basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

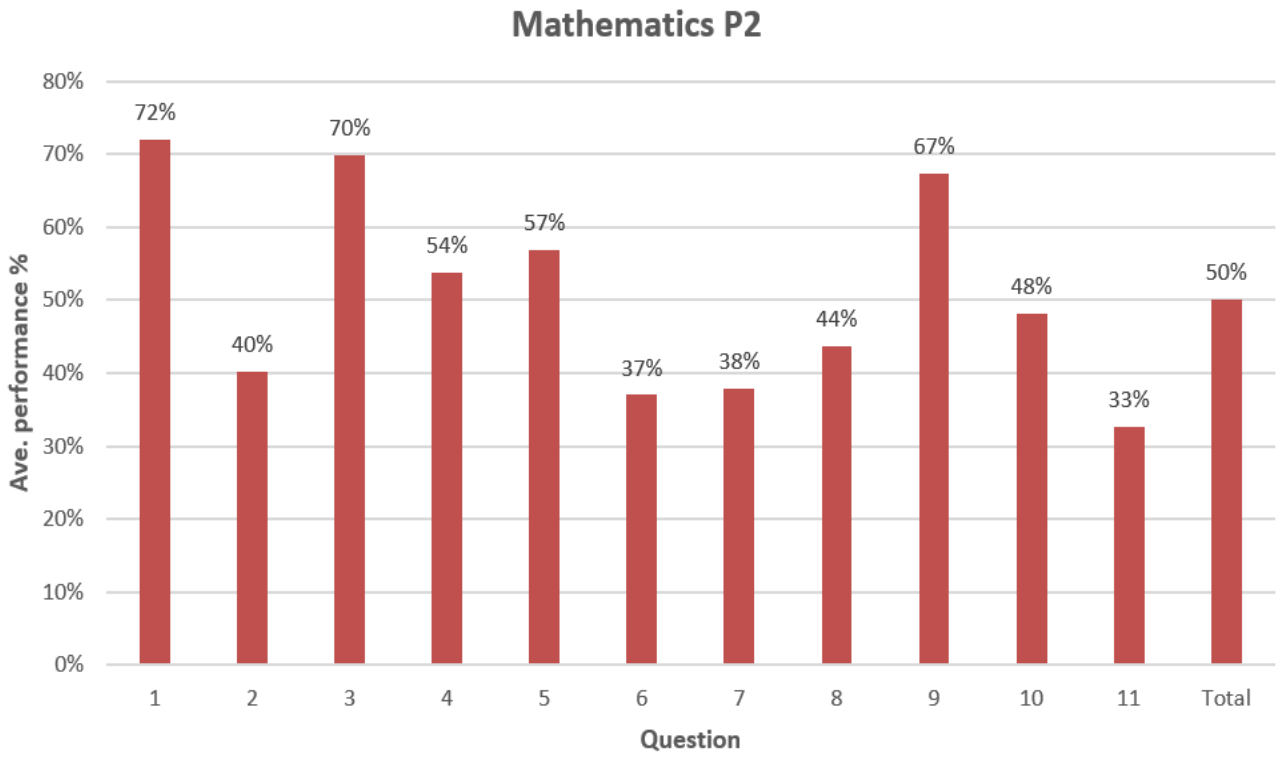
QUALITATIVE ANALYSIS OF LEARNER RESPONSES
AND
EVALUATION OF THE QUESTION PAPERS (PER PAPER)
NATIONAL SENIOR CERTIFICATE 2025
WESTERN CAPE EDUCATION DEPARTMENT

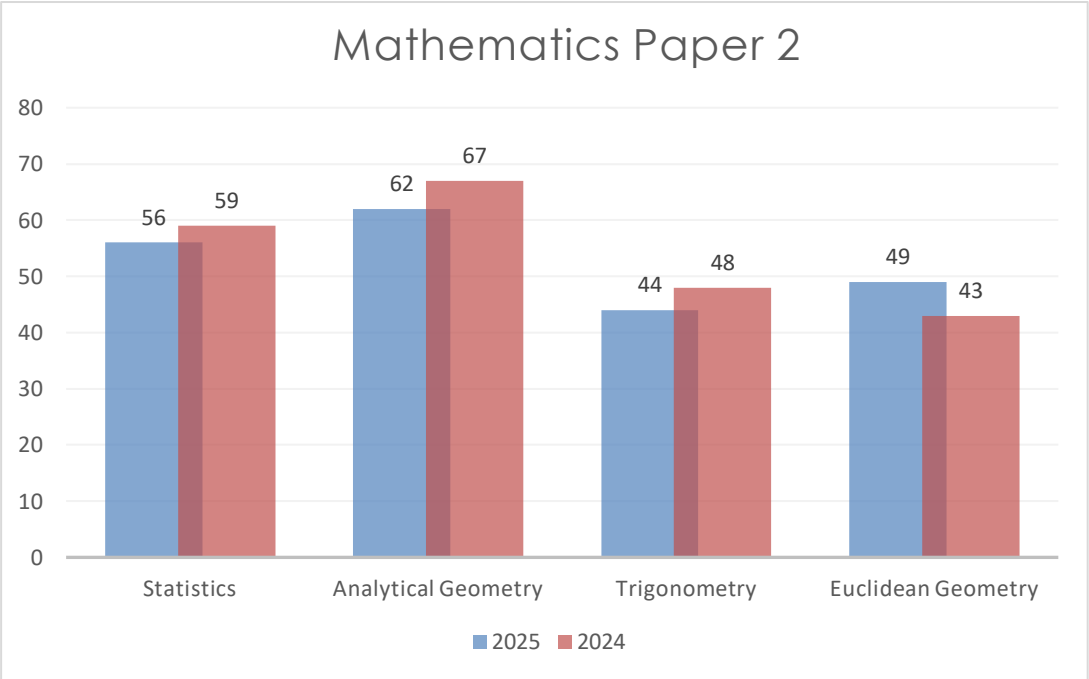
SUBJECT	**MATHEMATICS**		
QUESTION PAPER	**1**	**2**	**3**
DURATION OF PAPER	**3 HOURS**		
INTERNAL MODERATOR	**LINDLEY MINNAAR**		
CHIEF MARKER	**HANNELIE BAEHNISCH**		
DATES OF MARKING	**FROM: 29 NOVEMBER 2025**	**TO: 10 DECEMBER 2025**	
HEAD OF EXAMINATION	**MS LM BREDENKAMP**		

