RESUME OF THE CHIEF EXAMINERS' REPORTS FOR THE MATHEMATICS PAPERS

1. STANDARD OF THE PAPERS

The Chief Examiners for Mathematics (Core) 2 and Mathematics (Elective) 2 agreed that the standard of their respective papers compared favourably with those of previous years.

2. PERFORMANCE OF CANDIDATES

The Chief Examiners for Mathematics (Core) 2 stated that the performance of Candidates was not encouraging whilst the Chief Examiner for Mathematics (Elective) 2 stated that candidates performance was quite encouraging.

3. CANDIDATES STRENGTHS

(1) The Chief Examiner for Mathematics (Core) 2listed some of the strengths of candidates as ability to:

(i) simplify fractions using the concepts of BODMAS;

(ii) solve inequalities;

(iii) complete table of values for a quadratic relation, drawing the graph of the relation and using it to solve related problems;

(iv) constructtable of values under a given operation in arithmetic modulo 7 and using it to solve related problems;

(v) change the subject of a given relation;

(vi) construct cumulative frequency table for a given distribution, drawing a cumulative frequency curve and using it to solve related problems;

(2) The Chief Examiner for Mathematics (Elective) 2 enumerated some of the strengths of candidates as ability to:

(i) solve problems involving distance in mechanics;
(ii) calculate spearman's rank correlation coefficient;

(iii) find the inverse of a function;

(iv) calculate mean using assumed mean method;

(v) expand binomial expression;

(vi) find specific terms of A.P and G.P Sequence.

4. CANDIDATES' WEAKNESSES

(1) The Chief Examiner for Mathematics (Core) 2 listed the following weaknesses of candidates as difficulty in:

- (i) recalling and applying circle theorem to solve related problems;
- (ii) translating word problem into mathematical statement;
- (iii) using ruler and a pair of compasses only to construct a trapezium;
- (iv) solving Problems involving probabilities;
- (v) understanding the concept of plane geometry.

(2) The Chief Examiner for Mathematics (Elective) 2 on his part listed the following among others as weaknesses of candidates as difficulty in:

- (i) solving problems involving Binary Operation;
- (ii) finding the equation of circle;
- (iii) evaluating definite integrals;
- (iv) resolving forces into component form;
- (v) solving problems involving permutation of events;
- (vi) simplifying and rationalizing of surds;
- (vii) drawing histogram with unequal intervals.

5. SUGGESTED REMEDIES

The Chief Examiners for Mathematics (Core) 2 and Mathematics (Elective)2 suggested that teachers should give equal attention to all the topics in the syllabus and stop specializing in teaching some topics.

They also recommended that, candidates should be given more exercises to practice.

MATHEMATICS (CORE) 2

1. GENERAL COMMENTS

The standard of the paper compared favourably with that of the previous years. However, the candidates performance was not encouraging.

2. A SUMMARY OF CANDIDATES' STRENGTHS

Candidates' strengths were enumerated: in the following areas as

(i) simplifying fraction using the concept of BODMAS;

(ii) solving inequalities;

(iii) completing table of values for a quadratic relations; drawing the graph of the graph relation and using the graph to solve related problems;

(iv) drawing tables of value under a given operation in modulo 7 and using thetable to solve related problems;

(v) change of subject of a given relation;

(vi) constructing cumulative frequency table for a given distribution, drawinga cumulative frequency curve and using it to solve related problems.

3. A SUMMARY OF CANDIDATES' WEAKNESSES

Candidates weakness were clearly identified in the following areas:

(i) inability to recall and apply circle theorem to solve related problems.

(ii) inability to translate word problem into mathematical statement,

(iii) inability to use ruler and a pair of compasses only to construct a trapezium

(iv) inability to solve probability related problems;

(v) lack of understanding of the concept of plane geometry.

4. **SUGGESTED REMEDIES FOR THE WEAKNESSESS**

(1) Tuition relating to these areas should be thorough.

(2) Candidates should be exposed to problem solving guide lines such as;

(i) understanding the problem,

(ii) developing and carrying out a plan to solve the problem,

(iii) checking the answer after solving the problem.

(3) candidates should be encouraged to solve more problems relating to these areas identifiedsothat they can understand the underlyingconcepts.

