26.49%) candidates opted for the correct answer, indicating that the candidates' performance was weak as shown in Table 38.

Table 38: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
Number of Candidates	244,179	357,842	269,627	256,030	196,220	26,886
Percentage	18.08	26.49	19.96	18.95	14.53	1.99

The analysis shows that 966,056 (71.52%) candidates chose distractors A, C, D and E. The candidates who chose distractor A "64" calculated the value of n^2 instead of n, hence they wrote $n = 64$. The candidates who chose distractor C interpreted n^2 as $2n$, therefore they calculated the value of n and got $n=32$. The candidates who chose distractor D calculated the value of n^2 . Still, those candidates did not change sign of 128 to positive as they were not aware of the change of negative number (-128) to positive number (+128) when shifted to the other side of the equal sign "=" in the equation. Thus, they divided -128 by 2 and got -64. Similarly, the candidates who chose distractor E divided -128 by 4 and got -32. These mistakes indicate that the candidates lacked competency in solving equations.

However, the candidates who chose the correct option B “8” simplified the equation $2n^2 - 128 = 0$ and got $n^2 = 64$. Then, they calculated the square root of 64 and obtained $n=8$.

Question 39: The average height of nine pupils of Standard Seven is 150 centimetres. If the total height of 4 pupils is 450 centimetres, what will be the average height in centimetres of the remaining five pupils?

- A 1,350 B 900 C 4,500
D 180 E 300

The question assessed candidates’ competency in solving word problems related to statistics. A total of 1,350,784 candidates attempted this question. The analysis shows that 240,322 (17.79%) candidates opted for the correct answer, hence the candidates’ performance was weak as indicated in Table 39.

Table 39: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
Number of Candidates	148,088	351,398	271,506	240,322	310,668	28,802
Percentage	10.96	26.01	20.10	17.79	23.00	2.13

The analysis of the candidates’ responses shows that, 1,081,660 (80.08%) candidates chose distractors A, B, C and E. The candidates who chose distractor A calculated the total height of 9 pupils by finding the product of the average height of nine pupils (150 centimetres) and the number of pupils (9) and got 1,350 centimetres. The candidates who chose distractor B calculated the sum of heights of the remaining five students and got 900 centimetres. The candidates who chose distractor C calculated the product of the total height of four pupils and the number of 9 pupils and got 4,050 centimetres. Then, they added 4,050 centimetres obtained to the sum of the heights of the four pupils (450 centimetres) and got 4,500 centimetres. The candidates who chose distractor E calculated the difference between the total height of four pupils (450 centimetres) and the average height of nine pupils (150 centimetres) and got 300 centimetres.

On the other hand, the candidates who opted for the correct answer D "180" calculated the total height of nine pupils by finding the product of the average height of nine pupils (150 centimetres) and

the number of pupils (9) and obtained 1350 centimetres. After that, the candidates calculated the difference between the total height of nine pupils (1350 centimetres) and the total height of four pupils (450 centimetres) and got 900 centimetres which was the total height of five pupils. Finally, they calculated the average height of five pupils by dividing 900 centimetres by 5 that led to 180 centimetres.

Question 40: The following table shows number of malaria patients who were admitted at Kariko health center for a period of five years consecutively:

Year	Number of Patients
2016	208
2017	150
2018	237
2019	173
2020	127

What is the average number of patients admitted per year?

- A 179 B 192 C 768
D 895 E 237

This question tested the candidates' competency in finding the average. A total of 1,350,784 candidates attempted this question. The analysis shows that 433,708 (32.11%) candidates opted for the correct answer, thus the candidates' performance was weak as shown in Table 40.

Table 40: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
Number of Candidates	433,708	163,882	136,905	384,728	205,956	25,605
Percentage	32.11	12.13	10.14	28.48	15.25	1.89

The analysis shows that 891,471 (66.0%) candidates who chose distractors B, C, D and E committed mistakes in the methods they used. The candidates who chose distractor B calculated the average number of patients admitted from 2016 to 2019 and got 192. The candidates who chose distractor C calculated the number of patients admitted from 2016 to 2019 and got 768. The candidates who chose distractor D calculated the total number of all patients from 2016 to

2020 and got 895. The candidates who chose distractor E wrote the number of patients admitted in 2018, which is 237 which shows that they were incompetent in statistics especially in finding average.

