Let the mind manage the body
Que l'esprit gère le corps

NCE 2025

EXAMINERS' REPORT

Mathematics

Subject code: N510

April 2026

General comments

To achieve higher grades in this paper, candidates are reminded of the following essential requirements:

1. *Comprehensive Coverage of the Syllabus*: A thorough understanding of all topics is vital to ensure confidence in attempting every question, including those that may appear unfamiliar.
2. *Accurate Recall of Formulae*: Mastery of the necessary formulae is fundamental, as errors in recall often lead to avoidable mistakes in calculation and reasoning.
3. *Precision in Calculation*: Careful and accurate computation is critical, particularly in multi-step problems where small slips can undermine otherwise correct methods.
4. *Clear Presentation of Working*: Candidates should set out their solutions neatly and legibly, showing all relevant steps. This not only demonstrates understanding but also allows examiners to award method marks where appropriate.
5. *Adherence to Question Requirements*: Answers must be provided in the exact form requested—whether as fractions, decimals, or rounded values—to avoid unnecessary loss of marks.

Introduction

The October 2025 NCE Mathematics assessment provided a comprehensive overview of candidates' performance across the syllabus, revealing both commendable strengths and persistent challenges. Many candidates approached the examination with confidence, particularly in the early sections of the paper, where time management and presentation were generally effective. Scripts were often neat and well-structured, allowing candidates to secure method marks through clear working. This careful presentation contributed to the overall pass rate of 75.03%, with girls achieving a higher success rate of 77.1% compared to 72.42% for boys. The mean mark of the cohort was approximately 58%, reflecting an average grasp of the syllabus.

Strong performances were evident in arithmetic, statistics, and inverse proportion. These areas highlighted candidates' sound preparation and accuracy, demonstrating that foundational knowledge was well established. Such strengths underscored the importance of consistent practice and mastery of basic concepts, which enabled many candidates to perform confidently and effectively in these sections.

However, the assessment also exposed notable weaknesses in more demanding areas. Algebra proved particularly challenging, with frequent errors in manipulation, simplification, and the application of indices. Probability, mensuration, and coordinate geometry similarly revealed gaps in higher-order reasoning and problem-solving skills. Conceptual topics, such as sets and angles, were often misunderstood. Candidates were confused between related ideas—for example, prime versus composite numbers or misapplying the laws of indices. These difficulties suggested that while candidates were comfortable with routine procedures, they struggled when required to apply knowledge in abstract or multi-step contexts.

Exam technique emerged as another recurring issue. Despite the availability of method marks, untidy or incomplete solutions limited opportunities for partial credit. Furthermore, many candidates lost marks by failing to provide answers in the required form, such as giving fractions instead of decimals or neglecting rounding instructions. These lapses highlighted the need for greater attention to detail and adherence to examination requirements.

Overall, the October 2025 assessment painted a balanced picture of candidate performance. On one hand, it showcased commendable strengths in foundational knowledge, effective time management, and presentation. On the other, it revealed persistent weaknesses in conceptual understanding, algebraic manipulation, and exam technique. The examination successfully differentiated the more able candidates through stretch questions, but it also underscored the importance of strengthening reasoning and problem-solving skills across the cohort. For educators, the findings point to the need for targeted support in algebra, probability, mensuration, and geometry, alongside reinforcement of exam strategies. For candidates, the lessons are clear: mastery of foundational skills must be complemented by careful attention to instructions, neat presentation, and the development of deeper conceptual understanding.

Comments on specific questions

Question 1

Work out:

$$\begin{array}{r} 849 \\ -\ 523 \\ \hline \\ \hline \end{array}$$

The subtraction of the two 3-digit numbers was well answered by almost all the candidates. A few candidates added the two numbers.

(*Ans: 326*)

Question 2

Work out:

(a) $2.1 + 0.5$

(b) $\frac{9}{17} - \frac{3}{17}$

Part(a)

The majority of candidates answered this part well.

(*Ans: 2.6*)

Part(b)

Performance in this part involving simple subtraction of fractions with the same denominators was very satisfactory. (*Ans:* $\frac{6}{17}$)

Question 3

Find $\sqrt[3]{8}$

A high proportion of candidates correctly answered this question.

A few gave 2 x 2 x 2 or 2^3 or 3 as final answer and did not score.

(*Ans: 2*)

Question 4

State the **order** of the matrix. $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

Many candidates knew that the matrix has 2 rows and 1 column but were unable to write the order in the required form and could not score the mark. Writing 1×2 as the order was a common mistake. (*Ans:* 2×1)

Question 5

Express 13% as a **fraction**.

A majority of candidates demonstrated sound understanding by writing the correct fraction. However, some candidates proceeded to convert the fraction into a decimal. Candidates should carefully read the question and provide only the required form of the answer. (*Ans:* $\frac{13}{100}$)

Question 6

Circle the **composite** number in the list below. 2 13 27 41

This was one of the least well-answered questions in the basic questions. Only 4 out of 10 candidates circled the composite number. A significant number of candidates struggled to correctly identify the composite number from the given list. Some candidates circled more than one number, suggesting:

- uncertainty about the definition of a composite number indicating a gap in understanding composite versus prime number.
- inability to read and understand instructions. Careful reading of instructions is essential to avoid selecting multiple answers when only one is required. (*Ans: 27*)

Question 7

Convert 5 L into mL.

