Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
Home of Examinations and Assessment, Zone 6, Zwelitsha, 5600
REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

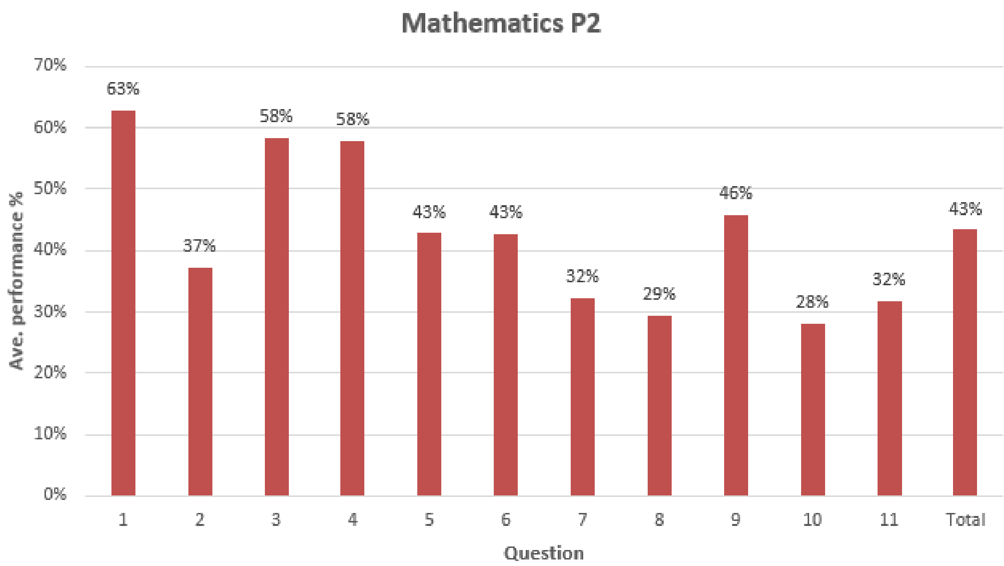
2024 NSC CHIEF MARKER'S REPORT

SUBJECT	**MATHEMATICS**
QUESTION PAPER	2
DURATION OF QUESTION PAPER	**3 HOURS**
PROVINCE	**EASTERN CAPE**
NAME OF THE INTERNAL MODERATOR	**S.D MARANGE**
NAME OF THE CHIEF MARKER	**N GABELANA**
DATES OF MARKING	**28 NOVEMBER – 14 DECEMBER 2024**
HEAD OF EXAMINATION:	**MR E.M MABONA**

SECTION 1: (General overview of Learners Performance in the question paper as a whole)

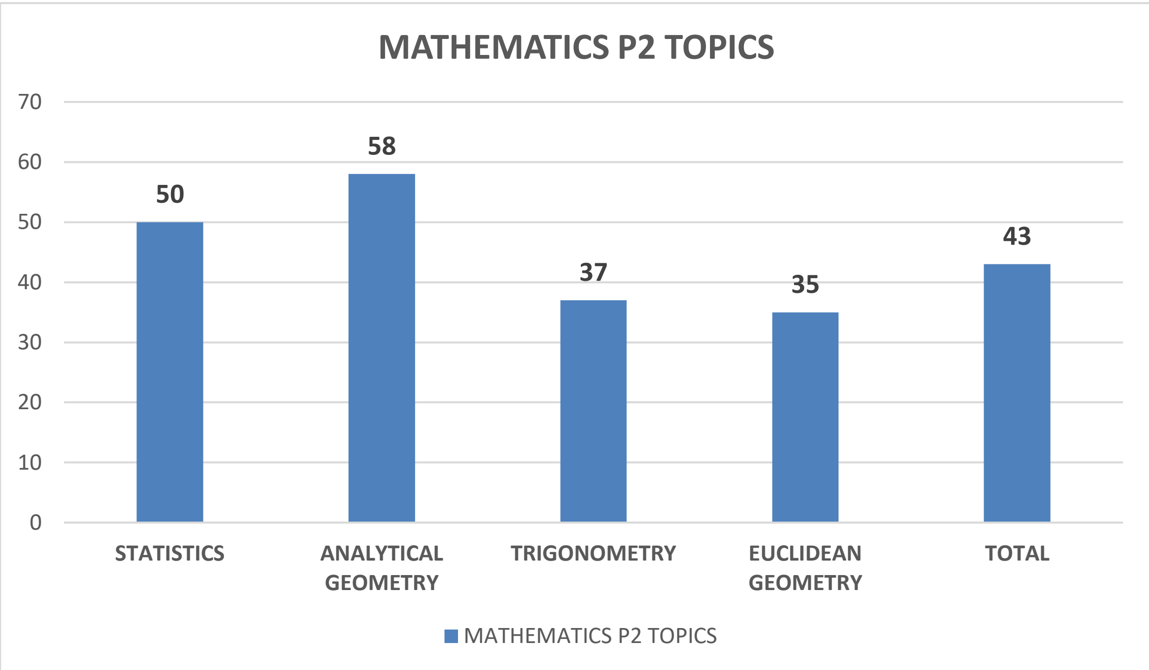
Based on 100 scripts sampled for Rasch analysis, the candidates had a pass percentage of 43% which is 4% drop from 2023 results. Generally, candidates are scoring marks in Analytical geometry better than the other three topics. Statistics usually tops in terms of performance but this question 2 was the worst performed. Candidates failed to read the scale on the given ogive graph and could not answer the question very well in question 2.

