

6.0 MATHEMATICS REPORT

In the year 2019, a total of **1,081,511** candidates sat for the **KCPE Mathematics** examination. The candidates registered a mean of **24.65** with a standard deviation of **11.03**. This was an improvement in performance when compared to the performance in the year 2018, which had a mean score of **21.57** with a standard deviation of **8.57**.

6.1 GENERAL PERFORMANCE

Table 16: General performance in Mathematics for the last five years

Year	2015	2016	2017	2018	2019
National Mean	28.08	22.70	25.57	21.57	24.65
Standard Deviation	10.77	9.35	10.41	8.57	11.03

From *Table 16* above, it can be observed that the overall performance in year **2019 KCPE Mathematics** improved significantly compared to the performance in the year **2018**, both in mean and standard deviation. This year's performance can be attributed to the mastery of content by the candidates which enabled them to perform fairly well in the examined paper.

Table 17: General Performance in 2019 KCPE Mathematics by Gender compared to the last two years

Year	2019		2018		2017	
	Male	Female	Male	Female	Male	Female
Entry	542,614	538,897	527,245	524,942	494,821	498,660
National Raw Mean	25.42	23.87	22.06	27.38	24.81	26.32
Standard Deviation	11.40	10.59	8.94	8.05	10.05	10.71

From *Table 17* above, it can be observed that:

In the year **2019**:

- (i) Male candidates performed better with a mean score of 25.42 compared to female candidates who had a mean of 23.87;
- (ii) Male candidates had a better spread in scores distribution with a standard deviation of **11.40** compared to female candidates who registered a standard deviation of **10.59**;
- (iii) There were slightly more male candidates than female who sat for the Mathematics paper;
- (iv) Both male and female candidates performed well in comparison to the previous year 2018.

Table 18: Performance in 2019 KCPE Mathematics on each content area of the syllabus in comparison to the last two years

Content Area	2019		2018		2017	
	No. of Questions	% of candidates scoring correctly	No. of Questions	% of candidates scoring correctly	No. of Questions	% of candidates scoring correctly
Numbers	11	61.30	14	53.51	14	75.70
Measurement	10	42.79	09	33.71	14	45.60
Geometry	06	44.33	06	32.73	06	43.15
Money	07	47.63	09	40.64	06	37.45
Algebra	05	49.41	03	42.95	04	46.01
Percentages, proportions & Ratios	06	48.04	04	23.99	02	48.22
Graphs	02	36.43	02	51.04	02	48.56
Tables	02	41.77	01	44.90	01	45.74
Averages	01	55.78	02	47.81	01	49.39

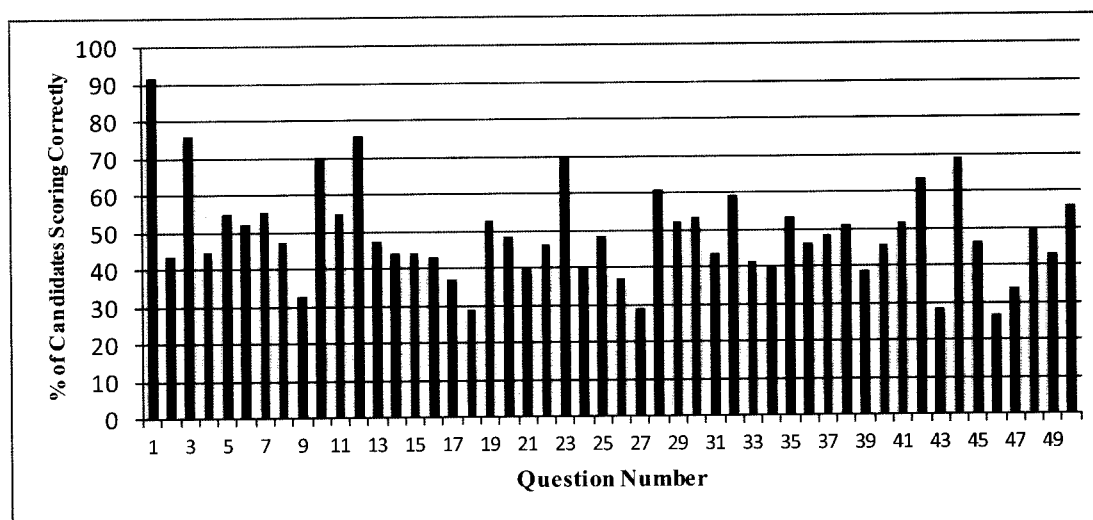
From **table 18** above, it can be observed that:

- (i) In the year **2019**, candidates performed better in content area involving numbers, measurements, geometry, money, algebra, averages, percentages, proportions and ratios than in other areas of the syllabus compared to **2018** where candidates performed better in graphs and money.
- (ii) In the year **2019**, candidates performed poorly in content area involving graphs compared to the year **2018** where candidates performed poorly in percentages, proportions and ratios.

6.2 ANALYSIS OF PERFORMANCE IN SELECTED ITEMS

From **Figure 9** below, it can be noted that **four** questions recorded a *facility index of less than 30%*, an indicator of poor performance while **one** question recorded a *facility index of more than 80%*, an indicator that the question proved quite easy for the candidates. The **four** questions that posted unique challenges to candidates shall be considered for detailed discussion and analysis.

Figure 9



The discussion below will focus on analysis based on the concept and skills, the items tested and cognitive processes the candidates presumably underwent to arrive at the correct responses or incorrect responses. (*) denotes the correct response to the question under discussion.

Question 18

An open rectangular tank has a base measuring 2.0 m by 1.5 m. It has a height of 2.5 m. The surface of the tank was painted. What was the total area painted?

- A. 7.5m^2
- B. 11.75m^2
- C. 20.5m^2
- D. 23.5m^2

Response Pattern for Question 18

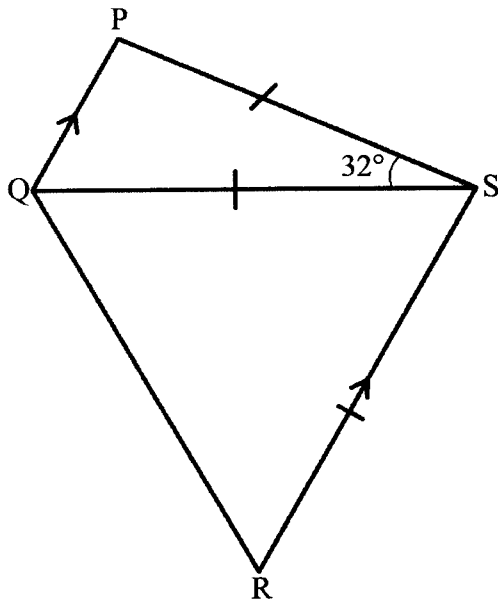
Option	A	B	C*	D
% Choosing option	34.74	23.74	28.67	11.93
Mean mark in other questions	20.54	23.21	30.64	24.33

This question tested candidate's ability to **calculate the surface area of an open cuboid**. The correct option is **C (20.5m^2)** chosen by bright candidates as shown by the mean mark of 30.64 in other questions. The candidates who chose option **A (7.5m^2)** calculated the volume of the cuboid. The candidates who chose option **B (11.75m^2)** calculated half of the total surface area of the closed cuboid with the assumption it's an open cuboid. The candidates who chose option **D (23.5m^2)** calculated the total surface area of the closed cuboid.

Teachers are advised to give pupils adequate exercises on surface area of open cuboids.

Question 27

In the figure below, line QP is parallel to line RS, line QS = line SR and angle QSP = 32° .



What is the size of angle PQR?

- A. 53°
- B. 74°
- C. 106°
- D. 127°

Response Pattern for Question 27

Option	A	B	C	D*
% Choosing option	17.35	28.38	24.66	28.74
Mean mark in other questions	19.74	21.89	25.00	29.74

The question tested on the candidate's ability to **identify and recognize properties of parallel lines**. The correct option is **D (127°)** chosen by bright candidates as shown by the mean mark of 29.74 in other questions. The candidates who chose option **A (53°)** calculated the base angles of the isosceles triangle SQR. The candidates who chose option **B (74°)** calculated the base angles of the isosceles triangle SPQ. The candidates who chose option **C (106°)** calculated angle PSR (i.e. $32^\circ + 74^\circ = 106^\circ$) instead of the stated angle PQR.