This question was well answered by the majority of the candidates. (*Ans: 5000*)

Question 8

Evaluate $3 \times (4 - 2) + 5$

Candidates' performance on this question was generally good, with many arriving at the correct answer.

However for many candidates, the application of BODMAS (order of operations) continues to be a challenging area. A frequent incorrect response was 15, which arose from candidates failing to give priority to the bracket.

Some candidates attempted the calculation from left to right, disregarding the order of operations. (*Ans:11*)

Question 9

(a)	Expand $4\,(x + 2)$
(b)	Factorise $6x - 15$

Part(a)

Well answered by most of the candidates.

Common wrong answer seen was $4x + 2$. (*Ans:4x + 8*)

Part(b)

Many candidates attempted this part successfully. However, some candidates could not factorise the expression. Common wrong answers were:

- $3(2x - 15)$,
- $(2x - 5)$
- $3(x - 5)$

(*Ans:3(2x + 5)*)

Question 10

Simplify $(a^5)^4$

The majority of candidates correctly recognized that the power law was required and applied it successfully. This demonstrates sound understanding of the rules of indices.

A number of candidates mistakenly added the powers rather than multiplying them, leading to the incorrect result a^9. This suggests some confusion between the multiplication law of indices and the power law of indices. (*Ans:* a^{20})

Question 11

Question 11 consisted of 7 multiple choice questions. They were mainly questions assessing knowledge and applications at basic level

Comments on Specific Parts of Question 11

Part(a)

> What is the value of **3** in 21.03?
>
> **A** 3 tens
>
> **B** 3 tenths
>
> **C** 3 hundreds
>
> **D** 3 hundredths

Performance in this part was below average. The most common distractor was option B. 20% of the candidates scoring above 90 marks did not choose the correct answer.

(*Ans: D)*

Part(b)

> Which of the following is an **irrational** number?
>
> **A** $\sqrt{25}$
>
> **B** $\sqrt{5}$
>
> **C** $\frac{22}{7}$
>
> **D** 0.25

Performance in this part was fair. While some candidates demonstrated sound understanding of the distinction between rational and irrational numbers, a considerable proportion made the common error of identifying $\frac{22}{7}$ as an irrational number. This misconception led many to select option C, which was incorrect. It is important to note that $\frac{22}{7}$ is an approximation of π - a rational fraction and therefore does not meet the definition of an irrational number.

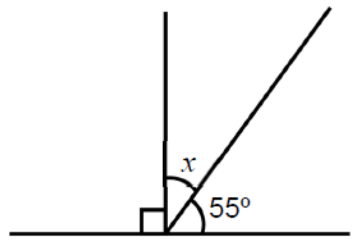
Candidates who answered correctly showed clear reasoning and were able to apply definitions accurately. However, weaker responses revealed gaps in conceptual knowledge.

(*Ans: B*)

Part(c)

What is the **value** of angle x?

A	35º
B	45º
C	125º
D	135º



This part was also satisfactorily answered by most candidates.

(*Ans: A*)

Part(d)

Convert 2 kg 350 g into grams.

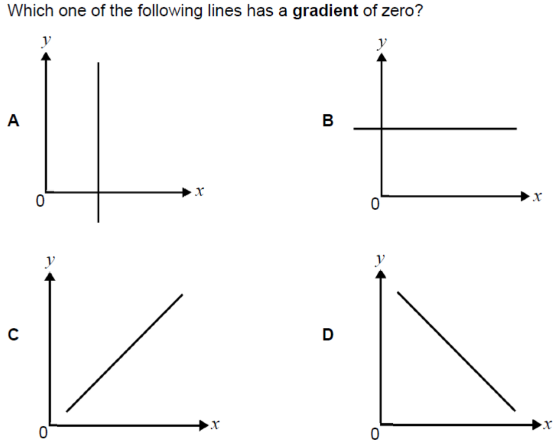
A	2350 g
B	235 g
C	23.50 g
D	2.350 g

This part was well answered by most candidates.

(*Ans: A*)

Part(e)

Which one of the following lines has a **gradient** of zero?



Performance on this item was below average. Many candidates struggled to correctly identify the diagram representing a line with a gradient of zero. It appears that they have not understood the concept that a horizontal line has a gradient of zero. Option C was a common distractor

(*Ans: B*)

Part(f)

A bag of flour weighs 15 kg. What is the mass of 4 such bags? **A** 11 kg **B** 19 kg **C** 30 kg **D** 60 kg

Performance of candidates in this part was very satisfactory.

(*Ans: D*)

Part(g)

What is the **L.C.M.** of $4x$ and $12y$? **A** $4x$ **B** $12y$ **C** $12xy$ **D** $24xy$

This part was well answered by most candidates.