On the other hand, the candidates who chose the correct answer A “179” calculated the total number of all patients and got 895. Then, they divided that total (895) by the number of years (5) and got 179 which is the average number of patients admitted per year.

2.2 Section B: Short Answer Questions

In section B the candidates were required to answer each question by showing clearly the working. The candidates were supposed to answer all questions in this section. The analysis of the responses of the candidates is presented in this section.

Question 41: Mr Nguvumali bought maize seeds for sh 1,600. If the price of 1.75 kg of maize seeds at the market is sh 11,200, what amount of maize seeds did Mr Nguvumali get?

This question tested the candidates’ competency in solving word problems related to direct variation. A total of 1,350,147 candidates attempted this question. The analysis shows that 41,274 candidates equivalent to 3.06 per cent, scored 1.0 to 2.0 mark(s), thus the candidates’ performance on the question was weak. Figure 1 shows the percentage of candidates for each score.

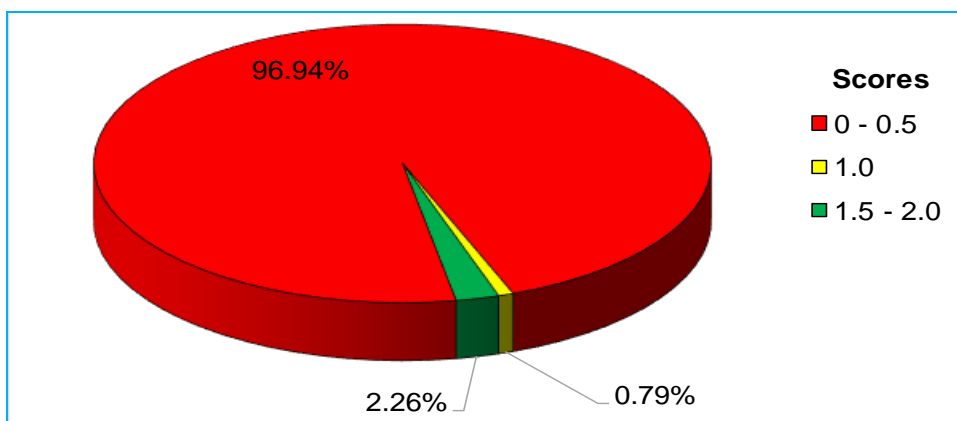


Figure 1: Performance of candidates on question 41.

the data analysis shows that 1,308,873 candidates equivalent to 96.94 per cent scored zero and low mark(s) due to various reasons. Most of the candidates calculated incorrect ratio by dividing the price of 1.75 kilograms which is sh 11,200 by the amount of 1.75 kilograms and got sh 6,400. Then, they divided sh 6,400 by sh 1,600 and got 4 kilograms. Further analysis shows that, some candidates calculated the product of 1.75 kg and sh 1,600 and got sh 28,000 instead of sh 2,800. Then, they divided sh 28,000 by sh 1,600 and got 2.5 kg of maize seeds. There were candidates who calculated the sum of all the numbers given (11,200+1,600+1.75) and got 129.75, contrary to the requirements of the question. This indicates that, they were not competent on ratios. Some candidates wrote the amount of maize seeds given (1.75 kg) as the amount of maize seeds purchased at the price of sh 1,600. Also, there were candidates who calculated the product of the cost used to buy maize seeds (sh 1,600) and the amount of maize seeds (1.75 kg) and got sh 2,800. Extract 41.1 shows a sample response of one of the candidates who failed to answer this question correctly.

QUESTION NO. 41	sol n
11 200	
- 1 600	
9 600	
	9 600 (MILLION)

Extract 41.1: A sample of an incorrect response to question 41.

In Extract 41.1, the candidate calculated the difference between the price of 1.75 kg of corn seeds (sh 11,200) and the amount of money available to buy corn seeds (sh 1,600). The candidate lacked the skills to solve mathematical problems related to direct variation.