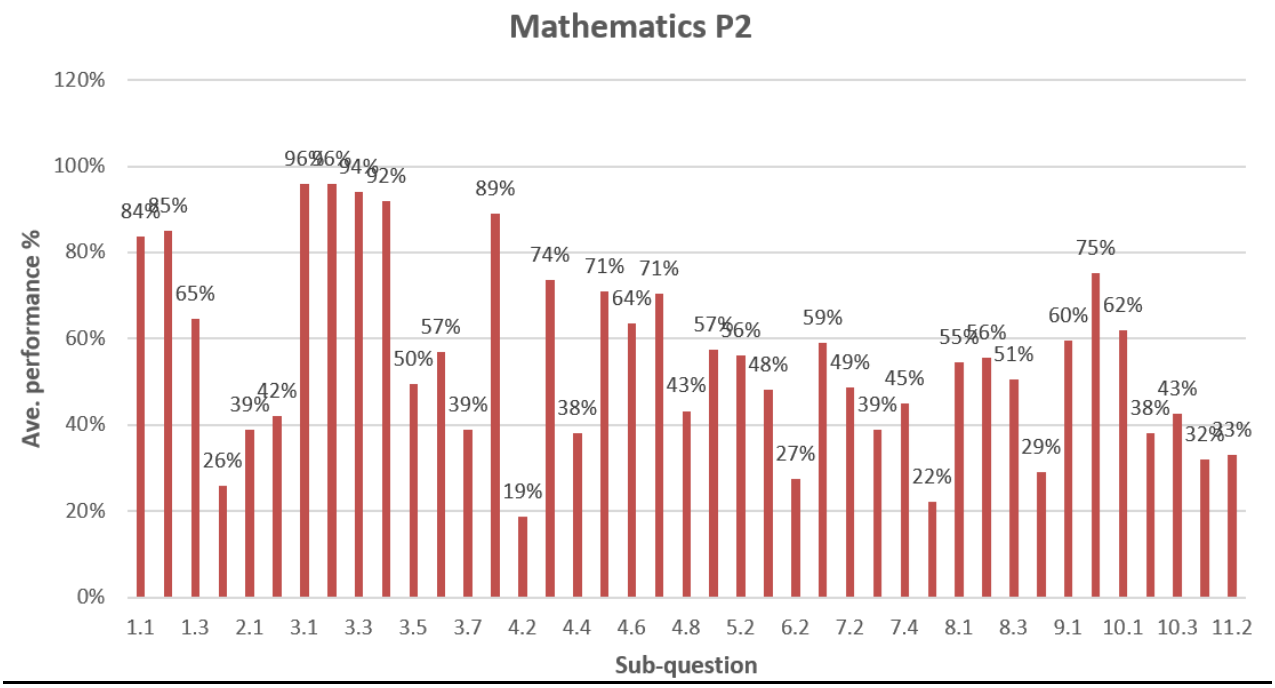
REPORT 2: QUALITATIVE ANALYSIS OF LEARNER RESPONSES

SECTION 1: ***(GENERAL OVERVIEW OF LEARNER PERFORMANCE IN THE QUESTION PAPER AS A WHOLE)***

The table below shows the average percentage per question for Paper 2 from a random sample of 100 candidates chosen for the Rasch analysis. The graph below shows the average percentage per question for comparative purposes.





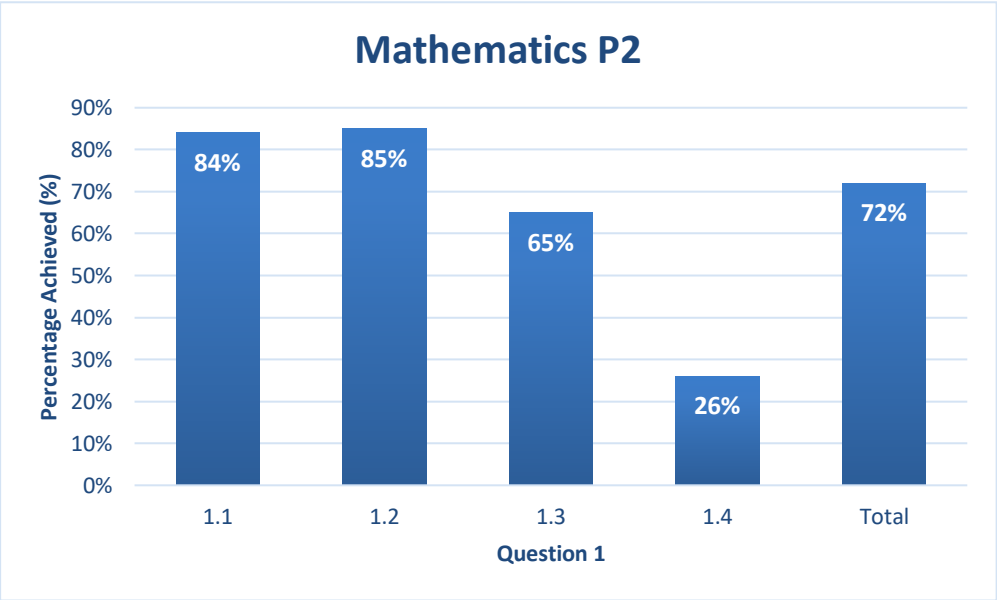


<u>SECTION 2</u>: *COMMENT ON CANDIDATES' PERFORMANCE IN INDIVIDUAL QUESTIONS*

(It is expected that a comment will be <u>provided for each question</u>)

