

5.0 MATHEMATICS

In the year 2013, **837834** candidates sat for the KCPE Mathematics examination. The candidates registered a mean score of **26.43** with a standard deviation of **9.47**. This was a drop in performance when compared to the performance in the year 2012, which had a mean score of **28.15** with a standard deviation of **10.51**.

5.1 GENERAL PERFORMANCE

Table 9: General Performance in Mathematics for the last five years

Year	2009	2010	2011	2012	2013
National Mean	24.78	26.90	26.16	28.15	26.43
Standard Deviation	10.09	10.26	10.01	10.51	9.47

From *Table 9* above, it can be observed that the performance in 2013 KCPE Mathematics dropped significantly compared to performance in the previous four years both in mean and standard deviation except for the years 2009 and 2011 where the means were 24.78 and 26.16 while the standard deviations were 10.09 and 10.01 respectively.

Table 10: General Performance in 2013 KCPE by Gender

Gender	Male	Female
Entry	425529	412305
National Raw Mean	27.11	25.72
Standard Deviation	9.85	9.05

From *Table 10* above, it can be observed that:

- (i) Male candidates performed better with a mean score of 27.11 compared to female candidates who had a mean score of 25.72.
- (ii) Male candidates had a better spread in scores distribution than the females.
- (iii) There were more male candidates than female who sat for the Mathematics paper in the year 2013 KCPE examination.

Table 11: Performance in 2013 KCPE Mathematics on each content area of the syllabus

Content Area	No. of Questions	% of candidates scoring correctly
Numbers	13	68.34
Measurement	13	45.19
Geometry	08	47.22
Money	04	37.57
Algebra	03	47.93
Percentage Profit/Loss	04	58.90
Graphs/Tables/Averages	05	47.48

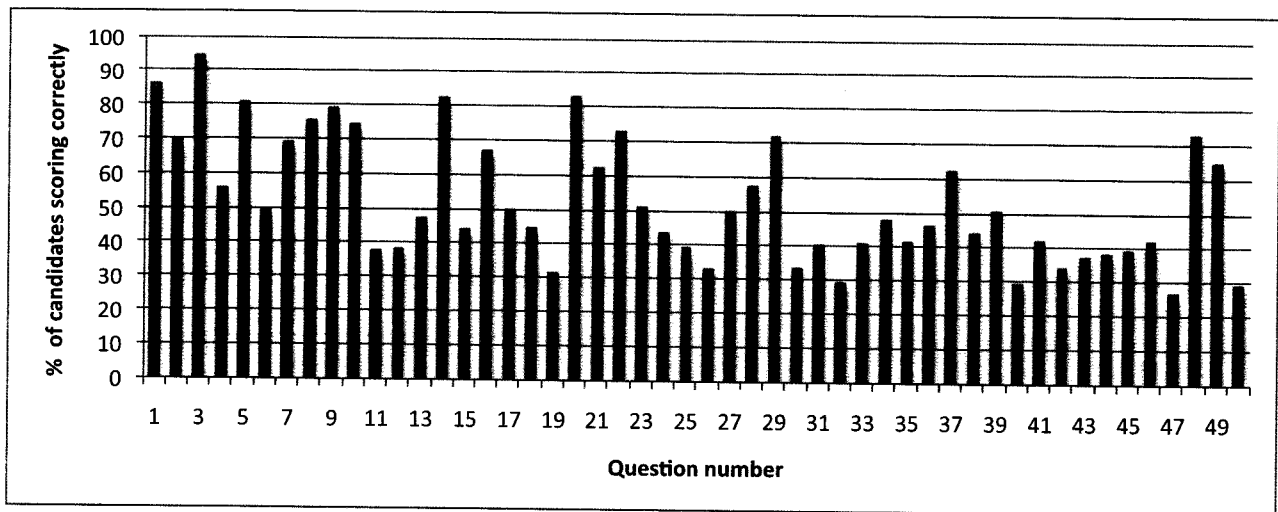
From *Table 11*, it can be observed that:

- (i) Candidates performed better in content area involving numbers than in other areas of the syllabus.
- (ii) Candidates performed poorly in content area involving money activities.