On the other hand, the candidates who scored all marks correctly calculated the amount of maize seeds that was bought at a price of sh 1,600, given that the price of 1.75 kilograms is sh 11,200. The candidates divided the amount of 1.75 kilograms by sh 11,200 and got the ratio of $\frac{1}{6,400}$. Then, they calculated the product of the ratio

$\frac{1}{6,400}$ and the price of sh 1,600 and got 0.25 kilograms. Extract

41.2 indicates a sample of a correct response from one of the candidates.

QUESTION NO. 41	$x = \frac{1.75 \text{ kg}}{7} \times \frac{100}{100}$	∴ The amount
$1.75 \text{ kg} = 11200 \text{ sh}$		of maize seed
$x = 1600 \text{ sh}$	$x = \frac{1.75 \text{ kg}}{700}$	s that Mr.
$1200 \text{ sh} \times x = \frac{1.75 \text{ kg} \times 1600 \text{ sh}}{11200 \text{ sh}}$	$x = 0.25 \text{ kg}$	Ngurumali got
$7 \text{ sh} \times x = \frac{1.75 \text{ kg} \times 1 \text{ sh}}{7 \text{ sh}}$	that	is 0.25 kg
		m

Extract 41.2: A sample of a correct response to question 41.

In Extract 41.2, the candidate formulated and solved the equation $11,200x = 1.75 \times 1,600$ and obtained the value of x , which represents the amount of maize seeds that were purchased at a cost of sh 1,600.

Question 42: A school rectangular garden has an area of $9,632\text{m}^2$. If the length of the garden is 112 metres, what will be the perimeter of the whole garden to the nearest hundreds?

The question assessed candidates' competency in calculating the perimeter and area of a rectangle. Also, the question assessed the candidates' ability to round off numbers to the nearest hundreds. A total of 1,350,147 candidates attempted this question. The analysis shows that 66,783 candidates, equivalent to 4.95 per cent scored 1.0 to 2.0 mark(s). So, the candidates' performance was weak. Figure 2 shows the percentage of candidates for each mark.

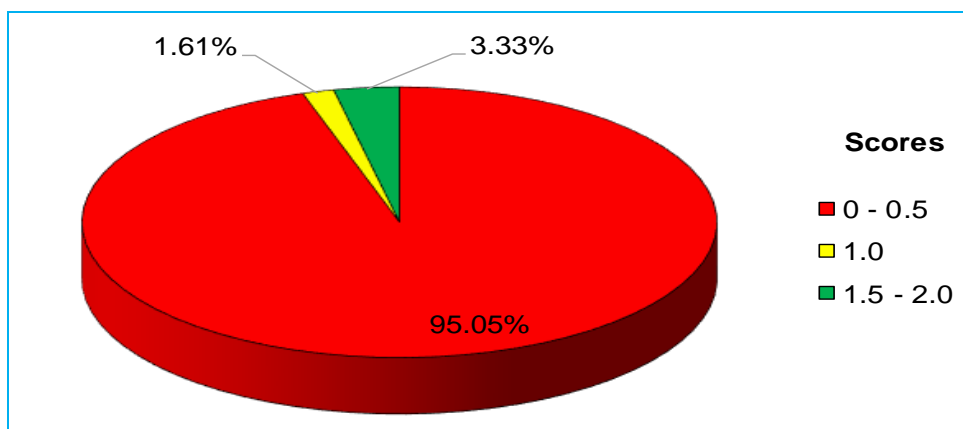


Figure 2: Performance of candidates on question 42.

The analysis shows that 1,283,364 (95.05%) candidates got low marks due to various reasons. In calculating the width of the rectangle, the candidates used incorrect formulae like $\text{area} = (\text{length} + \text{width}) \times 2$. The candidates were not aware that the formula $\text{area} = (\text{length} + \text{width}) \times 2$ is used to calculate the perimeter and not the area. Others used the incorrect formula $\text{Perimeter} = \text{length} \times \text{width} \times 2$ to evaluate $112 \times 86 \times 2$, and hence got an incorrect perimeter of the rectangle. Likewise, there were candidates who determined the product of the area ($9,632 \text{ m}^2$) and the length (112 m) of the given rectangle and got the wrong answer.