<u>QUESTION 1</u>

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



- This question was well answered overall.
- Question 1.4 had a big impact on this question.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

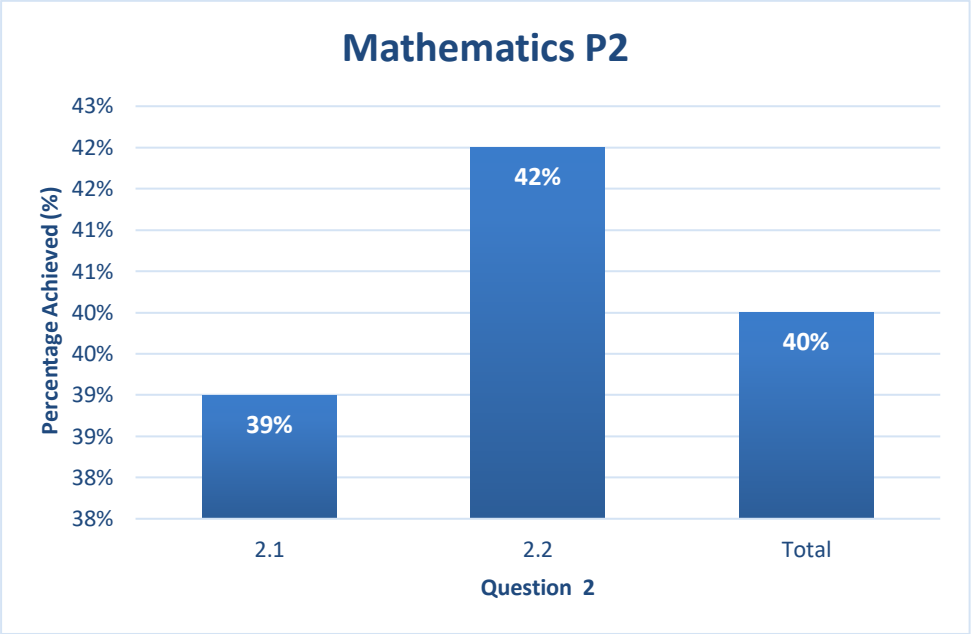
The equation of the least square regression line:

$y = a + bx$; the value of a and b obtained using the calculator. Candidates can score easily marks in this question however:

	• Poor calculator skills resulted in some candidates resulted in candidates not calculating the values of a and b correctly. • Some could not round off correctly to two decimal places. • Some omitted the variable x in the equation. • Candidates do not show the individual answers for a and b and only give the final equation but then swop values around when writing down the equation and thus loose marks. • In question 1.3 after calculating the correlation coefficient (r) candidates struggle to describe the meaning of the value of r. • In question 1.4 candidates struggle to write down the average decrease in the selling price Candidates could not relate the graph of a straight line in Functions to the average rate of change of the regression line in Statistics.
(c)	***Provide suggestions for improvement in relation to Teaching and Learning.***
	• Learners should be given multiple opportunities to practice calculator skills. (Schools should supply resources to those who cannot afford it.) • Teachers should emphasize correct rounding procedures. (from as early as Gr 8). • Encourage learners to write down all steps and not just final answers. • Candidates should be taught the meaning of the correlation coefficient (r) and what a certain value indicates. • Teachers should explain each definition or concept in detail. Statistical language should be used in class so that learners become familiar with the terminology. • Teachers should integrate the different topics functions in statistics and not teach in silos.
(d)	***Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.***
	Use Casio representative to do workshop at school for learner and teachers. The will also provide the emulator to be used on a computer.

QUESTION 2

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



- This question was poorly answered overall.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In question 2.1 the data given in the Cumulative frequency table was different from the "normal" table with classes all starting at zero and no frequency given.
- Candidates struggle to calculate the frequency in question 2.1.2 and from this information draw the histogram in question 2.1.3.
- Candidates use the cumulative frequency to draw the histogram since the frequency was not given in question 2.1.3.
- In question 2.1.4 candidates struggle to read the skewness from the histogram.
- In question 2.2 candidates work **only** with the data of the given 8 learners in the table although the team consist of 9 players.
- Candidates use the mean and standard deviation of the 8 players instead of 9 players to calculate how many players are outside one deviation of the mean.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