5.2 ANALYSIS OF PERFORMANCE IN SELECTED ITEMS

From *figure 5* below, it can be noted that four questions recorded a facility index of less than 30% an indicator of poor performance in the questions. These questions shall be considered for detailed discussion and analysis.

Figure 5



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

Question 32

Sangale left home at 2330 h on Monday for a journey which took $2\frac{1}{4}$ days to complete.

On what day and time in am/pm system did he complete the journey?

- A. Thursday 5.30 am
- B. Wednesday 5.30 am
- C. Thursday 11.30 pm
- D. Wednesday 11.30 pm

Response Pattern for Question 32

Option	A*	B	C	D
%Choosing option	28.80	27.96	21.32	20.51
Mean mark in other questions	32.59	25.01	23.17	23.49

The question tested candidate's knowledge on how to convert 24-hour system to 12-hour system. The candidates were required to first change the $\frac{1}{4}$ days into hours i.e. 6 hours. Adding the 6 hours to 23 30h on Monday will take Sangale to Tuesday 5.30 am. Two days later the journey will take Sangale to Thursday 5.30 a.m. The correct response is **A (Thursday 5.30 am)** chosen by bright candidates as shown by the mean mark of **32.59** in other questions. The candidates who chose option **B (Wednesday 5.30 am)** only considered $1\frac{1}{4}$ days instead of $2\frac{1}{4}$ days. Option **D (Wednesday 11.30 pm)** was chosen by those candidates who converted 23 30h into 12-hour system giving 11.30 pm. Two days later from Mondays takes the journey to Thursday 11.30 pm without considering the $\frac{1}{4}$ day. Those who chose Option **C (Thursday 11.30 pm)** approximated the $2\frac{1}{4}$ days to 3 days.

Teachers are advised to not only impart knowledge but also guide their pupils in comprehension of given tasks in a question, accordingly.

Question 40

A trader deposited sh 20 000 in a bank. The money was in the following denominations:

- sh 1000 – 5 notes
- sh 500 – 15 notes
- sh 200 – 24 notes

The remaining amount was in 100 shillings and 50 shillings notes. The 100 shillings and 50 shillings notes were equal in number. How much money did the trader deposit in 50 shillings notes?

- A. sh 2 700
- B. sh 1 800
- C. sh 1 350
- D. sh 900

Response pattern for question 40

Option	A	B	C	D*
%Choosing option	15.25	19.84	34.26	28.96
Mean mark in other questions	22.95	23.46	27.45	29.39

The question tested on application skills in the concept of money change/balance. Candidates were required to work out the remaining amount after the trader deposited given notes in the stem of the question i.e. $20\ 000 - (5 \times 1000 + 15 \times 500 + 24 \times 200) = 2\ 700$. They needed to realise that the ratio of the 100 shillings to 50 shillings is 1:2. Thus the value of the 50 shillings notes is obtained by dividing the remaining amount 2700 by 3 to obtain sh 900. The correct option is therefore **D (sh 900)**. The candidates who chose option **A (sh 2700)** were not able to proceed after obtaining 2 700. Those who chose option **B (sh 1800)** obtained the value of the 100 shillings notes while, those who chose option **C (sh 1350)** merely divided the sh 2700 by 2 to obtain sh 1350.

Teachers are advised to involve their pupils in activities involving money change and balance. They should also provide pupils with adequate exercises for practice in this area.

Question 47

The price of an article in a shop was increased by 10%. The following month the price was decreased by 20%. The price of the article after the decrease was sh 79 200.

What was the original price before the increase?