Also, some candidates calculated the perimeter by adding the length (112 m) and width (86 m) and got wrong answer (198 m). However, there were candidates who calculated the perimeter by finding the difference between the area of the rectangle ($9,632 \text{ m}^2$) and its length (112 m), which was not the correct approach to calculate the perimeter. Extract 42.1 shows an incorrect answer of one of the candidates who failed to answer this question correctly.

QUESTION NO. 42	JDLN	
AREA = 9632 cm ²	9632	1078784
LENGTH = 112 METRE	$\times 112$	= <u>1079000</u>
	19264	
	+ 9632	
	9632	

Extract 42.1: A sample of an incorrect response to question 42.

Extract 42:1 shows that the candidate was not competent to recognize the correct formula for finding the area and perimeter of a rectangle.

On the other hand, the candidates who scored all marks managed to apply the formula $\text{area} = \text{length} \times \text{width}$ to calculate the width of the rectangular garden whose area was $9,632 \text{ m}^2$ and width was 112 m.

Thus, they divided 9,632 square meters by 112 meters and obtained the width of the garden which is 86 meters. Finally, they looked for the perimeter by using the formula $\text{perimeter} = (\text{length} + \text{width}) \times 2$ to calculate $(112 + 86) \times 2$ and obtain 396 meters. Finally, they approximated 396 metres to the nearest hundreds and got 400

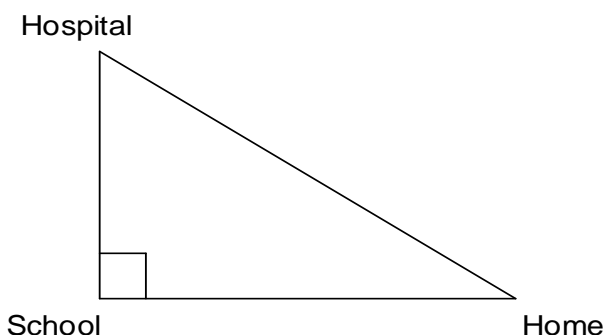
metres. Extract 42.2 represents the correct answer from one of the candidates.

QUESTION NO. 42			
$A = 9632 \text{ m}^2$ 112m	w	Area = 9632 m^2 $9632 \text{ m}^2 = 112 \times w$ $w = 9632 \div 112$ $w = 86 \text{ m}$	Length = 112m Width = 86m Perimeter = $2(L + w)$ Perimeter = $2(112 + 86)$ Perimeter = $396 = 400 \text{ m}$
$A = \text{Length} \times \text{Width}$ $A = 9632 \text{ m}^2$			\therefore The perimeter of the whole garden to the nearest hundreds will be 400 metres

Extract 42.2: A sample of correct answer to question 42.

In Extract 42.2 the candidate applied the correct formula to calculate the perimeter of a rectangle and finally approximated the answer to the nearest hundreds.

Question 43: Bahati walked at a distance of 400 metres from home to school and then she walked at a distance of 300 metres from school to hospital as shown in the following figure.



How long did she walk from hospital to home through the short route?

This question tested the candidates' competency in applying the Pythagoras theorem. A total of 1,350,147 candidates attempted this question. The analysis shows that 152,177 candidates, equivalent to 11.27 per cent scored 1.0 to 2.0 mark(s). So, the candidates' performance was weak. Figure 3 shows the percentage of candidates for each mark.