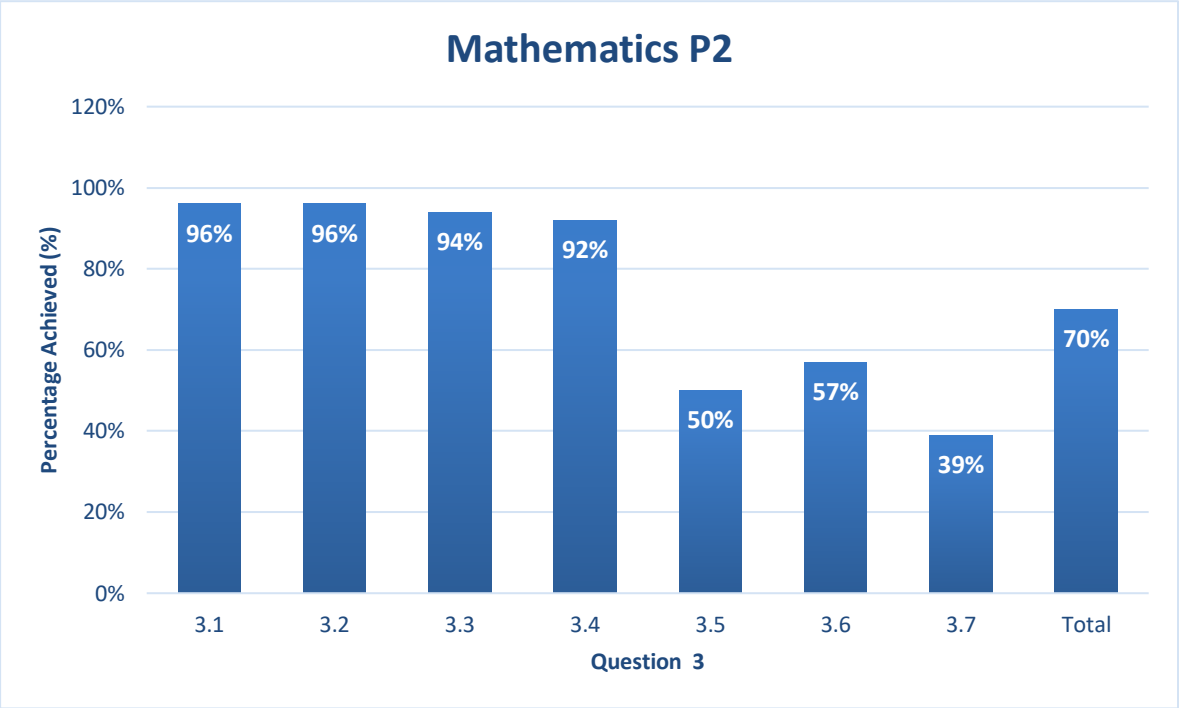
- Often in data handling educators mostly cover routine type of questions.
- Candidates should also be exposed to more complex questions.
- Teach skewness from Box & Whiskers, histogram and ogive.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Candidates should get more practice in answering questions that are not routine to improve their understanding of the concepts in Statistics.
- Practice "wordy" problems in class.

QUESTION 3

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Candidates performed well in Q 3.1, 3.2, 3.3 and 3.4, but did not perform so well in the rest of the question. Question 3.7 was answered poorly.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In question 3.5 candidates struggle to calculate the fourth vertex of a parallelogram if three are given.
- Many candidates still get confused when calculating gradients of parallel and perpendicular lines.
- In question 3.6 candidates assume that T was the midpoint instead of proving T is the midpoint and lost marks.
- Candidates apply the incorrect area rule especially if height is not given in question 3.7.
- Many candidates lost marks by using the incorrect formula for the area - e.g. using two sides that were not perpendicular in the A = $\frac{1}{2}b.h$ formula or using the incorrect included angle when using the trig area formula.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

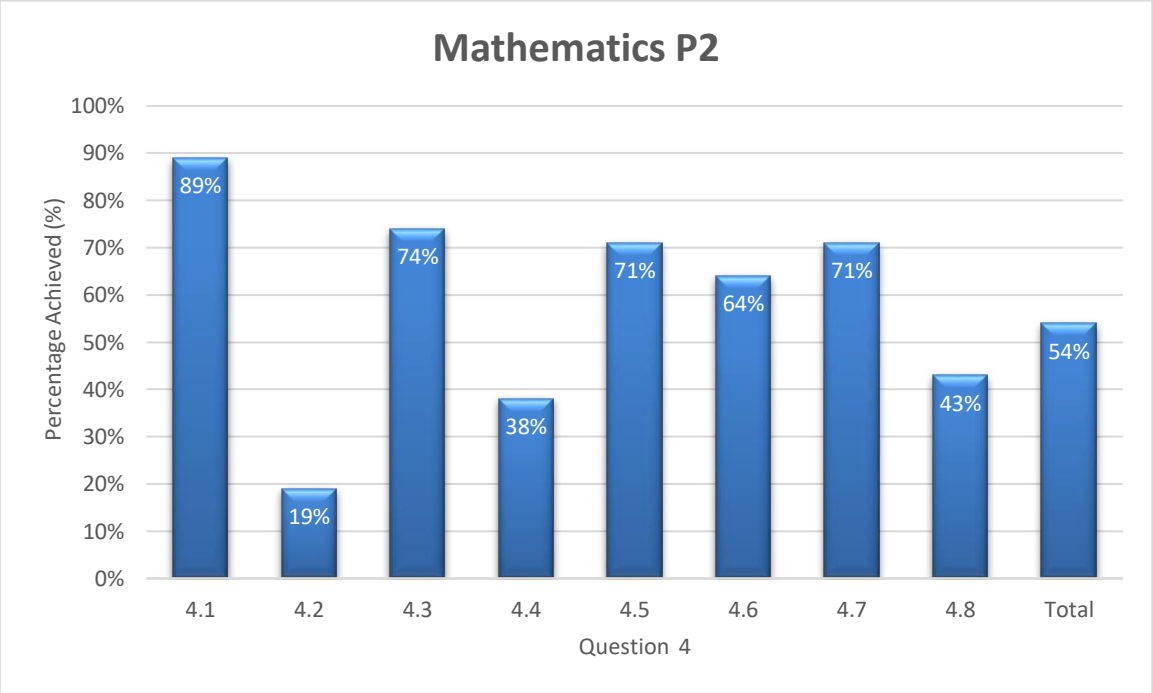
- Candidates should know how to calculate the fourth vertex in a parallelogram. The vertical and horizontal shift of the second/opposite vertex gives the fourth vertex.
- Teachers need to revise the concept of perpendicular lines, gradients and simultaneous equations, particularly that point T is the point of intersection of the two lines.
- Candidates need to be given more practice in applying area rules in triangles and parallelograms using different methods.
- Correct use of calculations with surds should be emphasized in lower grades.