The most common distractor was option D.

(*Ans: C*)

Question 12

A list of numbers is given below. Circle the **smallest** number. 2.05 2.5 2.55 2.005

A significant number of candidates earned the mark for this part.

(*Ans: 2.005*)

Question 13

Part (a)

(a) Evaluate $\frac{1}{2} + \frac{1}{3}$

This part was quite well answered by most candidates. Among those who could not earn full credit, most of them scored the partial mark either for writing 2/6 or 3/6. (*Ans:* $\frac{5}{6}$)

Part (b)

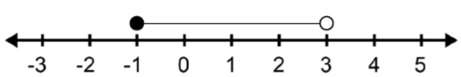
Mira has Rs 360. She gives $\frac{2}{5}$ of her money to Tim
How much money does Tim receive?

The majority of the candidates were able to score full marks in this part.

However, it was noted that after correctly obtaining 144 from $\frac{2}{5} \times 360$, a few candidates mistakenly subtracted from 360, thereby spoiling their otherwise correct solution. (*Ans: 144*)

Question 14

Which inequality correctly describes the set of numbers shown on the number line?



Tick (✓) the correct inequality.

$-1 \le x \le 3$ ☐ $-1 < x \le 3$ ☐

$-1 \le x < 3$ ☐ $-1 < x < 3$ ☐

Part (a)

The majority of the candidates chose the correct inequality.

(*Ans: 1 ≤ x < 3*)

Part (b)

Solve the inequality $-5x > 20$

Half of the candidates demonstrated a sound understanding of the principles involved in solving inequalities.

Candidates could not reach the correct final answer due to recurring numeric and algebraic mistakes. The most frequent incorrect responses included:

• $x > -4$: arising from failure to reverse the inequality sign when dividing by -5.

• $x > 4$: caused by ignoring the negative sign in the coefficient of x.

• $x > 25$: resulting from incorrect transfer of the coefficient -5 to the right-hand side.

Additional errors noted were:

Some candidates replaced the inequality symbol ‘<’ with ‘=’ and proceeded to solve the resulting equation.

A few candidates solved the inequality correctly in their working but wrote only -4 in the answer space, thereby losing marks.

Candidates should be reminded that:

- Dividing or multiplying by a negative number requires reversing the inequality sign.
- Careful attention must be paid to the signs of coefficients throughout the solution.
- The final answer must be expressed as an inequality, not as a single numerical value.

(*Ans: $x < -4$*)

Question 15

Part(a)

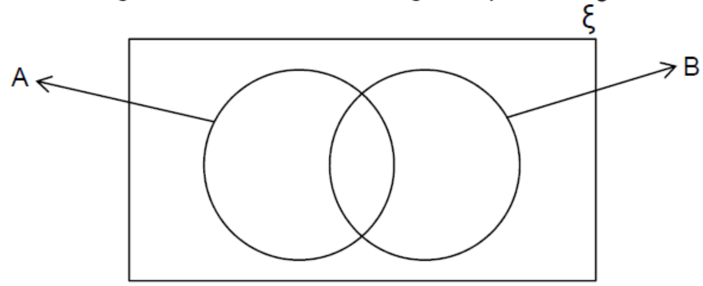
Write down the missing term in the following sequence: (2, 3), (3, 5), (4, 7), (……., …….)

This part was well answered by most candidates.

(Ans: (5 , 9))

Part (b)

In the Venn diagram below, shade the region representing A ∪ B.



Only around half of the candidates were successful in shading the correct region.

Most candidates struggled to identify and shade the required region. Instead of shading the union of sets A and B, many shaded the intersection of the two sets, thereby losing marks.

Question 16

$\mathbf{P} = \begin{pmatrix} 8 \\ -5 \end{pmatrix}$ $\mathbf{Q} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

Find

(a) $\mathbf{P} - \mathbf{Q}$

(b) $2\mathbf{Q}$

This question was attempted by a large number of candidates, many of whom were quite successful in evaluating the matrices **P – Q** and 2**Q**.

Despite this, a significant number of candidates were unable to earn full credit due to arithmetical errors in the further simplification of elements. The most frequent incorrect responses included:

- $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$ for **part (a)**
- $\begin{pmatrix} 9 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} 16 \\ -10 \end{pmatrix}$ for **part (b)**

Candidates should be reminded that:

- ✓ Accuracy in basic arithmetic is essential when simplifying matrix elements.
- ✓ Careful checking of each step can help avoid small errors that lead to incorrect final answers.
- ✓ When working with matrices, attention must be paid not only to the operations but also to the signs of each element.

(Ans: *(a)* $\begin{pmatrix} 5 \\ -7 \end{pmatrix}$, *(b)* $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$)

Question 17

(a)	Find the **value** of m, if $27 = 3^m$.
(b)	Hence, solve $3^{6x} \div 3^{4x} = 27$.

Candidates were expected to use the answer of part(a) to attempt part(b).

Part (a)

This part was well answered by many candidates. The value of 3 was correctly stated by the vast majority. A few candidates gave the incorrect answer 9, arising from dividing 27 by 3.