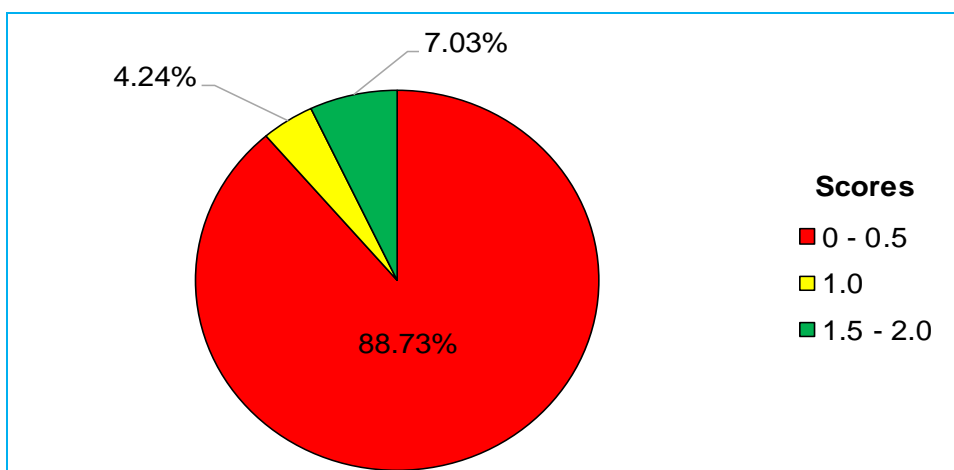


Figure 3: Performance of candidates on question 43.

The analysis shows that 88.73 per cent of the candidates scored low marks on this question. Those candidates failed to obtain the square of m 400 and m 300. For example, they wrote $400^2 = 1,600$ instead of $400^2 = 160,000$; and $300^2 = 900$ instead of $300^2 = 90,000$, hence they got incorrect answer.

Also, there were candidates who calculated the area of the triangle formed by the three locations (school, hospital and home). Those candidates evaluated $\frac{1}{2} \times 400 \text{ m} \times 300 \text{ m}$ to get $60,000 \text{ m}^2$. However, there were candidates who calculated the total length from home to hospital through school by adding 400 m and 300 m to get 700 m, contrary to the requirements of the question. Moreover, some of the candidates failed to find the square root of $250,000 \text{ m}^2$ that could give the length of the short route. For example, some wrote $\sqrt{250,000 \text{ m}^2} = 50,000 \text{ m}$ instead of $\sqrt{250,000 \text{ m}^2} = 500 \text{ m}$. Extract 43.1 shows a sample of an incorrect answer from one of the candidates.

QUESTION NO. 43	
Home - School = 400m	
School - Hospital = 300m	
400	100 METRES
- 300	
100	

Extract 43.1: A sample of an incorrect response to question 43

In Extract 43.1 candidates calculated the difference between the distance from home to school and the distance from school to hospital and got 100 m which was incorrect answer.

On the other hand, the competent candidates were able to apply the Pythagoras theorem to calculate the distance from hospital to home. Those candidates applied the formula $c^2=a^2+b^2$ where “a” is the distance from home to school, “b” is the distance from school to hospital and “c” is the distance from hospital to home. The candidates calculated $c^2=400^2+300^2$ and got $c^2 = 250,000 \text{ m}^2$. Thereafter, the candidates calculated the square root of $c^2 = 250,000 \text{ m}^2$ to get 500 m which is distance from hospital to home through the short route. Extract 43.2 shows a sample of a correct answer from one of the candidates.

QUESTION NO. 43

Solution

Pythagoras theorem = $c^2 = a^2 + b^2$

$c^2 = (300 \text{ m})^2 + (400 \text{ m})^2$

$c^2 = 90000 + 160000 \Rightarrow$ She walked 500m

$\sqrt{c^2} = \sqrt{250000}$

$c = 500$

Extract 43.2: A sample of a correct answer for question 43.

In Extract 43.2, the candidate showed his/her competency in applying Pythagoras theorem correctly and got the correct answer.

Question 44: A grandmother takes 3 hours to cook food. If she started cooking at 09:45, at what time did she complete cooking in 12 hours' system?

This question tested the candidates' competency to solve word problems related to time. A total of 1,350,147 candidates attempted this question. The data analysis shows that, 373,106 candidates equivalent to 27.63 per cent scored 1.0 to 2.0 mark(s), indicating that the candidates' performance was weak. Table 41 shows the percentage of candidates and the classes of their scores.