5. **DETAILED COMMENTS**

Question 1

(a) Without using Mathematical tables or calculators, simplify:
$3\frac{4}{9} \div (5\frac{1}{3} - 2\frac{3}{4}) + 5\frac{9}{10}$.

(b) A number is selected at random from each of the sets {2, 3, 4} and {1, 3, 5}. Find the probability that the sum of the two numbers is greater than 3 and less than 7.

The part (a) of the question was quite easily done by most candidates. The mixed numbers were changed into improper fractions and the concept of BODMAS was applied to simplify the expression. Few candidates however did not simplify the expression completely but rather left their answers as improper fraction. It was also observed that some of the candidates left their final answers in decimal form.

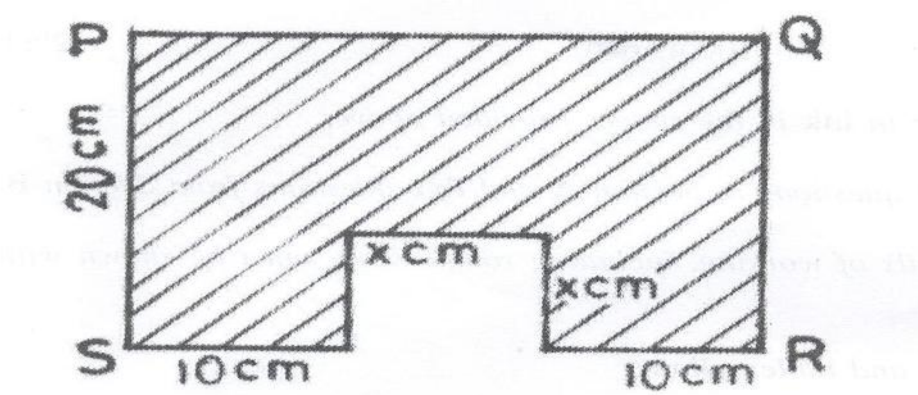
In part (b), candidates were expected to build a sample space for the addition of the number pairs selected from the given sets. It was realized that most candidates did not add the number pairs to obtain the required sample space but rather listed the number pairs as the sample space.

Again some candidates only considered thepairs of values whose sum is greater than 3 and less than 7 and also counted the number of elements in the two given sets as the sample space , hence their final answer was presented as 4/6 instead of 4/9.

Question 2

(a) **Solve the inequality** $4 + \frac{3}{4}(x+2) \leq \frac{3}{8}x + 1$.

(b)



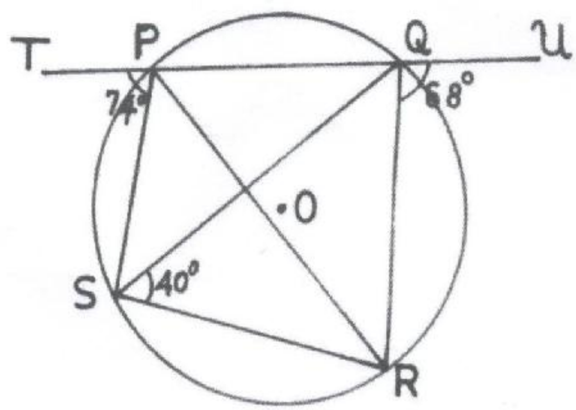
Most candidates answered the part (a) correctly. They cleared the fractions by multiplying through by the appropriate least common multiple (LCM), grouped like terms, and finally solved the inequality.
Few candidates however messed up with the clearing of the fractions. They cleared only the fractions and did not multiply the LCM by the whole numbers in In the inequality; They obtained $4+6(x+2)\leq 3x +1$ instead of $32+6(x+2)\leq 3x+8$ and this resulted into a wrong solution.

The part (b) was quite challenging, most candidates were unable to form the relevant equation from the given diagram. Even though some candidates obtained the required quadratic equation $x^2 - 20x +84 = 0$ they were unable to solve it by either using the factorization method or the quadratic formula. However few candidates were able to solve the quadratic equation and obtained the required values of x.

