5.0   MATHEMATICS

In the year 2008, **688,099** candidates sat for the KCPE Mathematics examination. These candidates registered a mean score of **23.58** with a standard deviation of **9.96** compared to a mean score of **24.62** with a standard deviation of **10.38** the previous year.

5.1   GENERAL PERFORMANCE

Table 10 below shows the general performance for the year 2008 KCPE Mathematics examination. For purposes of comparison, data for the years 2005 to 2008 is also provided.

Table 10: General Performance in Mathematics over the last four years

Year	2005	2006	2007	2008
National Raw Mean	23.45	26.97	24.62	23.58
Mode Mark	15	18	15	16
Highest Mark	50	50	50	50
Standard Deviation	9.90	10.33	10.38	9.96

Table 11 below shows the general performance for the year 2008 KCPE Mathematics examination by gender.

Table 11: General Performance in Mathematics in the year 2008 by gender

GENDER	MALE	FEMALE
National Raw Mean	24.79	22.22
Modal Mark	16	16
Highest Mark	50	50
Standard Deviation	10.28	9.42

Table 12 below shows the number of questions set in each aspect of the syllabus and candidates' performance in the set areas.

Table 12: Performance in Mathematics KCPE examination in the year 2008 on each aspect of the syllabus

| TYPE OF QUESTIONS	NO. OF QUESTIONS	% OF CANDIDATES SCORING CORRECTLY			
		2005	2006	2007	2008
Arithmetic:					
a) Mechanical	9	42.04	54	55.57	21.51
b) Applied	26	47.86	52.66	29.39	41.76
Data from Table	2	38.17	56.00	43.68	43.25
Geometry	8	38.05	45.96	46.19	40.64
Graphs	1	49.14	55.31	37.44	52.41
Algebra	4	45.72	42.64	34.77	42.94

From the above data, the following conclusions may be drawn:

i)   A remarkable improvement in performance was registered by the year 2008 candidates in application of arithmetic skills than the preceding year.

ii)   The year 2008 candidates performed dismally in mechanical arithmetic than the previous years.

5.2   ANALYSIS OF PERFORMANCE IN SELECTED ITEMS

The following is an analysis of candidates' performance in the year 2008 Mathematics examination. The candidates registered a mean score of **23.58** out of **50** with a standard deviation of **9.96**.

Figure 5 below shows the percentage of candidates scoring correctly in each item in the year 2008 KCPE Mathematics examination. Any item with a percentage of **30%** or below of candidates scoring correctly is considered to have been poorly performed, hence difficult. The poorly performed items will therefore be identified for detailed analysis.