Table 41: The Candidates Performance in Question 44

Scores	0 - 0.5	1.0	1.5 - 2.0
Number of Candidates	1,308,873	10,719	30,555
Percentage	72.37	0.35	27.29

The analysis shows that 977,041 (72.37%) candidates who scored zero or 0.5 marks were not competent in reading and adding the metric units of time. Most of the candidates were not conversant with difference between time and time of duration. The candidates misinterpreted 09:45 as the duration of 3 hours and 45 minutes; therefore, they subtracted 3 hours from 3 hours and 45 minutes and got 45 minutes. There were candidates who translated the given time (09:45) into Swahili language by writing it as 03:45 which is contrary to the requirements of the question. Similarly, there were candidates who used the phrase of words “in 12 hours system” wrongly as 12 minutes, therefore they added 3 hours and 12 minutes to 3 hours and 45 minutes and got 6 hours and 57 minutes which is not the correct answer. Extract 44.1 is a sample of an incorrect response from one of the candidates.

QUESTION NO. 44			
4	M		
09:45		$\frac{1}{09:45}$	
+ 03:30		$\frac{60}{15}$	
<u>13:15</u>			
		$\frac{13:15}{-12:00}$	ANSW 1:15 pm
		<u>1:15</u>	

Extract 44.1: A sample of incorrect response to question 44.

Extract 44.1 shows that, the candidate added 09:30 (instead of 3 hours) to 09:45 and got 13:15. The candidate then subtracted 12:00 from 13:15 and got 1:15 p.m which is the incorrect way to reach the required answer.

On the other side, the candidates who scored all marks added the duration of 3 hours to the time at which the grandmother started cooking (09:45) and got 06:45 p.m. Extract 44.2 shows the sample of the correct answer from one of the candidates.

QUESTION NO. 44		
Started cooking	09:45	∴ Grandmother completed cooking at 12:45 pm.
⇒ 09:45	+ 3:00	
Used ⇒ 3 hours	12:45	
	= 12:45 pm	

Extract 44.2: Sample of the correct answer to question 44

In Extract 44.2, the candidate was able to identify that the given time (09:45) is the morning time and then added 3 hours to get 12:45 pm.

Question 45: Kapiligali had a capital of sh 85,000. He bought 13 buckets @ sh 250, 3 dozens of salt @ sh 1,200, cooking oil for sh 4,500, 3 kg of tomatoes @ sh 1,300 and 5 kg of rice @ sh 2,000. How much did Kapiligali remain with?

The question tested the candidates' competency in solving word problems related to currency. A total of 1,350,147 candidates attempted this question. The analysis shows that, 271,502 candidates equivalent to 20.11 per cent scored 1.0 to 2.0 mark(s). Generally, the candidates' performance was weak. Figure 4 summarizes the candidates' performance on this question.

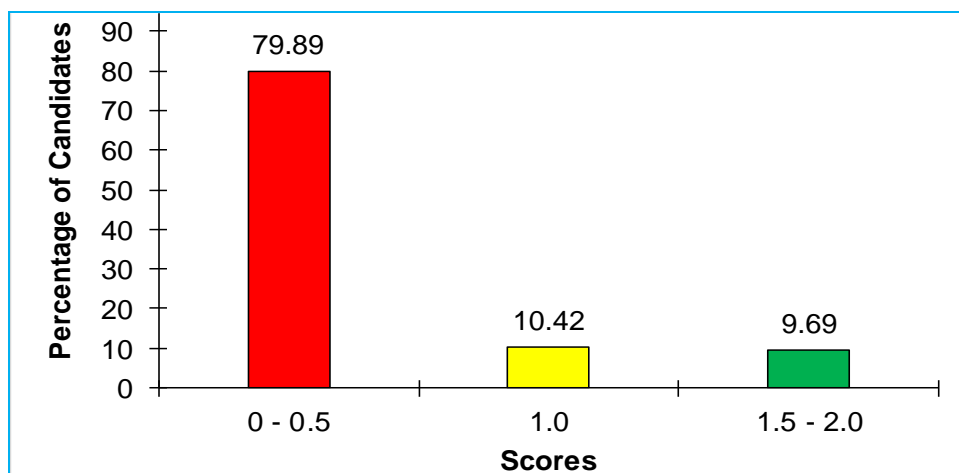


Figure 4: Performance of Candidates in Question 44.