Question 3

(a) **The ratio of the interior angle to the exterior angle of a regular polygon is 5 : 2. Find the number of sides of the polygon.**

(b)



The diagram shows a rectangle PQRS from which a square of side *x* cm has been cut. If the area of the shaded portion is 484 cm^2, find the values of *x*.

In part (a) most candidates had difficulty in stating the ratio of the interior angle to thecxterior angle of a regular polygon as$\frac{180\,(n-2)}{n}$: $\frac{360}{n}$ = 5:2 or $\frac{180(n-2)}{n} \times \frac{n}{390} = \frac{5}{2}$ and therefore they could not solve for the value of n. However, few candidates who were able to recall the two formulae wrote them correctly and solved for thevalue ofn with ease.

In part (b), most candidates did not answer the question since they could not recall the appropriate circle theorems to solve the problem.

However, few candidates who were able to recall the relevant circle theorems such as angles formed in the same segment, exterior angle of a cyclic quadrilateral, managed to calculate the value of angle PRS.

Question 4

(a) **By how much is the sum of $3\frac{2}{3}$ and $2\frac{1}{5}$ less than 7?**

(b) **The height h m, of a dock above sea level is given by**
$H = 6+4\cos(15p)^o 0 < p < 6$.

Find:

(i) the value of h when p = 4;

(ii) correct to two significant figures, the value of when h = 9 m.

In part (a) most candidates could not understand the phrase ‘‘by how much’.’ It was realized that lack of understanding crippled them to state the correct mathematical expression for the problem. Instead of writing the correct mathematical expression as 7 – ($3\frac{2}{3} + 2\frac{1}{5}$) most of them wrote $3\frac{2}{3} + 2\frac{1}{5} < 7$.

The part (b) was well answered by most of the candidates.They substituted the given values in (i) and (ii) into the equation and obtained the required values for**h** and **p.** Even though it was quite easily done, few candidates fumbled and could not solve the equation as expected. After substituting the value of **p**, they came up with an unacceptable solution such as **h** = **10cos 60°**, which eventually yielded an answer**h** = **5m**, instead of **8m.**

It was observed that candidates added the constant to the co-efficient of the trigonometric component to obtain **h** =10cos 60° which is highly unacceptable

Question 5

A trapezium PQRS is such that PQ||RS and the perpendular from P to RS is 40 cm. if |PQ| = 20 cm, |SP| = 50 cm and |SR| = 60 cm. calculate, correct to 2 significant figures, the:

(a) area of the trapezium;

(b) <QRS.

(a) Candidates were expected to sketch the trapezium to show all the givendimenstions.It was found out that most of the candidates sketched the diagram correctly while others sketched it any how without showing all the necessary details.

Candidates who were able to sketch the diagram managed to recall the formulaforfinding the area of a trapizum as $\frac{1}{2}$ (a+b)h. They substituted the respective givendimensions into the formula and obtained the required answer. In finding |SN| most of the candidates used Pythagoras theorem since triangle |SPN|is a right-angled triangle.

Question 6

(a) (i) Illustrate the following statement in a Venn diagram:
All good Literature students in a school are in the General Arts class.

(ii) Use the diagram to determine whether or not the following are valid conclusions from the given statement:

(α) Vivian is in the General Arts class therefore she is a good Literature student;

(β) Audu is not a good Literature student therefore he is not in the General Arts class;

(γ) Kweku is not in the General Arts class therefore he is not a good Literature student.

(c) The cost *(c)* of producing n bricks is the sum of a fixed amount, *h*, and a variable amount *y* where *y* varies directly as *n*. If it costs GH¢950.00 to produce 600 bricks and GH¢1030.00 to produce 1000 bricks,

(i) Find the relationship between *c*, *h* and *n*;

(ii) Calculate the cost of producing 500 bricks.

In part (a), of the question was quite challenging to most candidates, but out of the few candidates who answered the question were able to draw the venn diagram and analyse the statements given. They made interesting inferences from it and from their responses it revealed that most of them were not exposed to this topic in the syllabus.

The part (b) was analytical and candidates were expected to use the defined variables to write an equation in the form $C = h+kn$ (where $y = kn$).
Most candidates were not able to recognise that the question was a prtial variation and so they solved it anyhow .However few candidates who analyses the question were able to write the required equation involving the three defined variables.