(d)	***Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.***

Candidates should be taught how to reason and explain their thinking.

QUESTION 4

(a) ***General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?***



Questions 4.1; 4.3; 4.5; 4.6 and 4,7 were well-answered

Questions 4.2; 4.4; and 4.8 were poorly answered

(b) ***Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.***

- Candidates struggle to show $q = 4$ in question 4.2.
- In question 4.2 recognizing the different right-angled triangles and that the radii $\mathrm{AM} = \mathrm{ME} = q + 1$ was challenging to the candidates.
- In question 4.8 candidates struggle with the integration of Trigonometry, Euclidean Geometry and Analytical Geometry to calculate the angle.

(c) ***Provide suggestions for improvement in relation to Teaching and Learning.***

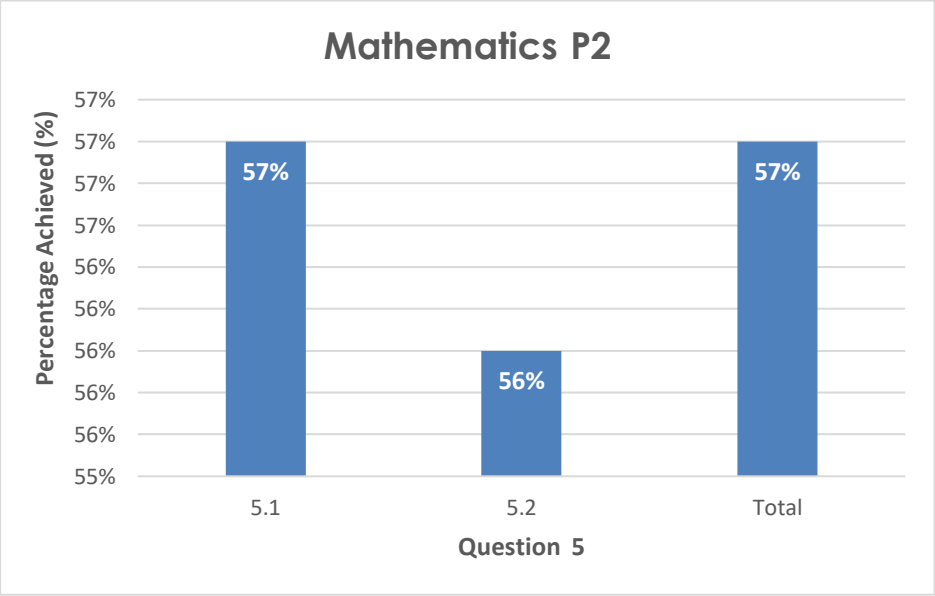
- Constant revision of Analytical Geometry concepts taught in Grades 10 and 11 is essential, as much of the Grade 12 work revolves around these concepts, for example the theory regarding parallel and perpendicular lines.
- Teachers need to revise the concept of perpendicular lines and gradients, particularly that the tangent is perpendicular to the radius at the point of contact.
- Educators should spend time on examples / questions of tangents that touch circles.

(d) ***Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.***

- The different topics in Mathematics should be integrated. Learners must be able to establish the connection between Euclidean Geometry and Analytical Geometry and Trigonometry as well as measurement.
- Candidates must know how to name Angles in a diagram correctly.
- Candidates must use the diagram given in the answer book and not the one on their question paper. They must indicate any lengths and angles calculated on the diagram.
- Candidates should practice more examples on how to calculate different angles in an Analytical diagram and not only inclination angles.
- Candidates should know that a positive gradient will give an acute inclination angle, and a negative gradient will give an obtuse inclination angle. They must learn to label their angles correctly and clearly, adding in letters where necessary. All other angles must be calculated using their knowledge of geometry in previous years.
- Teachers should encourage learners to write down the values that they have already calculated (lengths, angles and gradients) on the diagram. This will assist learners
- when answering follow-up questions.

QUESTION 5

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Fairly answered by candidates.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In question 5.1. Some candidates struggled to interpret the given trigonometric definition: $\tan 50° = k$
- Candidates could not identify the correct sides (opposite and adjacent).
- Many drew the triangle in the wrong quadrant.
- Applying Pythagoras to get the unknown side caused some problems for many candidates
- Applying double angles and compound angles formula

- Simplifying the given angles to $50°$ or $40°$.
- In question 5.2 candidates fail to realize that for a square root $\sqrt{}$ the value must be positive and that the denominator of the fraction is not equal to zero.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