Figure 5 - Mathematics

Figure 5 - Mathematics
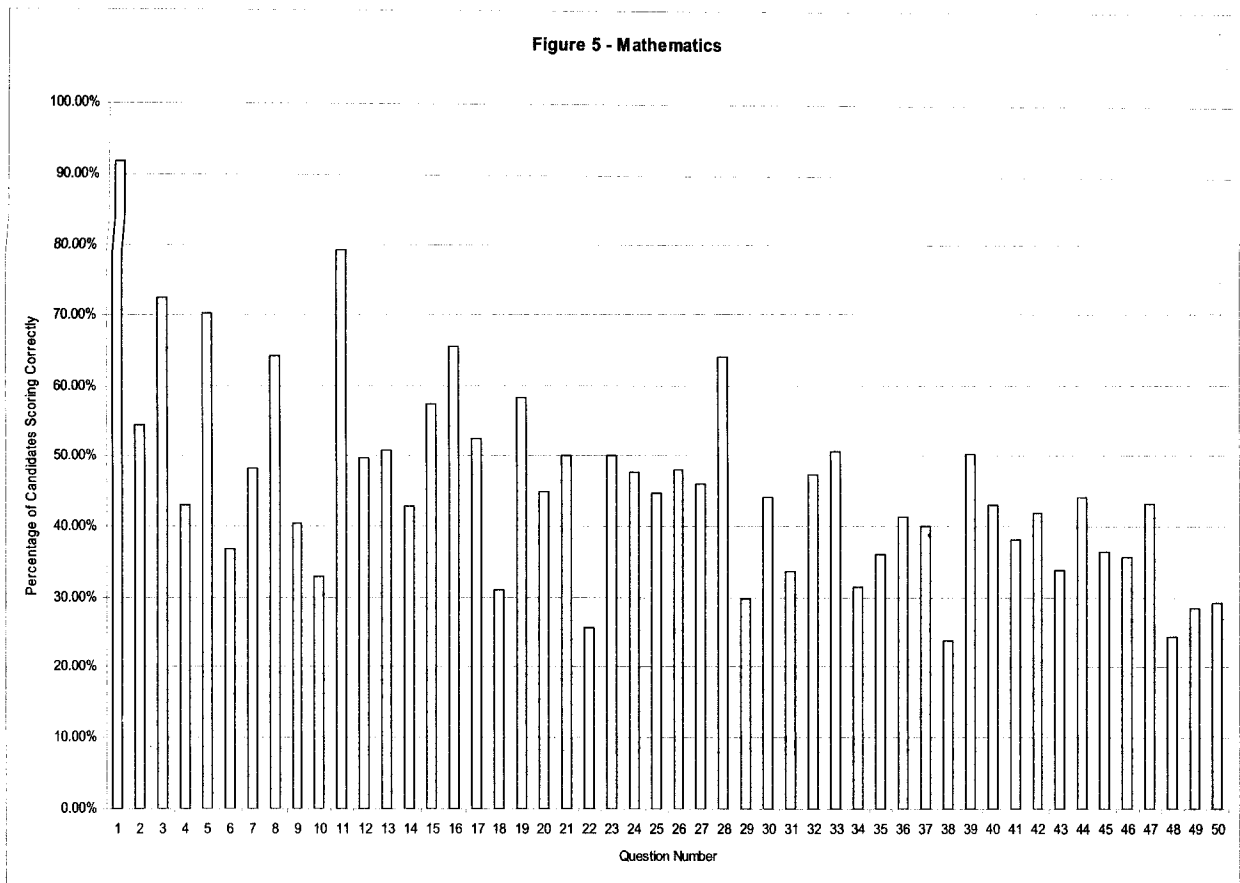
Table 13: Questions which recorded a facility index of 30% and below

Question Number	22	29	38	48	49	50
% candidates scoring the item correctly	25.63	29.68	23.85	24.30	28.53	29.24

The ensuing discussion will focus on analysis of the items above, based on the concepts and skills each item tested and the thinking processes the candidates possibly went through to arrive at the correct responses and the misconceptions that are likely to have made candidates get attracted to the wrong responses. The analysis is based on a random sample of **48,598** candidates. An asterisk (*) in a response pattern denotes the correct response.

Question 22:

Otieno, Leila, Rotich and Furaha shared sh 840. Otieno got twice as much as Leila. Leila got three times as much as Rotich while Rotich got half of what Furaha got.
What was the difference between Otieno's share and Furaha's share?
A   sh 350
B   sh 420
C   sh 210
D   sh 280

Response Pattern

Option	A	B	C	D*
% Choosing option	8.76	20.13	43.77	25.63
Mean mark in other questions	19.47	18.62	21.38	30.49

This is a comprehension question in which candidates were expected to identify the appropriate ratios to apportion worth sh 840 to Otieno, Leila, Rotich and Furaha. That is **6:3:1:2** respectively. This translates to sh 420 for Otieno, sh 210 for Leila, sh 70 for Rotich and sh 140 for Furaha. The correct option therefore is **D (Sh 280),** the difference in share between Otieno's and Furaha's.

This option attracted **25.63%** of the candidates, This option was also chosen by the bright candidates as shown by a mean mark of **30.49** in other questions. Those who chose option A *(sh 350)* possibly found the difference between Otieno's and Rotich's. Those who chose option B *(sh 420)* stopped at Otieno's shares while the candidates who chose option C *(sh 210)* went for Leila's shares.

Question 29:

Musa left home at 11.45 am and took 1 h 20 min to travel to town. After staying in town for one hour, he travelled back home. The time taken to travel to town was twice that taken for the return journey. At what time did he reach home?