They made all the required substitutions and came up with a simultaneous equation which they solved to obtain the required answers.
It was also observed that some of the candidates ignored the specified variables and used their own variables,which made them to fumble with the question.

Question 7

The table is for the relation $y = px^2 - 5x + q$.

x	-3	-2	-1	0	1	2	3	4	5
y	21	6		-12				0	13

(a) (i) Use the table to find the values of p and q.
(ii) Copy and complete the table.

(b) Using scales of 2 cm to 1 unit on the x – axis and 2 cm to 5 units on the y – axis, draw the graph of the relation for $-3 \leq x \leq 5$.

(c) Use the graph to find:
(i) y when $x = 1.8$;
(ii) x when $y = -8$.

It was realized that some candidates were not familiar with the question. So instead of using the y intercepts, from the table to find the value of **q** so easily and then use it to find **p**, they rather formed complex equations which could not be solved so easily. Some went ahead to solve their equations and had wrong values for y. This eventually affected the drawing of the graph.

. However, most of the candidates were able to find the values of p and q correctly and then completed the table of values for the given relation. Most of them showed mastery in drawing the graph for the relation and used it to solve the related problems, while others couldnot draw smooth curve and this affected the readings of thevalues.

Some also ignored the rubrics that stated ‘‘use the graph to find’’. . . . and did otherwise by calculating the values of x and y in (i) and (ii).

Question 8

(a) Using ruler and a pair of compasses only, construct a:
(i) trapezium$WXYZ$ such that $|WX| = 8$ cm, $|XY| = 5.5$ cm, $|XZ| = 8.3$ cm, $\angle WXY = 60^o$ and $WX || ZY$.
(iii) rectangle$PQYZ$ where P and Q are on [illegible].

(b) Measure:
(i) $|QX|$;
(ii) $\angle XWZ$.

The question was poorly answered by most of the candidates since it required demonstration of skills in order to construct trapezium WXYZ. It was observe that some of the candidates who attempted the question were able to construct the given dimensions such as |wx| = 8cm, |xy| = 5.5cm and < WXY = 60° correctly but fumbled with the construction of |ZY| parallel to |WX|.
Again candidates, inability to construct perpendicular lines from Y and Z to meet line WX at P and Q, clearly showed that they were not equipped with the requisite skills and the application of the concept to construct rectangle PQYZ. Candidates could not answer the related questions since the figures they constructed were inaccurate.

<u>Question 9</u>

(a) **The first term of an Arithmetic Progression (AP) is – 8. If the ratio of the 7^{th} term to the 9^{th} term is 5 : 8, find the common difference of the *AP*.**

(b) **A trader bought 30 baskets of pawpaw and 100 baskets of mangoes for ₦ 2,450.00. She sold the pawpaw at a profit of 40% and the mangoes at a profit of 30%. If her profit on the entire transaction was ₦ 855.00, find the:**

(i) **cost price of a basket of pawpaw;**

(ii) **selling price of the 100 baskets of mangoes.**

Fairly good attempt was made by most candidates to answer part (a) of the question. They formed the 7^{th} and 9^{th} terms of the Arithmetic progression (AP) and proceeded to findthe common difference.
Others found the 7^{th} and 9^{th} terms of the AP but failed to substitute the first term whichis equal to(– 8) into the expression and therefore left it as:U_7 = a+6d and
U_9 = a+8d. Some candidates were able to find the 7^{th} and 9^{th} terms of the AP correctly and presented them in the ratio form as -8 +6d : - 8+8d but failed to equate it to the given ratio of 5:8
In part (b), most candidates were unable to write down the relevant algebraic equations, from the word problem. It was realized that reading and analyzing the problem and coming out with the correct mathematical statement was their main problem.

However few candidates managed to come out with the correct simultaneous equations which they solved to obtain the required cost price and the selling price of a basket of pawpaw and 100 basket of mangoes respectively.