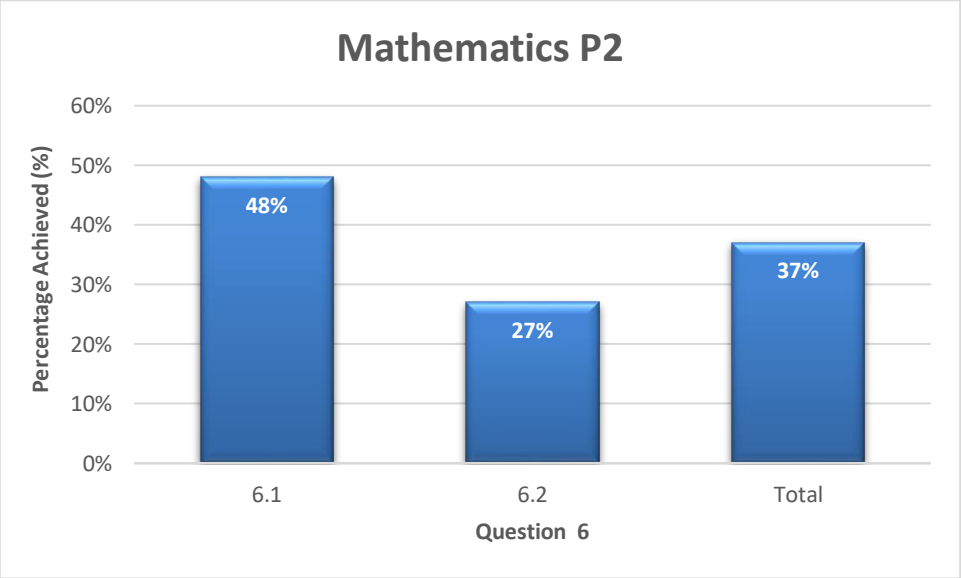
- Focus on basics.
- Exposing learners to double and compound angles.
- Candidates must ensure that they check the signs of the x- and y-coordinates.
- Candidates confuse sine & cosine ratios.
- In applying the reduction formulae candidates should be reminded to show all steps
- Candidates should know their identities to make the correct choice of which one to use to simplify or prove

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Candidates should be exposed to the integration of Algebra (factorizing in this question) in all the spheres of Mathematics. (even from grade 10)
- Learners find it difficult to recall the Trigonometry taught in Grades 10 and 11. Revision of this work must be ongoing

QUESTION 6

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Poorly answered

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In question 6.1 candidates struggle with the application of the basic reduction formulas, square identity, quotient identity and factorization.
- In question 6.2 given the arithmetic sequence in trigonometry confused some candidates.

- Candidates struggle to factorize the equations.
- Candidates did not read the question properly and failed to apply the conditions of the arithmetic sequence.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

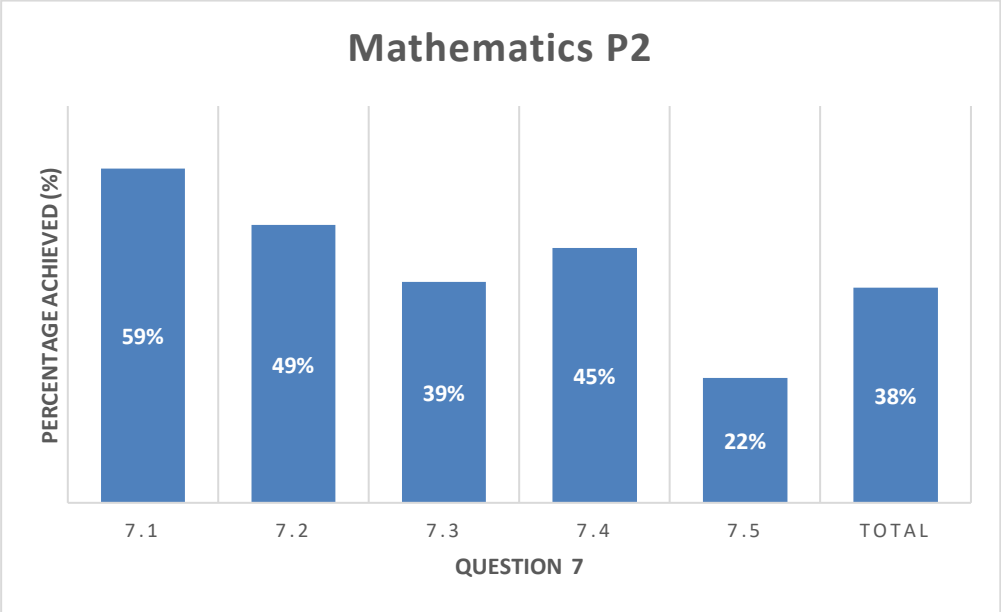
- Candidates should know their identities to make the correct choice of which one to use to simplify or prove.
- Revise all the different types of factorizations when doing trigonometry.
- The key to solving trigonometric equations lies in understanding in which quadrants a trigonometric function is positive or negative. Also, it must be stated that $k \in Z$ in the general solution.
- Use similar examples to show candidates the integration of topics: Numbers and patterns with trigonometry.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Candidates should be exposed to the integration of Algebra (factorizing of a common factor, grouping, difference between two squares, cubic and of a Trigonometric trinomial) in all the spheres of Mathematics
- Working through previous question papers will provide good understanding of mathematical content.

QUESTION 7

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Poorly answered

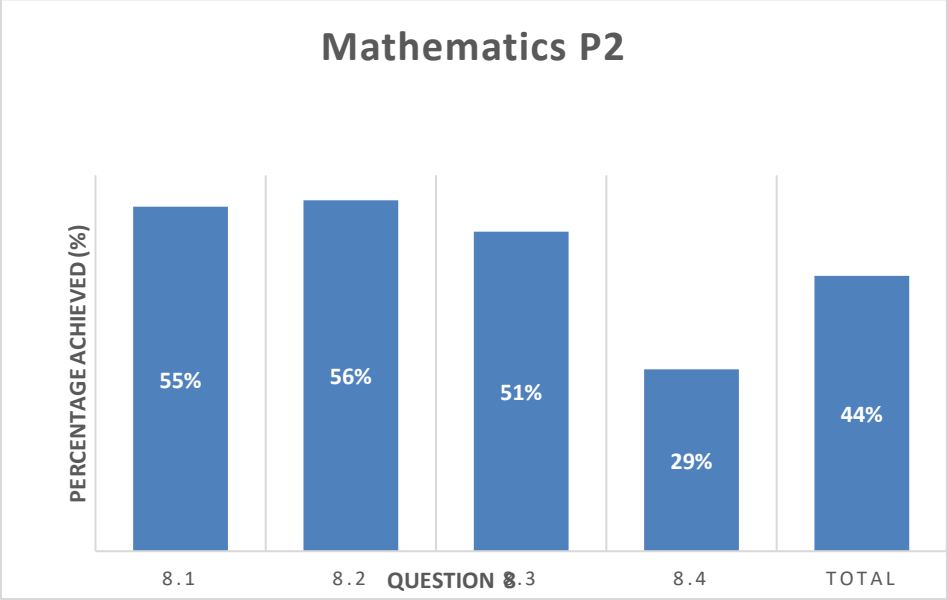
(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Drawing the graph $g(x) = \tan 2x - 1$ in question 7.2 was a challenge to the candidates.