Formal proof in Euclidean geometry was not well answered by candidates. The main reason being that they failed to add construction on the given diagram. In formal proofs, candidates are required to do construction according to the given proof.



Question 2, 7, 8, 10 and 11 performed below 40%. Candidates struggled to answer the questions. Question 1 was well answered compared to all other questions.

The graph below depicts the performance per topic.



Trigonometry carries more marks in paper two, but candidates are failing to score good marks. Euclidean Geometry is the worst performed topic with 35%. Statistics and Analytical Geometry are normally performing above 60% in the previous years but this year the performance dropped.

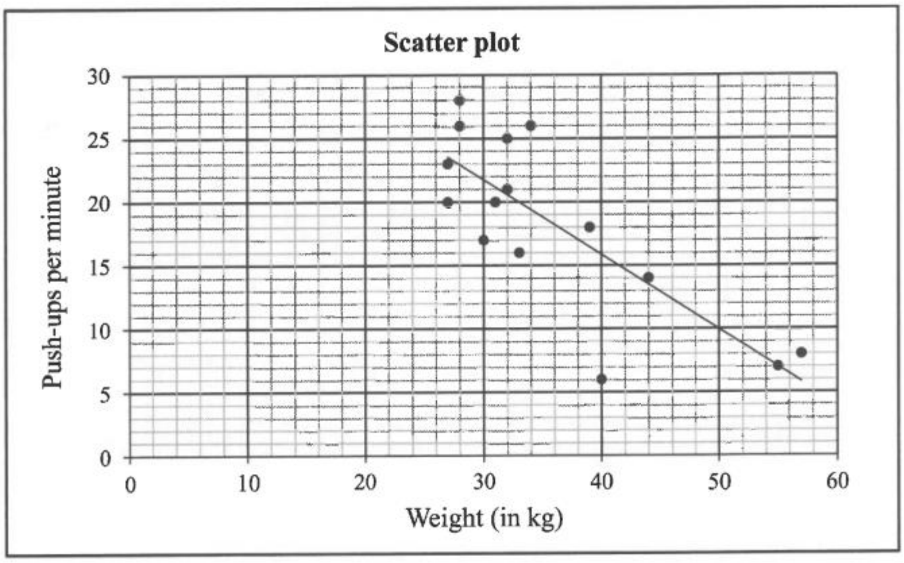
SECTION 2: Comment on candidates' performance in individual questions
The performance per question is shown using bar graphs on each question. Below, each graph, there will be detailed explanation of the performance.

QUESTION 1

QUESTION 1

At the beginning of a season, the coach of a junior boys' rugby team recorded the weight (in kg) of the 15 players in his team and the number of push-ups that each player was able to do in one minute. The data is represented in the table and scatter plot below. The least squares regression line for the data is drawn.