Question 10

(a) **Without using Mathematics tables or calculators, simplify:**

$$\frac{2 \tan 60^{o} + \cos 30^{o}}{\sin 60^{o}}$$

(b) **From an aeroplane in the air and at a horizontal distance of 1050 m, the angles of depression of the top and base of a control tower at an instant are 36º and 41º respectively. Calculate, correct to the nearest metre, the:**

(i) **height of the control tower;**

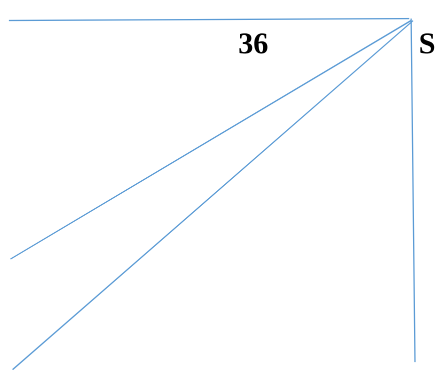
(ii) **shortest distance between the aeroplane and the base of the control tower.**

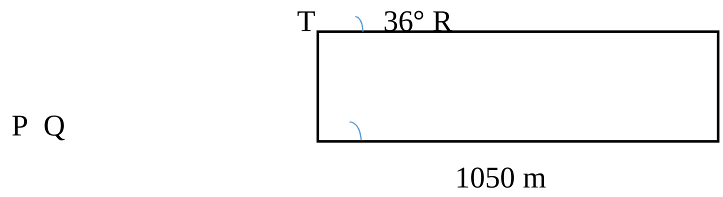
The part (a) was well answered by most candidates. They showed mastery in using trigonometric concept in simplifying the given expression. They used the Correct surd equation of the given trigonometric ratios in solving the problem.

They manage to find the corresponding surds for the various trigonometric ratios such as $\tan 60° = \sqrt{3}$, $\sin 60° = \frac{\sqrt{3}}{2}$ and $\cos 30° = \frac{\sqrt{3}}{2}$ before substituting into the expression correctly. Some simplified it and obtained the required answers while others fumbled with the simplification of the surds.

The part (b) was poorly answered by most candidates since they could not visualize the problem and sketch the required diagram to answer the question. However, few outstanding candidates showed mastery in answering the question.

They visualized the problem and managed to sketch the required diagram which enabled them to solve the problem. This question actually require the sketching of a diagram such as *



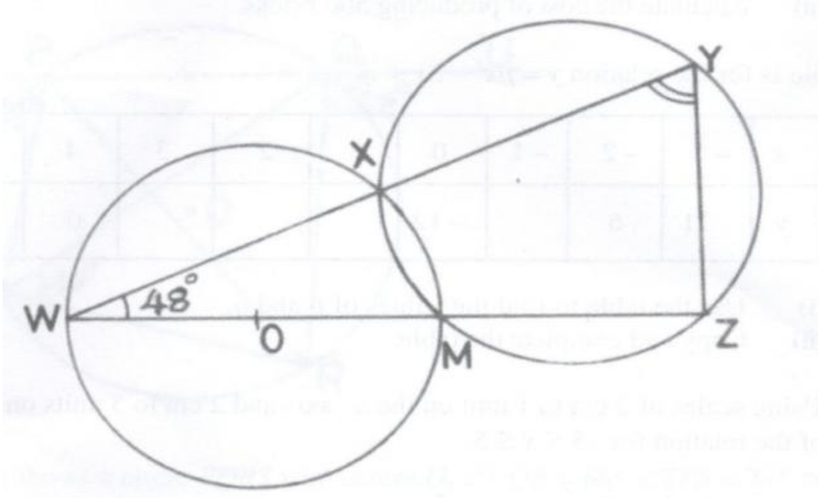


Once the correct diagram is sketched then the trigonometric ratios can be used to find the height of the control tower as well as the shortest distance between the aeroplane and the base of the control tower.

Question 11

(a) **Make m the subject of the relation** $h = \frac{mt}{d(m+p)}$

(b)



In the diagram, *WZ* and *WY* are straight lines, *O* is the centre of circle WXM and <*XWM* = 48º. Calculate the value of <*WYZ*.

(c) **An operation ⊗ is defined on the set X = {1, 3, 5, 6} by m⊗ n = m + n + 2 (mod 7), where m, n ∈ X.**

(i) **Draw a table for the operation.**

(ii) **Using the table, find the truth set of**

(α) **3⊗ n = 3;**

(β) **n⊗ n = 3.**

The part (a) was well answered by most of the candidates. They cleared the fraction, grouped like terms and subsequently made ‘m’ the subject of the relation.