	• All the asymptotes were not indicated, and the shape of the graph was poorly drawn. • Translation of trig graphs is still a challenge to most learners in question 7.3 • Many candidates did not attempt question 7.5 they did not see the link between the question and the graphs that were given. Some candidates calculated the x-intercept but ignored the inequality change.
(c)	***Provide suggestions for improvement in relation to Teaching and Learning.***
	• Drawing all trigonometric graphs, including "tan" graph. Focusing on asymptotes, shape and x and y – intercepts. • Teaching should not only be focused on drawing trig graphs but should be accompanied by deductive/ interpretive questions from the graph(s). • Although the period and amplitude of trig graphs are introduced in gr 10 already, these concepts should be revised in gr 11 and 12 to remain fresh in candidates' minds. • Candidates should be able to use and understand the Function notation in Trigonometry. • Teachers must incorporate transformations from Grade 8 and 9 into functions in Gr 10 to 12 to improve the learner's ability to integrate topics.
(d)	***Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.***
	• Many questions were based on interpreting the graphs and it was clear that candidates did not know how to do this, leading to poor performance. • Working through previous question papers will provide good understanding of mathematical content. • Using software such as Geogebra or Desmos (free online graphing) as a teaching tool could enhance learners understanding of trigonometry graphs, allowing them to make the link between the various variables and the impact a lot quicker.

QUESTION 8

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Question 8 was fairly answered except question 8.4 which was poorly answered.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Some candidates did not attempt question 8.
- In question 8.1 candidates were asked to show that $AB = 18$. Candidates use the 18 to calculate 18.
- In question 8.4 candidates struggle to identify the correct triangle to apply the cosine rule

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Educators should teach learners how to approach a "show that" question.
- A careful analysis of the information that is given will give learners some idea of the concepts required in solving a triangle.
- Teaching should include 3D diagrams with algebraic values and not only questions with numerical values for angles and sides.
- Teaching should also include when to use the different formulae/ rules.
  Teachers need to develop strategies to be used when solving right-angled triangles and triangles that are not right-angled. Teach learners the conditions that decide which
- rule should be used to solve the question.

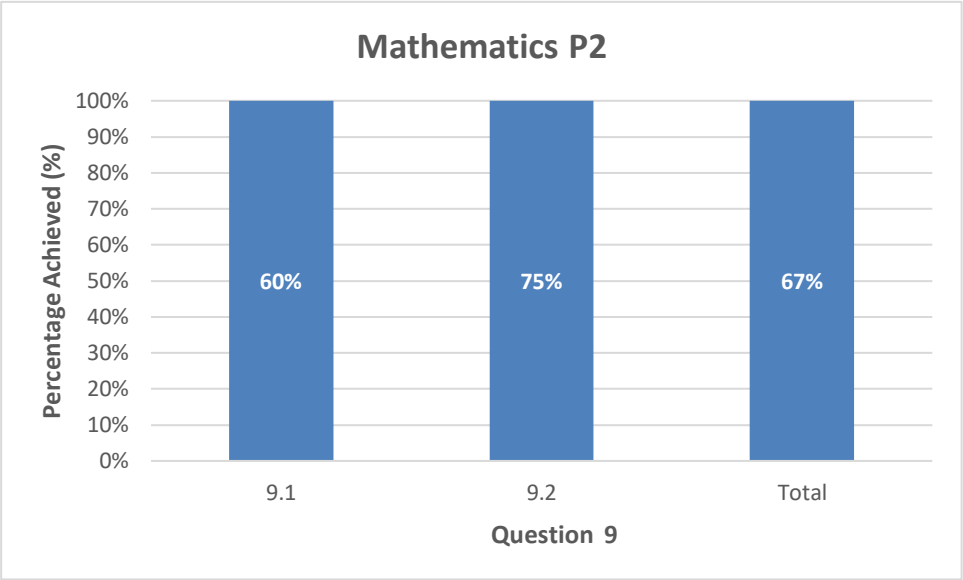
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Initially, expose learners to numeric questions on solving 3-D problems. This makes it easier for them to develop strategies on how to solve such questions. Once learners have gained confidence with numeric type questions, they should then be exposed to non-numeric and higher-order questions.
- Working through previous question papers will provide good practice of both numeric and non-numeric questions.

- Learners should be encouraged to highlight the different triangles using different colors.
- Schools should consider using an Answer book for the exams in Grade 11 & 12 to prepare learners adequately in exam writing skills.

QUESTION 9

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



The question was well- answered.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Candidates must show the constructions in the Answer book (not on their question paper.) No marks were awarded if there was no construction.
- There are still candidates who does not use the correct wording for the reasons of theorems, Candidates must for example not use the words "radii" or "isosceles triangle" as a reason; it should be "angles opposite equal sides"

(c) Provide suggestions for improvement in relation to Teaching and Learning.