The analysis of candidates' responses shows that, 1,078,645 (79.89%) candidates scored low marks due to various reasons. These candidates used an incorrect method to add up the amount of money where they considered the cost of only one product in each type of product. Among these candidates, there were those who listed the prices per item and then calculated total price. Thus, they calculated the sum of sh 250, sh 1,200, sh 4,500, sh 1,300 and sh 2,000 and got sh 9,250 which is not the correct amount of the purchases of all items. Later, they calculated the difference between the capital (sh 85,000) and the amount of money they obtained (sh 9,250) and got sh 75,750. Also, the candidates failed to multiply, add

and subtract correctly, so they got incorrect answers. For example, there were candidates who failed to correctly calculate the difference between capital (sh 85,000) and purchases (sh 25,250). However, there were candidates who calculated the sum of capital (sh 85,000) and purchases (sh 25,250) and got sh 110,250. Extract 45.1 shows a sample answer of one of the candidates who failed to answer this question correctly.

QUESTION NO. 45	3250		
13x250=3250	3600	162,500	
3x1000=3600	4500	- 85,00	
2x = 4,500	3900	77,500	
3kg x 1,300=3900	10,000		
5kg x 200=10,000	162,500		∴ He remain with <u>77,500/-</u>

Extract 45.1: A sample of an incorrect response to question 45.

Extract 45.1 shows that, the candidate lacked competency of analysing the total purchases from the given capital. As a result, the candidate performed incorrect calculations.

Nevertheless, the candidates who scored all marks were competent in performing calculations related to invoices. The candidates calculated the total cost by multiplying the cost per item by the number of the same item. The candidates realized that, 13 buckets cost sh 3,250; 3 dozens of salt cost sh 3,600; 3 kg of tomatoes cost sh 3,900; 5 kg of rice cost sh 10,000; and the cost of cooking oil is sh 4,500. Then, they calculated the total cost used to buy all the items and got sh 25,250. Finally, the candidates calculated the remaining amount of money by evaluating the difference between the given capital (sh 85,000) and the amount of money spent (sh 25,500) and got sh 59,750. Extract 45.2 shows a sample of a correct response from one of the candidates

QUESTION NO. 45	ITEMS	COST	TOTAL AMOUNT = 85000
	13 buckets @ 250/=	3250	USED AMOUNT = 25250
	3 dozens @ 1200/=	3600	BALANCE = ?
	Cooking oil for 4500/=	4500	85000
	3kg tomatoes @ 1300/=	3900	-25250
	5kg of rice @ 2000/=	10000	59750
	TOTAL	25250	HE REMAINED WITH 59,750 SHILLINGS

Extract 45.2: A sample of a correct response to question 45.

In Extract 45.2, the candidate showed the competency in calculating the total purchases and the amount of money remained after purchases.

3.0 SUMMARY OF THE CANDIDATES' RESPONSE ANALYSIS

The analysis of the candidates' responses shows that, out of 40 questions from Section A, 7 questions were well performed. Out of these questions one was set from the competency of *Applying the Concepts of Patterns to Solve Real Life Problems*, three were set from the competence of *Applying the Concepts of Numbers to Communicate Ideas and Concepts in Different Contexts*, two were set from the competence of *Applying Mathematical Operations to Solve Problems* and one was set from the competency of *Applying Number Relations to Solve Problems in Different Contexts*.

Further analysis shows that 8 questions were averagely performed. Out of these questions four were set from the Competency of *Applying the Concepts of Patterns to Solve Real Life Problems*, two were set from the competency of *Applying Mathematical Operations to Solve Problems*, one was set from *Applying Algebraic Skills in Daily Life* and another one was set from the competency of *Applying Number Relations to Solve Problems in Different Contexts*.