A   3.25 pm
B   2.45 pm
C   4.45 pm
D   1.45 pm

Response Pattern

Option	A	B*	C	D
% Choosing option	18.34	29.68	38.03	12.84
Mean mark in other questions	18.71	26.84	24.09	17.24

This question tested the candidates' ability to work with the am/pm time system. The candidates needed to correctly interpret the statement *"twice time taken"* to mean that the time taken to travel back home from town is obtained by doubling the time taken to travel to town from home.

The correct option is **B (2.45 pm). 29.68%** of the candidates chose this option, who also represented the bright candidates as shown by the mean mark of **26.84** in other questions. Majority of the candidates (38.03%) chose option C (4.45 pm). These candidates doubled the time taken from home to town in order to obtain the time Musa took for the return journey. Those who chose option D (1.45 pm) did not consider the one hour taken while in town. Those who chose option A (3.25 pm) interpreted time taken for the return journey to be equal to the time Musa took to travel to town from home.

Question 48:

Murage left town Q at 8.15 am for town R travelling at a
speed of 90 km/h, Mwebi left town R at 9.00 am for town
Q travelling at a speed of 120 km/h. The two met at a
place 180 km away from Q.
What was the distance between towns Q and R?
A   330 km
B   150 km
C   300 km
D   276 km

Response Pattern

Option	A*	B	C	D
% Choosing option	24.39	28.11	30.44	15.15
Mean mark in other questions	27.31	20.65	22.80	21.15

This question tested candidates' ability to apply their knowledge of time and speed on everyday life
situations. The correct option is **A (330 km)**. **24.39%** of the candidates chose this option. The option
was chosen by the bright candidates as indicated by the mean mark of **27.31** in other questions.

The candidates who chose option **B (150 km)** managed to obtain the distance from town **R** to the
meeting place which is **150 km**. Those who chose option **C (300 km)** misinterpreted the meeting
place as midway between the two towns. These were the majority of the candidates as shown on the
table of response pattern. The rest of the candidates who chose option **D**
(276 km) were merely using guess work.

Question 49:

During an election there were four candidates K, L, M
and N. Candidate M received 3 421 votes which was
1 677 votes more than N received and 4 147 votes less
than L received. The total number of valid votes cast was
23 406.
How many votes did K receive?
A   10 673
B   12 733
C   14 161
D   7 319

Response Pattern

Option	A*	B	C	D
% Choosing option	28.53	23.33	27.90	18.67
Mean mark in other questions	30.97	21.29	18.66	19.78

This is a comprehension question testing candidates' understanding on word problem based on
operation on whole numbers. The correct option is Option **A (10673)**. **28.53%** of the candidates
chose this option. These were the bright candidates as indicated by the **30.97** mean mark in other
questions. The candidates who chose option **B (12733)** merely added up the votes for L, M and N.
Those who chose option **C (14161)** did not completely comprehend the question; they merely added
up the number of votes as given. Those who chose option **D (7319)** misread **less than** to mean **more
than.**

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Question 50:

December the twelfth of 1999 was a Sunday.
What day of the week was twelfth April 2000?
A   Monday
B   Tuesday
C   Wednesday
D   Thursday

Response Pattern

Option	A	B	C*	D
% Choosing option	26.94	21.51	29.24	20.86
Mean mark in other questions	20.48	22.73	26.34	22.09

This question tested candidates' knowledge on the calendar. The correct option is **C (Wednesday)** which recognizes year 2000 as a **leap year**, with February having **29 days**. This option attracted **29.24%** of the candidates who happened to be the bright candidates as shown by the mean score of **26.34** in other questions.

Candidates who chose option **A (Monday)** regarded every month of the year as having **30 days**. Those who chose option **B (Tuesday)** did regard year 2000 as a leap year. Those who chose option **D (Thursday)** regarded the month of April as having 31 days.

5.3   GENERAL COMMENTS

The above analysis indicates that most of the poorly performed questions were from concepts that deal with time, including the calendar. Teachers are therefore advised to take more time when handling these areas.