(Ans: 3)

Part (b)

This part was poorly attempted. 6 out of 10 Candidates struggled to apply the division law correctly on the left-hand side and to equate the resulting power to the value of m obtained in part (a).

Instead of applying the division law, some candidates wrongly attempted to solve $\frac{6x}{4x} = 27$

Candidates should be reminded that misinterpretation of algebraic expressions often leads to unnecessary errors; candidates should check their working against the laws of indices before finalising their answers. Some did not realise that the two parts were linked and they tackled both parts independently. *(Ans:* $\frac{3}{2}$*)*

Question 18

A line passes through the points **A** (0, 1) and **B** (3, 7).

(a) Find the **gradient** of the line **AB**.

(b) **State** the equation of the line **AB**.

Part (a)

Many candidates performed well and obtained the correct answer. However, a common wrong answer among those who did not get the correct answer was $\frac{1}{2}$ arising from the wrong formula $\frac{x_2 - x_1}{y_2 - y_1}$ instead of the correct gradient formula. *(Ans:2)*

Part (b)

Around 60% of candidates struggled to identify the y-intercept from the point and therefore failed to **state** the correct equation of line **AB**. In this case, the y-intercept is directly given by point **A** (0 ,1). It was common to see the equation given as $y = 2x + c$. *(Ans: y = 2x + 1)*

Question 19

12 men take 20 days to build a house.

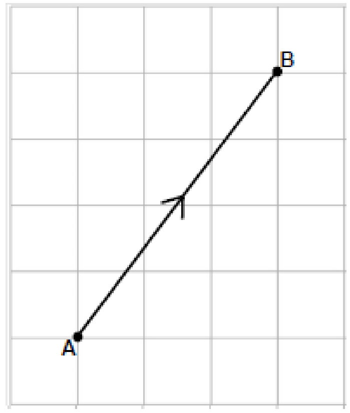
How many days would it take for 10 men to build a similar house?
[Assume that the men work at the same rate.]

7 out of 10 candidates answered this question well, correctly recognising that indirect proportion was required. Their understanding of the concept appeared sound, and most applied it successfully.

However, a small number of candidates mistakenly used direct proportion, which led them to the incorrect answer of $16.\dot{6}$ days instead of the correct answer of 24 days. *(Ans :24)*

Question 20

Point **A** is mapped onto point **B** under a translation T.



(a) Tick (✓) the box, which correctly indicates **T** expressed as a column vector.

$\begin{pmatrix} -3 \\ -4 \end{pmatrix}$ ☐

$\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ ☐

$\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ ☐

[1]

(b) Find the **magnitude** of the column vector **T**.

Part (a)

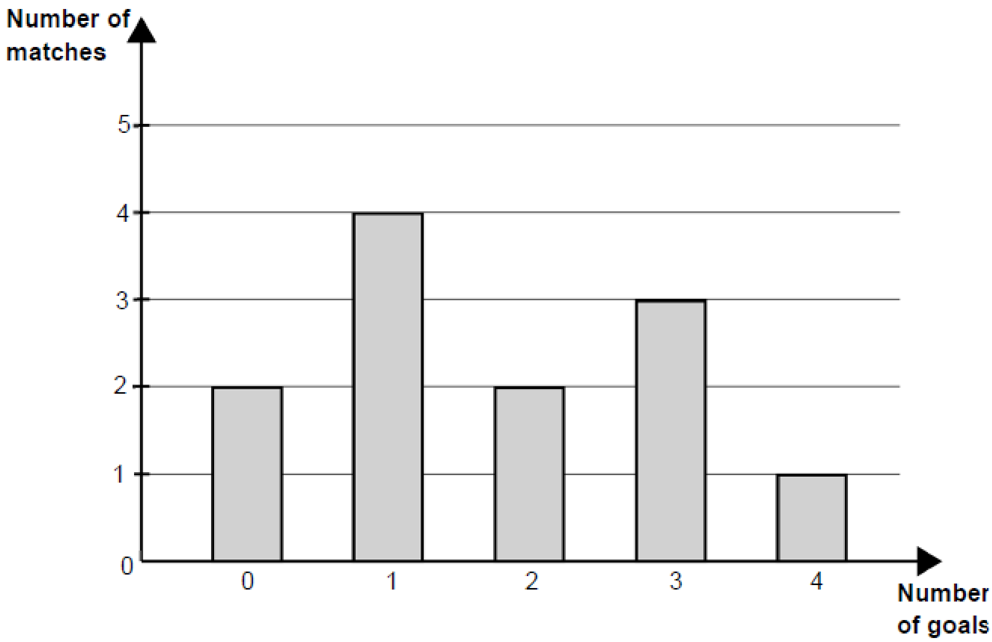
The performance of most candidates was very good. The majority correctly obtained the answer. *(Ans:* $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$*)*

Part (b)

Around 50% of the candidates struggled to recall and apply the formula for determining the magnitude of the vector in part (a). The term 'magnitude' appeared unfamiliar to several candidates, highlighting a weakness in both conceptual understanding and the ability to translate terminology into mathematical procedure. (*Ans: 5)*

Question 21

21. The bar chart shows the number of goals scored in 12 matches of a football tournament.



(a) Using the information given in the bar chart, complete the table.