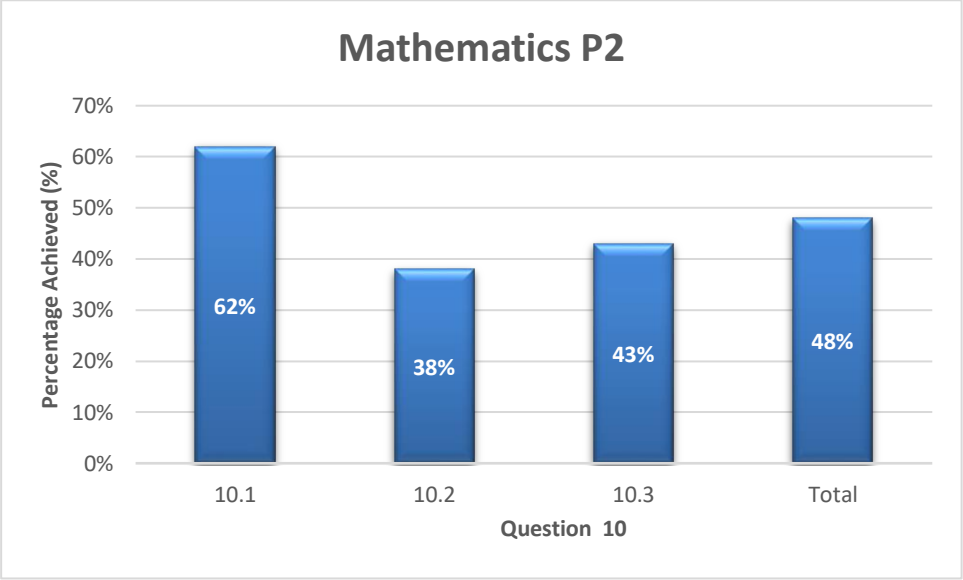
- Educators should refer to the back of the Mathematics Examination Guidelines for approved abbreviations of reasons to be used in solving Geometry riders. This can be distributed to other grades as well. Candidates should learn and use the acceptable reasons for Geometry from grade 8.
- Candidates should read the information given and transfer it to the diagram before they start answering a question

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Proofs are bookwork and should be known from the heart and practiced often.
- Learners should be taught that all statements must be accompanied by reasons. (the correct wording should be taught from Gr8) (including the acceptable/ correct abbreviations)

QUESTION 10

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



Question 10.2 and 10.3 were poorly answered.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Proving two lines are parallel in question 10.2 and proving PT is the diameter of the circle in question 10.3 remains a challenge for most candidates.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

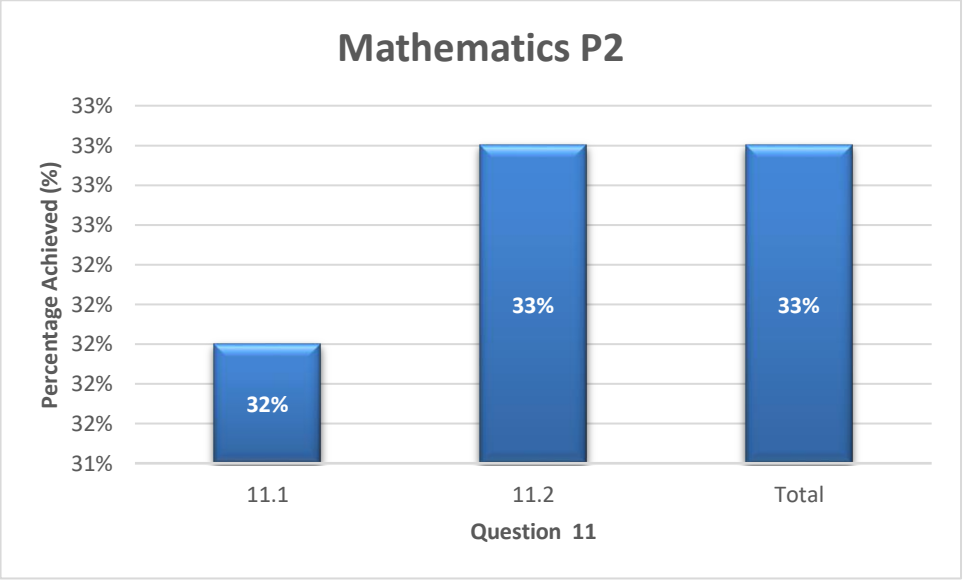
- In working through Euclidean geometry candidates should more than often be exposed to converse reasoning (proving two line parallel, etc.). Focus should be made on what parts of the proof are required to link it to the conclusion. Eg when proving two lines are parallel calculating the co-interior angles then the final step before the conclusion should be linking that the sum of the co-interior angles is supplementary. This step is vital. Or showing that the corresponding angle are equal.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Learners need to use their answer book to indicate angles calculated on their sketches.

QUESTION 11

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?



This question was poorly answered.

(b) Why was the question answered poorly? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In question 11.1 two sets of ratios were given. Finding the link between the two ratios were a struggle for candidates.
- Candidates treated the ratios as actual lengths.
- Question 11.2.5 challenged even the better candidates and was the poorest answered question in the paper. The question required deep conceptual understanding with many alternative options to get to the answer because of the many lines and ratios given in the diagram

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Teach skills on how to prove similarity. Identify which triangles to prove similar.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

In working through Euclidean geometry, candidates should be exposed to different variations of Geometry questions including questions with more complicated diagrams.

Learners must also be exposed to higher-order questions in class and in school-based assessment tasks