Teachers are advised to lead pupils in identifying and recognizing angle properties of parallel lines.

Question 43

Six people working for 5 days were paid a total of sh 6 000. How much more money would the same number of people be paid for 12 days?

- A. sh 8 400
- B. sh 14 400
- C. sh 20 400
- D. sh 1 200

Response Pattern for Question 43

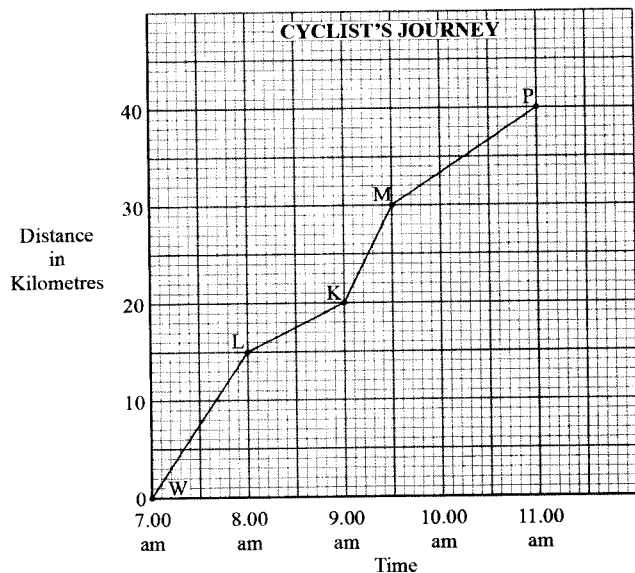
Option	A*	B	C	D
% Choosing option	28.40	38.04	14.27	18.26
Mean mark in other questions	30.52	24.58	19.29	19.44

This question tested on the candidate's ability to **differentiate between direct and indirect proportion**. The correct option is **A (sh 8 400)** chosen by bright candidates as shown by the mean mark of 30.52 in other questions. The candidates who chose option **B (sh 14 400)** worked out the amount paid to the six people for 5 days. The candidates who chose option **C (sh 20 400)** added sh 6 000 more on the amount paid to the six people for 5 days instead of getting the difference in the amount to be paid. The candidates who chose option **D (sh 1 200)** calculated the amount of money paid to the six people per day for the 5 days. Candidates were expected to comprehend the statements given and arrive at the correct response.

Teachers are advised to give pupils adequate exercises on direct and indirect proportion.

Question 46

The graph below represents a journey of a cyclist travelling from town W to town P through towns L, K and M?



Between which two towns was the cyclist travelling at the highest speed?

- A. KM
- B. LK
- C. WL
- D. MP

Response Pattern for Question 46

Option	A*	B	C	D
% Choosing option	26.68	9.84	24.80	37.83
Mean mark in other questions	32.47	21.12	24.29	20.08

This question tested candidate's skills on **reading and interpreting graphs**. The correct option is **A (KM)** chosen by bright candidates as shown by the mean mark of 32.47 in other questions. The candidates who chose option **B (LK)** only considered the least distance covered. The candidates who chose option **C (WL)** merely worked out the first speed travelled. The candidates who chose option **D (MP)** considered the longest time taken.

Teachers are advised to guide learners on reading and interpretation of graphs.

6.3 GENERAL COMMENTS

From the above analysis it can be noted that:

- 6.3.1 There were **four** questions with a facility index of **30% and below**, while **one** question had a facility index of more than **80%**. This implies that there were **four** questions that proved to be too difficult and **one** question proved quite easy for the candidates.
- 6.3.2 The difficult questions that registered a facility index of 30% and below tested on; calculation on surface area of open cuboids, identification and recognition of angle properties on parallel lines, direct and indirect proportion, reading and interpretation of graphs. These are areas teachers are required to emphasize on during teaching.
- 6.3.3 The easy question that registered a facility index of 80% and above was testing on the candidate's ability to reading numbers in words and then write in numerals.
- 6.3.4 Candidate's performed fairly well due to good comprehension skills to given tasks during examination. Teachers are advised to guide their pupils in understanding and interpreting given instructions in the test during examinations.