Number of goals	0	1	2	3	4
Number of matches	....	4	....	....	1

[2]

(b) Find the **mean** number of goals scored per match.

Part (a)

The vast majority of candidates were able to interpret the information presented in the bar chart and complete the table successfully. This demonstrates a sound ability to read and transfer data accurately. Most candidates obtained the correct entries in the table without difficulty. *(Ans: **2**, 4, **2**, **3**, 1)*

Part (b)

In contrast, 1 out of 3 candidates were able to earn credit in this part. Responses suggested that candidates were not familiar with the correct method for calculating the mean number of goals from a frequency distribution table. A range of incorrect answers was observed, including $\frac{21}{5}$, $\frac{21}{10}$, $\frac{12}{5}$ and $\frac{10}{12}$. The denominator of 5 often arose from the total number of possible goals, while the denominator of 10 came from the sum of the possibilities for the number of goals (i.e. 0+1+2+3+4).

Among those who correctly obtained, some approximated their answer to 2, under the mistaken belief that the mean number of goals must be a whole number. This revealed a lack of understanding of the concept of mean, which does not necessarily yield an integer value.

Educators should place greater emphasis on the distinction between reading data and applying statistical methods. Candidates need more practice in calculating the mean from a frequency distribution table, with particular attention to the correct use of frequencies and totals in the denominator. It is also important to reinforce the idea that the mean is not restricted to whole numbers, and that rounding should only be applied when explicitly required. Clearer guidance on interpreting instructions and avoiding unnecessary assumptions will help candidates develop stronger conceptual understanding and improve accuracy in future assessments.

(Ans: $\frac{21}{12}$*)*

Question 22

Part (a)

The plan of a house is drawn to a scale 1 : 400. On the plan, a wall is represented by a line of 7.5 cm. Find the actual length of the wall, in **metres**.

This part of the question proved to be quite challenging for many candidates. It appears that the concept of scale mapping and ratio was not clearly understood by candidates, and a wide range of random calculations were observed. While some candidates began correctly by multiplying 7.5 by 400, they failed to convert the result into metres, thereby losing accuracy. It was also noted that a few candidates simply divided or multiplied 7.5 cm by 100, obtaining 0.075 and 750 respectively as their final answers, without applying the given scale. These errors highlight a lack of understanding of the principles of scale and unit conversion, which are essential for solving such problems correctly. *(Ans: 30)*

Part(b)

Solve $p^2 - 10p + 10 = -14$.

The response to this part was diverse. Very few candidates successfully reached the correct solutions. Among those candidates who obtained the correct quadratic equation, solutions $p = \pm 2$ and $p = \pm 12$, resulting from wrong factorisation were commonly seen.

Many candidates transferred 10 to the right-hand side obtaining $p^2 - 10p = -24$ and made wrong attempts to solve for p.

These errors highlight weaknesses in algebraic manipulation and factorisation skills, as well as a lack of precision in handling equations.

(Ans: p=4 , p=6)

Question 23

A formula is given by $A = \pi r^2 + \pi r l$. (a) Calculate the value of A when $r = 7$ cm and $l = 4$ cm. Leave your answer in terms of π. (b) Make l the subject of the formula, leaving your answer in terms of π.

Part (a)

Performance in this part was generally satisfactory. However, a number of candidates substituted $\frac{22}{7}$ for π, arriving at a final value of 242 despite the clear instruction to leave the answer in terms of π . This error highlights the importance of reading instructions carefully and following them precisely, as failure to do so can lead to unnecessary loss of marks.

(*Ans: 77* π)

Part (b)

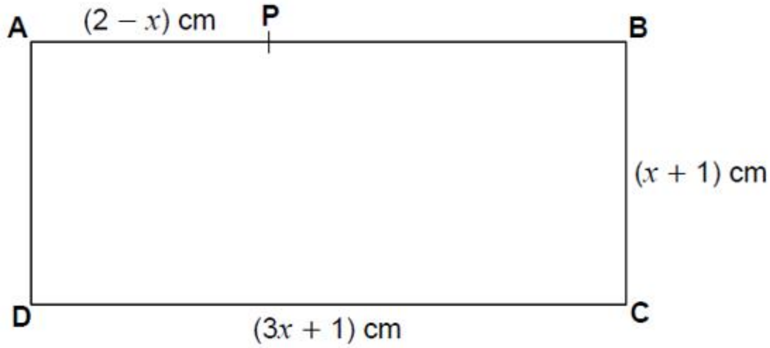
In this part, many candidates encountered difficulty in making l the subject of the formula.

A common mistake was the incorrect rearrangement of terms, producing $\pi r l = \pi r^2 - A$ instead of the correct $\pi r l = A - \pi r^2$. It was also frequently observed that candidates substituted A with the value obtained in part (a) and with the given value of 7, before attempting to calculate a numerical value for l. Such approaches revealed a lack of conceptual understanding of the task, which required algebraic manipulation rather than numerical substitution.