Weight (in kg) (x)	34	32	40	27	33	28	27	55	39	44	30	57	28	32	31
Number of push-ups per minute (y)	26	21	6	20	16	26	23	7	18	14	17	8	28	25	20



1.1 Determine the equation of the least squares regression line for the data. (3)

1.2 Write down the correlation coefficient. (1)

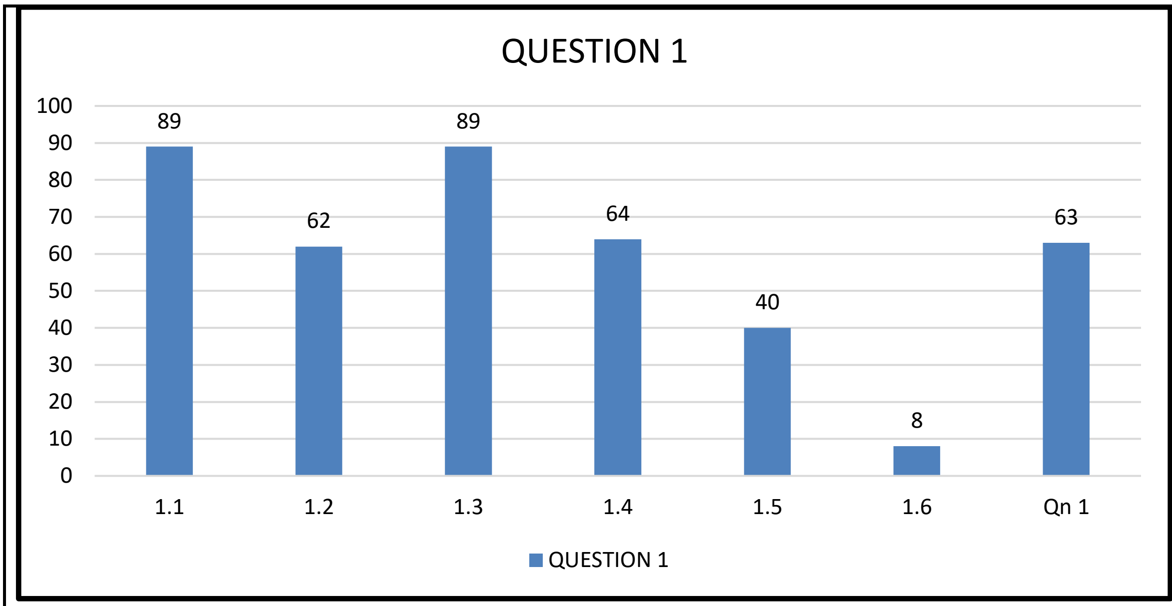
1.3 The coach uses the least squares regression line to set the target for the minimum number of push-ups by each team member according to their weight. Predict the number of push-ups that a member of the team, who weighs 29 kg, should do to meet the target. (2)

1.4 Write down the mean number of push-ups for the given data. (1)

1.5 The players trained hard during the season. At the end of the season, the coach reported that each player was able to do 5 more push-ups per minute than they did at the beginning of the season. How does the increase in the number of push-ups influence the standard deviation of the data? (1)

1.6 At the beginning of the season, the coach used the least squares regression line as the minimum target for a player to aim for. Determine the maximum possible increase in the number of push-ups that a team member must obtain to reach the minimum target. (2)

[10]



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

Question 1.1 and 1.3 were well answered. Learners were able to punch the data correctly into the calculator and managed to get the least squares regression line. The few candidates who did not score high marks were not able to punch all the data values correctly.

Question 1.5 and 1.6 were poorly answered by most of the candidates. Candidates failed to comprehend the requirements of the question.

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

The candidates failed to understand the questions basically because it had a lot of information that was required to be processed. Most candidates lost marks in question 1.2 because of rounding. The question required candidates to round off to 2 decimal places and candidates failed to do that.

The candidates who failed to score marks was because they failed to use their calculator effectively. In question 1.4, some candidates wrote the mean of weight instead of mean number of push-ups per minute.

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

Teachers are encouraged to prepare thoroughly for teaching and expose learners to higher order questions. Teachers must avoid teaching concepts only; they need to assess learners on questions that will provoke learners' minds to think critically.