The part (b) was based on the concept of circle theorems and the sum of interior angles of atriangle. These concepts would have been clearly seen in candidates worked solutions but unfortunately most of them ignored this question. It was observed that most candidates were not comfortable with the question.

Finally, part (c) wassatisfactorily answered by most of the candidates. They showed mastery in the presentation of their solution. They drew the modulo 7 table defined on the given set using the operation correctly. It was realized that most of the candidates did not use the table to answer the related questions but rather resorted to the use of trial and error method. Those who were able to use the table to answer the related question had the answer for question (ii) ($\propto$) corret but skeptical about the answer for question (ii) (β).

12. A water reservoir in the form of a cone mounted on a hemisphere is built such that the plane face of the hemisphere fits exactly to the base of the cone and the height of the cone is 6 times the radius of its base.

(a) Illustrate this information in a diagram.

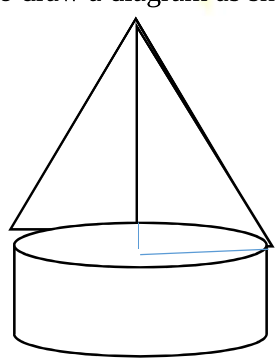
(b) If the volume of the reservoir is $333\frac{1}{3}\pi$ m^3, calculate, correct to the nearest whole number, the:

(i) volume of the hemisphere;

(ii) total surface area of the reservoir.

[Take $\pi = \frac{22}{7}$].

Candidates were expected to draw a diagram as shown:



After drawing the diagram, candidates were expected to state the formulae for the two solid figures; add them and then equate to the volume of the water reservoir.

Ie $2IIr3 + \frac{2}{3} IIr3 = 333 \frac{1}{3}II$. They were expected to solve the required equation and find the radius (r)
Once the value of the radius is obtained, the volume of the hemisphere could be found as well as the total surface area of the reservoir.

This question was poorly answered by most of the candidates. Most candidates could not draw the relevant diagram to illustrate the information given in the question. Again they could not recall the formula of the two solid figures, let alone add them to obtain the required equation.

<u>Question 13</u>

The table shows the marks scored by some candidates in an examination/

Marks (%)	**0 - 9**	**10 – 19**	**20 - 29**	**30 – 39**	**40 - 49**	**50 – 59**	**60 – 69**	**70 – 79**	**80 – 89**	**90 – 99**
Frequency	**7**	**11**	**17**	**20**	**29**	**34**	**30**	**25**	**21**	**6**

(a) **Construct a cumulative frequency table for the distribution and draw a cumulative frequency curve.**

(b) **Use the curve to estimate, correct to one decimal place, the:**

(i) **lowest mark for distribution if 15% of the candidates passed with distinction;**

(ii) **probability of selecting a candidate who scored at most 45%**

Most of the candidates answered the question correctly. They showed mastery in constructing the cumulative frequency table, and used it to draw smooth curve.
Also they used the curve to estimate the lowest mark for distinction and the probability of selecting a candidate who scored at most 45%.
However, few candidates could not obtain the correct cumulative frequencies as expected. Some also used the lower class boundaries instead of the upper class boundaries.
It was also observed that some of the curves were not smooth and this affected the estimated values read from the graph

FURTHER (ELECTIVE) MATHEMATICS

1. GENERAL COMMENTS

The standard of the paper compared favourably with that of the previous years. The candidates performed creditably well.

2. SUMMARY OF CANDIDATES' STRENGTHS

The candidates performed very well in the following areas;

(1) calculation of distance in mechanics;
(2) calculation of spearman's rank correlation coefficient;
(3) finding the inverse of a function;
(4) calculating of mean using assumed mean;
(5) binomial expansion;
(6) finding specific terms of sequences.

3. SUMMARY OF CANDIDATES' WEAKNESSES

Candidates weaknesses were evident in the following areas:

(1) inability to solve problems on binary operations
(2) difficulty in finding the equation of a circle with ends given points on on the diameter
(3) ability to evaluate definite integrals
(4) lack of knowledge in the concepts of permutation
(5) resolution of forces into component form
(6)lack of understanding rationalization and simplificant of surds
(7)inability to drawhistogram with unequal intervals

4. SUGGESTED REMEDIES

(1) Students should be admonished to find time for the study of the subject and solve more questions on the various topics.