(*Ans:* $l = \frac{A - \pi r^2}{\pi r}$)

Question 24

ABCD is a rectangle.
It is given that **DC** = $(3x + 1)$ cm and **BC** = $(x + 1)$ cm.
P is a point on **AB**, such that **AP** = $(2 - x)$ cm.



Giving each answer in its **simplest form**, find, in terms of x, an expression for

(a) **PB**,
(b) area of rectangle **ABCD**.

Part (a)

Many candidates recognised that $(2 - x)$ should be subtracted from $(3x + 1)$ in order to form an expression for PB. However, a significant number were unable to reach the correct answer due to errors in algebraic manipulation. A common mistake was to begin with $3x + 1 - 2 - x$, ignoring the use of brackets, which led to incorrect simplification and loss of marks.

(Ans: $4x - 1$)

Part (b)

This part was attempted by many candidates who correctly recalled the formula for the area of a rectangle. They proceeded to form the product $(x + 1)$ and $(3x + 1)$, but once again, errors in algebraic manipulation prevented them from arriving at the correct answer. This suggests that while candidates were able to identify the appropriate method, weaknesses in basic algebraic skills hindered their ability to complete the solution successfully.

(Ans: $3x^2 + 4x + 1$)

Question 25

Solve the simultaneous equations:

$$3x - y = 7$$

$$2x + 3y = 1$$

A significant number of candidates successfully solved the given pair of simultaneous equations. The elimination method was the preferred approach, being used more frequently than the substitution method.

However, arithmetic errors were commonly observed. For example, while eliminating variable x candidates sometimes derived incorrect steps such as:

$$-2y - \ +9y = 14 - 3 \Rightarrow 11y = 11 \Rightarrow \ y = 1$$

Such slips in calculation affected accuracy, though many candidates who obtained an incorrect value for the first variable were still able to proceed logically to determine the second variable. This allowed them to earn partial credit for method and follow-through.

Candidates are strongly advised to check their solutions by substituting the obtained values back into the original equations. This verification step ensures that both variables satisfy the given system and helps avoid the loss of marks.

(*Ans: x = 2, y =-1)*

Question 26

The exterior angles of a triangle are in the ratio 5 : 6 : 7. Calculate (a) the difference between the greatest and the smallest **exterior** angles, (b) the greatest **interior** angle of the triangle.

Part (a)

Many candidates found this question challenging. Some performed well in this section, and achieved full marks, showing that they understood the requirements of the question. However, those who did not score full marks often demonstrated awareness of what was expected but struggled to differentiate between the sum of exterior angles and the sum of interior angles of a triangle. This confusion led to incorrect answers such as 20^0, derived from the calculation $\frac{7-5}{18} \times 180^0$. The error reflects a conceptual misunderstanding rather than using a wrong method, highlighting the need for reinforcement of the fundamental property that the sum of interior angles of a triangle is 180^0 while the sum of exterior angles is 360^0. (*Ans: 40^0*)

Part (b)

A smaller proportion of candidates managed this part successfully, indicating that it was more demanding.

Most candidates struggled to connect Part (b) to Part (a).

- Some simply repeated the greatest angle from Part (a).
- Others subtracted the greatest angle of Part (a) from 180^0, which was not the required approach.

This indicates a weakness in applying sequential reasoning, where knowledge from one part of a question must be used to solve the next part. The responses suggest that candidates need more practice with multi-part problems that require logical progression and careful application of earlier results to subsequent steps. (*Ans:80^0*)

Question 27

John deposits a sum of Rs 200 000 for a period of 30 months in a bank.
The rate of simple interest is 3% per annum.

Find the **total** amount of money that John will get from the bank when he withdraws all his money after 30 months.

Many candidates were able to recall and correctly apply the formula for simple interest, successfully arriving at the expected answer.

However, a notable number of candidates overlooked key words in the question, particularly months and total amount. This led to a common error where they substituted 30 months for time instead of converting it to years by considering 30/12, resulting in an inflated simple interest of Rs 180,000 instead of Rs 15,000.

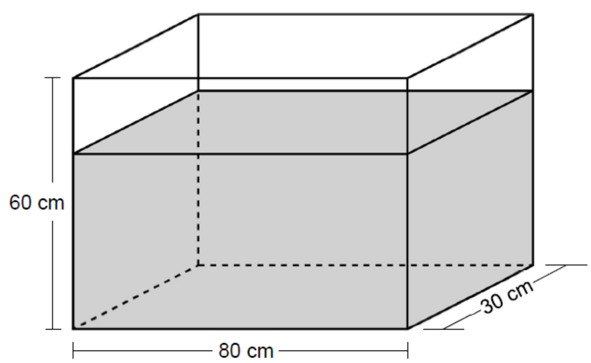
Furthermore, several candidates presented this incorrect value of simple interest as their final answer without adding it to the principal sum of Rs 200,000 deposited in the bank.