On the other hand, analysis shows that 25 questions had a weak candidates' performance. The analysis shows that in the competencies of *Applying Statistical Skills to Present Different Information*, *Applying Measurements in Different Contexts* and *Applying the Concepts of Shapes and Figures to Solve Different Problems* all questions were poorly performed.

In Section B, all questions were performed poorly. The analysis of the candidates' performance competency-wise is shown in Appendix I given in page 60.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The analysis shows that the candidates had difficulties in solving the questions which were examined from some of the competencies due to various reasons. Also they failed to correctly interpret word problems and information that were presented in figures and tables into mathematical statements. Also the candidates failed to use basic mathematical operations on the concept of whole numbers, decimals, fractions, percentages, Roman numbers, square and square root and were unable to distinguish between factors and multiples. Likewise, the candidates failed to apply formulae in finding the area, perimeters and volume of different figures as well as converting metric units of time, length, mass and volume.

4.2 Recommendations

In order to further improve the candidates' performance in future examinations, teachers should use participatory methods and techniques in the teaching and learning of each specific competency to enhance students' ability to:

- (a) distinguish between multiples and factors of a number by using various teaching and learning aids such as tables of multiplication of numbers and number charts in the Competency of *Applying the concepts of numbers to communicate ideas and concepts in different contexts*.
- (b) use basic mathematical operations on the concept of whole numbers, decimals, fractions, percentages, Roman numbers, square and square root of numbers by using real objects and pictures of different figures drawn on manila cards in the Competency of *Applying mathematical operations to solve problems*.
- (c) use and show the relation between algebra/statistics/invoices and real objects like pupils'

attendance list and currency (notes and coins) in solving problems in different contexts in the Competency of *Applying number relations to solve problems in different contexts*.

- (d) apply formulae in calculating the areas, perimeters and volume of various shapes and objects in different contexts, as well as applying the Pythagoras theorem to calculate the length of the missing side in right angled triangular shapes in the Competency of *Applying the concepts of shapes and figures to solve different problems*.
- (e) solve word problems correctly, simplify algebraic expressions and interpret information that are presented in different ways including figures and tables in the Competency of *Applying the concepts of algebra to solve real life problems*.
- (f) enhance pupil's ability of applying mathematical language in order to be able to comprehend the given questions in statistical and tabular form in the Competence of *Applying the concepts of algebra to solve real life problems*.

APPENDIX

PERFORMANCE PER COMPETENCE EXAMINED IN PSLE 2022

No.	Specific Competency	Performance Per Question		% Average Performance	Remarks
		Question Number	% Performance		
1	Apply the concepts of patterns to solve real life problems	8	54.42	54.46	Average
		9	55.76		
		10	62.92		
		11	53.95		
		12	45.26		
2	Apply the concepts of numbers to communicate ideas and concepts in different contexts	1	65.64	45.08	Average
		2	70.62		
		3	39.91		
		4	66.50		
		5	25.16		
		6	32.33		
		7	15.39		
3	Apply mathematical operations to solve problems	13	28.74	36.72	Weak
		14	22.34		
		15	71.90		
		16	79.80		
		17	53.65		
		18	42.57		
		19	28.70		
		20	30.70		
		21	21.49		
		22	20.98		
		41	3.06		
4	Apply the concepts of algebra to solve real life problems	37	46.76	36.61	Weak
		38	26.46		
5	Apply number relations to solve problems in different contexts	23	23.95	35.56	Weak
		24	72.87		
		25	36.66		
		26	45.18		
		27	38.89		
		28	19.52		

No.	Specific Competency	Performance Per Question		% Average Performance	Remarks
		Question Number	% Performance		
		44	27.29		
		45	20.11		
6	To apply statistical skills to present different information	39	17.79	24.95	Weak
		40	32.11		
7	Apply measurements in different contexts	33	17.90	19.55	Weak
		34	18.43		
		35	14.65		
		36	27.22		
8	Apply the concepts of shapes and figures to solve different problems	29	17.48	17.22	Weak
		30	14.35		
		31	30.45		
		32	24.23		
		42	4.95		
		43	11.27		