(2) Students showed by giving them more questions to solve so that they can develop more skills in solving questions.

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5. DETAILED COMMENTS

QUESTION 1

1. A binary operation Δ is defined on the set of real numbers, ℝ, by $a \, \Delta \, b = a^3 - b^3$. Without using calculator, find the value of $(\sqrt{3} + \sqrt{2}) \, \Delta \, (\sqrt{3} - \sqrt{2})$, leaving the answer in surd form.

1. A lot of candidates were able to substitution the values but could not simplify to arrive at the correct answer.others substituted and used calculations to find the answer without obeying the rubrics which says calculators should not be used.

QUESTION 2

2. Points (2,1) and (6,7) are opposite vertices of a square which is inscribed in a circle. Find the:
(a) centre of the circle;
(b) equation of the circle.

2. Most candidates could not find the centre within the given points on the ends of the diameter. Hence most of them could not find the equation of the circle. However some candidates substituted the two points into the general equation of the circle and could not proceed to the final conclusion.

QUESTION 3

3. If $f^{11}(x) = 2$, $f^{1}(1) = 0$ and $f(0) = -8$, find f (x).

3. A good number of candidates attempted this question but most of them could not find f (x) using the given information.Apparently most of them were confused with the symbols f ’(x) and f ‘‘(x). They did not realize they have to find the constants of integration in both cases.

QUESTION 4

4. Solve $\tan(2x - 15)^{o} - 1 = 0$, for values of x, such that $0^{o} \leq x \leq 360^{o}$.

Few candidates solved this question correctly and obtained the required angles

QUESTION 5

5. **A car moving with an initial velocity, u, travels in a straight line with a constant acceleration of $3ms^2$ until it attains a velocity of 33 ms^{-1} after 6 seconds. Calculate the distance travelled by the car.**

Candidates were able to solve for the distance and performed very well in solving this question. Most of them were able to quote the right formulae and substituted to find the initial velocity (u) and therefore the distance travelled.

QUESTION 6

6. **Five finalists in a beauty pageant were ranked by two judges X and Y as shown in the table.**

Judges	Anne	Linda	Susan	Rose	Erica
X	1	4	3	5	2
Y	3	2	4	5	1

A lot of candidates performed very well with this question.
They were able to calculate the spearman's rank correlation co efficient. Some candidates however quoted the wrong formula a5 $p = \frac{1-6ʢd^2}{n(n^2-1)}$

QUESTION 7

7. **There are 8 boys and 6 girls in a class. If two students are selected at random from the class, find the probability that they are of:**
   (a) the same sex;
   (b) different sex.

Candidate did not perform very well on this question
Most candidates showed ignorance of this probability rules. Some candidates did not realise it is a selection without replacement genstim

QUESTION 8

Forces of magnitude 3 N, 4 N and 2 N act along the vectors j,-i+j, and i+j, respectively. Calculate, correct to one decimal place, the magnitude of the resultant force.
Most candidate could not resolve the forces correctly. However the magnitude of the wrong resultant force was carried out correctly.

QUESTION 9

9. (a) the functions $f: \rightarrow x^2 + 1$ and $g: x \rightarrow 5 - 3x$ are defined on the set of real numbers, R.

    (i) State the domain of f-1, the inverse of f.

    (ii) Find g-1(2).

(b) Evaluate $\int_0^2 \frac{(x+3)dx}{\sqrt{x^2+6x+9}}$.

This question was popular and candidates performed quite well in solving for the inverse of a function. However most of them could not evaluate the definite integral question correctly. Some candidates integrated the numerator and denominator separately and found the quotient, which is unacceptable

QUESTION 10

(a) if $\frac{\sqrt{5}+4}{3-2\sqrt{5}} - \frac{2+\sqrt{5}}{4-2\sqrt{5}} = \underline{a} + \underline{b}\sqrt{5}$, find the values of a and b.

4^{+} 4^{+}

(b) (i) Evaluate $\begin{vmatrix} 2 & -1 & 2 \\ 1 & 3 & 4 \\ 1 & 2 & 1 \end{vmatrix}$.