These mistakes highlight the importance of careful reading of problem statements and accurate interpretation of time units and total amount requirements in financial mathematics.

(*Ans: 215 000)*

Question 28

The diagram shows a rectangular water tank **A** with dimensions 80 cm by 30 cm by 60 cm.



Tank **A**

(a) Tank **A** is $\frac{2}{3}$ full of water.
Calculate the volume of water in Tank **A**.

This part was well attempted by a number of candidates, with several demonstrating sound understanding of the problem.

However, the following common mistakes were observed:

- Some candidates gave 144,000 as their answer, which represented the total volume of the tank rather than the requested volume of water in the tank.
- Others mistakenly calculated the total surface area instead of the volume of water.

These errors suggest that while candidates were familiar with formulae, they did not always pay close attention to the specific requirements of the question.

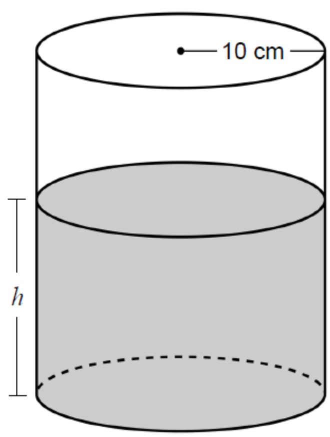
(*Ans: 96 000)*

Part (b)

The water from tank **A** is poured into a cylindrical container **B** with radius 10 cm.

While the water from tank **A** is being poured into container **B**, 6 L of water is **lost**.

Find the depth of the water, h cm, in container **B**. Give your answer in terms of π.



Container **B**

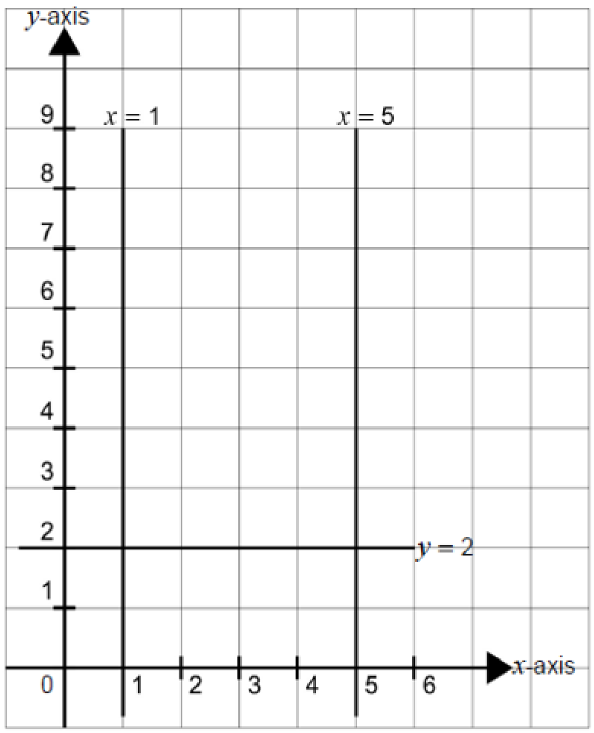
This part proved more challenging for the majority of candidates. Less than 20% of the candidates scored full marks

A vast number were unable to correctly convert 6 L into cm³, a fundamental step in solving the problem. In addition, many scripts revealed the use of incorrect formulae for the volume of a cylinder.

Among those who did manage the correct conversion and equated the volume of water left in container B to the appropriate cylinder formula, a few struggled with the algebraic manipulation required to express h in terms of π. This led to incorrect results such as 900π . These difficulties highlight weaknesses in unit conversion, formula recall, and algebraic manipulation, all of which are essential skills for success in such questions. (*Ans: 900/* π*)*

Question 29

Three lines $x = 1$, $x = 5$ and $y = 2$ are shown on the graph below.



(a) On the same Cartesian plane, draw the graph of $y = x + 4$.

(b) What is the special name given to the figure enclosed by the four straight lines?

(c) Calculate the **area** of the figure formed.

Part (a)

Very few candidates were able to correctly draw the line $y = x + 4$. The most common error observed was the drawing of the horizontal line $y = 4$, which indicates a misunderstanding of the slope-intercept form of linear equations. This suggests that candidates need further practice in distinguishing between lines with gradients and those representing constant values.

Part (b)

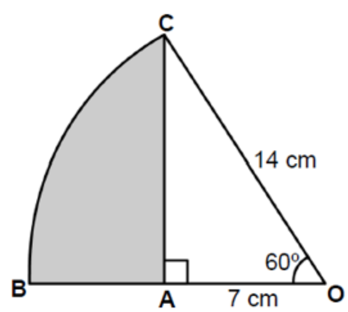
Despite the error in Part (a), a vast majority of candidates were able to correctly identify the name of the figure enclosed by the given lines $x = 1$, $x = 5$, $y = 2$ and their incorrectly drawn line from Part (a). This shows that candidates could still recognize and name geometric figures even when their earlier construction was flawed. *(Ans: Trapezium)*

Part (c)

Many candidates successfully calculated the area of the shape formed by the three given lines and their incorrect line from Part (a). This demonstrates that, although the initial graphing error persisted, candidates were still able to apply area formulas effectively to the figure they had drawn, reflecting partial understanding and procedural competence. *(Ans: 20)*

Question 30

OBC is a sector of a circle with centre **O** and radius 14 cm. It is also given that **AO** = 7 cm.