- A. sh 72 000
- B. sh 88 000
- C. sh 90 000
- D. sh 99 000

Response pattern for question 47

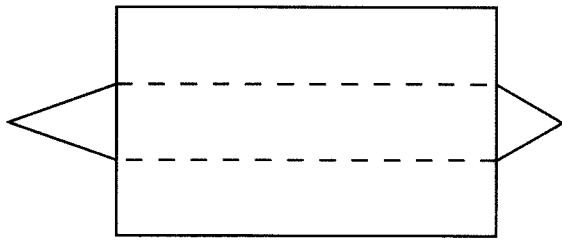
Option	A	B	C*	D
%Choosing option	20.42	26.92	26.16	24.71
Mean mark in other questions	22.68	24.61	30.07	28.04

The question tested on the candidates' knowledge on concepts of percentage increase/decrease. The correct option was **C (sh 90 000)** chosen by bright candidates as shown by the mean mark of **30.07** in other questions. The candidates who chose option **A (sh 72 000)** merely considered the 10% increment i.e. $79\,200 \times 100 \div 110 = 72\,000$ while those who chose option **D (sh 99 000)** considered the 20% decrement i.e. $79\,200 \times 100 \div 80 = 99\,000$. The candidates who chose option **B (sh 88 000)** merely subtracted 10% from 20% to get 10% decrease. They then worked out $79\,200 \times 100 \div 90 = 88\,000$.

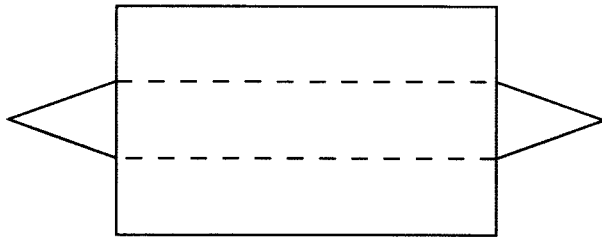
Teachers are advised to encourage pupils to do more practice on exercises involving money.

Question 50

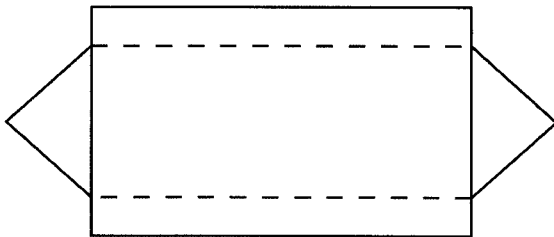
Which one of the following figures is the net of a triangular prism?



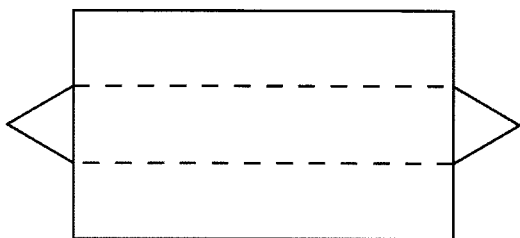
A



B



C



D

Response pattern for question 50

Option	A	B	C	D*
%Choosing option	6.56	45.48	17.33	29.21
Mean mark in other questions	22.53	26.69	21.44	30.13

The question tested candidates' knowledge and skills of modeling; in particular how to make the model of a triangular prism. Candidates were required to know that the sides of the triangular flaps

are equal to the width of the rectangular flaps. The correct response was option **D**. Majority of the candidates, **45.48%** with a mean mark of **26.69** in other questions chose option **B**. These candidates did not measure the flaps to ascertain equality. The candidates who chose options **A & C** did not have any idea on properties of a triangular prism.

Teachers are advised to guide pupils to conserve properties of basic regular solids, drawing nets and making models of regular solids.

5.3 GENERAL COMMENTS

From the above analysis it can be noted that:

- 5.3.1** There were four questions with a facility index of 30% and below while five questions had a facility index of 80% and above. This implies that there were four questions that proved to be too difficult and five questions that were too easy for the candidates.
- 5.3.2** The difficult questions that registered a facility index of 30% and below were from 12 & 24-hour systems, money change & balance, percentage increase & decrease and models. These are areas; therefore, teachers should deal on with much emphasis while teaching.
- 5.3.3** Most candidates perform poorly due to low comprehension skills to given tasks during examinations. Teachers are therefore advised to guide there pupils in understanding and interpreting given instructions in the test questions.