(ii) Using the results in (i), find, correct to two decimal places the values of x in the system of equations:

$2x - y + 2z + 5 = 0$

$x + 3y + 4z - 1 = 0$

$x + 2y + z + 2 = 0$

This question was not popular among candidates. In the (a) part they were to simplify by rationalizeing a surd to find of a and b. Most candidates performed poorly on this question was not popular among candidate in

They could also not use of cramer's rule to solve the systems of linear equation in three variables. It seems teachers do not teach this. Candidates demonstrated poor understanding of the entire question

QUESTION 11

(a) (i) Write down the binomial expansion of $(1 + x)^4$.

(ii) Use the result in (i) to evaluate $\left(\frac{5}{4}\right)^4$, correct to three decimal places.

(b) **The first, second and fifth terms of a linear sequence (A.P) are three consecutive terms of an exponential sequence (G.P). If the first term of the linear sequence is 7, find its common difference.**

Few candidates attempted this question and the performance was very encouraging they were able to expand $(1+x)^4$. Some of them could not use the expansion to evaluation $(\frac{5}{4})^4$
correctly

QUESTION 12

12. **The table shows the distribution of the heights of a group of people.**

Height/m	**0.4 – 0.5**	**0.6 – 0.9**	**1.0 – 1.2**	**1.3 – 1.4**	**1.5 – 1.7**
Number of People	**2**	**8**	**12**	**6**	**6**

(a) **Draw a histogram to illustrate the distribution.**
(b) **Using an assumed mean of 1.1 m, find correct to one decimal place, the mean height of the group.**

This was a very popular question and the performance was average except the drawing of histogram. Candidates calculated the men height well but treated the histogram as equal intervals. In (b) most candidates were able to find the mean using the assumed mean but some of them ignored the assumed mean and did not find the deviations before finding the mean. These candidates did not meet the demands of the question.

QUESTION 13

13. **(a)** **Edem and his wife were invited to a dinner by a family of 5. They all sat in such away that Edem sat next to his wife. Find the number of ways of seating them
in a row.**
(b) **A bag contains 4 red and 5 black identical balls. If 5 balls are selected at random from the bag one after the other with replacement, find the
probability that:**
(i) **a red ball was picked 3 times;**
(ii) **a black ball was picked at most 2 times.**

This was the most unpopular question amongst the candidate. Few who attempted could not find the number of ways of seating in a row in the (a) part. The and the (b) part was also poorly answered. Either the concept had not been understood or students had not studied it. The (a) part should have been solved as

No. of ways = 61 x 21

= 720 x 2

= 1440ways.

QUESTION 14

(a) Given that [illegible] = $\begin{pmatrix}4\\5\end{pmatrix}$ and [illegible] $\begin{pmatrix}[illegible]\end{pmatrix}$ [illegible]nd th[illegible]

(i) angle between the [illegible] [illegible] and [illegible];

(ii) unit vector along [illegible] - [illegible].

(b) P, Q, R and M are points in the Oxy plane. If [illegible] = 2i +8j, [illegible] = 11i [illegible] 12j and M divides QR internally in the ratio 3:7, find PM.

Candidates were supposed to find angle between two vectors, unit vector and [illegible] In a given ratio. They were able to find [illegible] and its magnitude' However the candidates could not find the required angle, the unit vector and [illegible] in the given ratio.

QUESTION 15

(a) A bucket full of water with a mass of 8 kg is pulled out of a well with a light inextensible rope. Find its acceleration when the tension in the rope is 150 N. [Take g = 10 ms^{-2}]

(b) A mass if 12 kg is acted upon by a force F, changing its speed from 15ms^{-1} to 25ms^{-1} after covering a distance of 50 m. Find the:

(i) value of F;

(ii) distance covered when its speed is 35 ms^{-1}.

This question was poorly answered by the candidates. They were to find acceleration when given tension in the rope to be 150 N but most of them could not find the result force as 150N – 80N = 70N and hence acceleration = $\frac{70}{8} = 8^3/_4 ms^{-2}$ or 8.75ms^{-2}

Most of them could not analysed the (b) part well and messed up in this question.