[Given sin 60° = 0.87, cos 60° = 0.5, tan 60° = 1.73]

(a) Using one of the trigonometric ratios listed above, find the length of **AC**. Give your answer to the **nearest whole number**.

(b) Find the length of arc **BC**. (Use $\pi = \frac{22}{7}$)

(c) Using your answers to part (a) and part (b), find the **perimeter** of the shaded part **ABC**.

Part (a)

Many candidates correctly identified and applied the appropriate trigonometric ratio (sine or tangent) to calculate the length of AC.

Common issues encountered were as follows:

- A significant number of candidates presented their final answer as a decimal rather than rounding to the nearest whole number, which led to unnecessary loss of marks.
- Poor presentation of working steps was frequently observed, reducing clarity.
- A few candidates ignored the instruction to use trigonometric ratios and instead applied Pythagoras' Theorem, stopping at $\sqrt{147}$ without simplification, which was incomplete.

Candidates must be reminded that accuracy in presentation and adherence to instructions (e.g., rounding requirements) are as important as correct method selection. (*Ans: 12*)

Part (b)

A number of candidates demonstrated partial understanding of circle geometry and length of arcs, but several recurring errors were observed. Some candidates applied an incorrect angle proportion, for example using $\frac{90}{360} \times 2\pi r$ when the required calculation involved a different sector angle 60^0. Others selected the wrong formula $\frac{60}{360} \times \pi r^2$,confusing arc length with sector area. In addition, a common slip was the use of 7 cm as the radius instead of 14 cm due to an error in identifying the correct radius in the diagram.

These errors suggest three main areas of weakness:

• Conceptual clarity: distinguishing between formulas for arc length and sector area.

• Procedural accuracy: applying the correct fraction of the circle's angle.

• Attention to detail: correctly identifying the length of the radius. (*Ans: 44/3*)

Part (c)

A high proportion of the candidates knew that the perimeter of the shaded region had to be obtained by adding the side AB, the side AC and the arc BC and scored full marks. (*Ans: 101/3*)

Question 31

A bag contains 12 red balls and x blue balls. A ball is chosen at random from the bag.

(a) (i) Write down in terms of x, the total number of balls in the bag.

(ii) Find in terms of x, the probability that a **red** ball is chosen.

(b) Given that the probability that a blue ball is chosen equals to $\frac{3}{5}$, find the **value** of x.

Most candidates attempted this question, showing a generally sound understanding of probability concepts. However, accuracy in algebraic manipulation and method selection varied considerably across parts.

Part (a)(i)

Many candidates correctly expressed the total number of balls as $12 + x$. A common error was the incorrect simplification to $12x$ which spoiled otherwise correct reasoning. This indicates a need for stronger emphasis on distinguishing between addition and multiplication in algebraic expressions.

(*Ans: $12 + x$*)

Part (a)(ii)

A large proportion of candidates earned the mark in this part. Even those who had obtained an incorrect expression in (a)(i) often demonstrated procedural understanding by writing the probability as a fraction with 12 in the numerator and their (incorrect) total in the denominator. This shows that while algebraic accuracy was inconsistent, probability reasoning was more secure.

(*Ans:* $\frac{12}{12+x}$)

Part (b)

Less than 40% of candidates successfully obtained 18 as the number of blue balls. Candidates employed a range of methods, including comparing fractions, using proportion, and trial-and-error approaches. While these methods were valid, it was rare to see candidates apply algebraic techniques such as equating the probability of a red ball to $\frac{2}{5}$ or a blue ball to $\frac{3}{5}$, then solving for x. This suggests that many candidates rely on intuitive or numerical strategies rather than formal algebraic reasoning.

(*Ans: 18*)

Recommendations and Conclusion

Educators are encouraged to place greater emphasis on conceptual clarity in algebra, probability, and geometry, ensuring that learners can apply knowledge flexibly rather than relying solely on memorisation. More practice with multi-step reasoning, sequential problem-solving, and careful interpretation of instructions will help candidates approach unfamiliar problems with confidence. Candidates should also be reminded of the importance of clear, structured working, as this not only demonstrates understanding but also allows examiners to award method marks where appropriate.

Exam preparation should include varied question types, reinforcing skills in unit conversion, formula application, and data interpretation. Educators should highlight common pitfalls, such as misapplication of indices laws or confusion between interior and exterior angles, while encouraging candidates to verify their solutions and check for accuracy.

In conclusion, the examination results underscore the need for a balanced approach: consolidating strengths in basic computation while addressing weaknesses in reasoning, application, and presentation. By fostering precision, perseverance, and adaptability, educators and candidates can work together to achieve stronger outcomes in future assessments, building both immediate examination success and long-term mathematical resilience.