It must be emphasized that when asked to draw least squares regression line, the domain must be noted, and the line should not exceed the given domain. Please check the line drawn in the question 1.

Learners must be drilled on calculator use, as there are more marks that are obtainable through the good use of a calculator. In question one, 70% of the marks were obtained from good use of a calculator.

Rounding off is a concept learnt in lower grades, but candidates were losing marks due to failing to round off in question 1.2. Teachers are advised to incorporate these concepts during teaching and learning. Learners must not lose marks because of concepts that were introduced in lower grades. There must be teamwork with teachers teaching lower grades so that we FET teachers check if these concepts are being taught well.

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

Though Statistics carries 20 marks in paper two, it needs to be taught well by teachers. Assesses learners regularly so that learners will master the topic. If learners are well prepared for examinations, they can collect maximum marks in statistics and boost their chances of passing the subject.

The SMT must assist the mathematics teachers by ensuring that all learners in grade 10 – 12 have their own calculators. Learners need to understand the calculators they are using and avoid borrowing a calculator towards the examination period.

Subject advisors and Teacher development must collaborate and ensure that the content gap workshops conducted by teacher development are impactful in making sure that learners pass the subject.

Teachers are encouraged to have PLC (professional Learning communities) and assist each other with challenging topics.

1 + 9 workshops are encouraged where teachers meet and plan together, the topics that will be taught in the following 9 days.

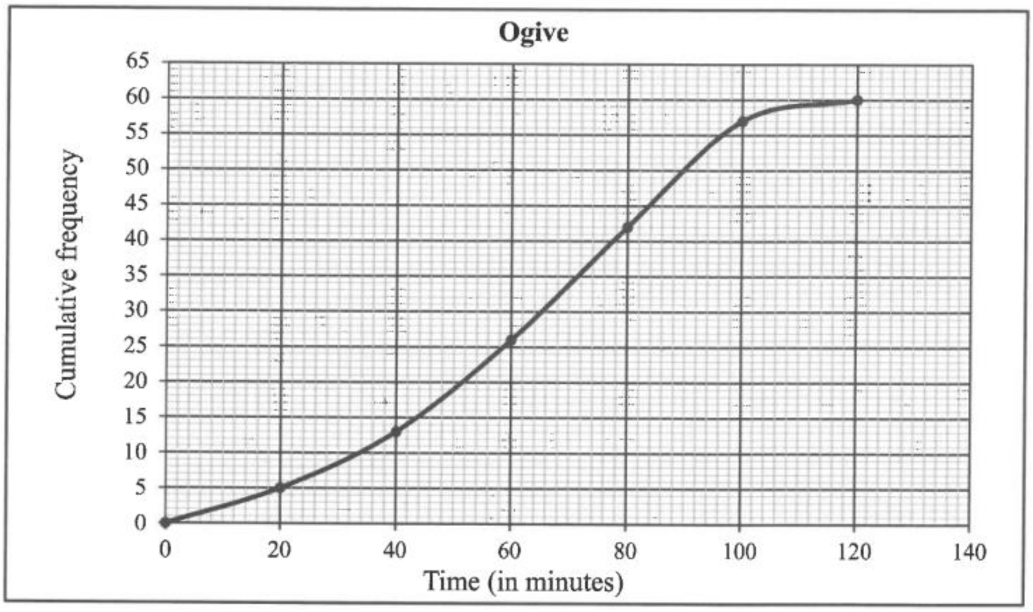
Effective roving tutors must be used in schools that are struggling, but the host teacher must be present when the roving tutor is assisting the learners. Teachers need to develop and not over rely on roving tutors.

Team teaching is effective if it is done well, therefore teachers must be encouraged to visit each other and have lessons in the neighboring schools.

QUESTION 2 (Summary)

QUESTION 2

The cumulative frequency graph (ogive) shows the time taken (in minutes) for 60 employees to travel to work each morning.



2.1 Estimate the median travel time. (1)

2.2 Estimate the lower quartile. (1)

2.3 Estimate the interquartile range. (2)

2.4 The minimum and maximum times taken for an employee to travel to work are 5 and 120 minutes respectively. On the scaled line in the ANSWER BOOK, draw a box and whisker diagram to indicate the distribution of the data as represented in the ogive above. (2)

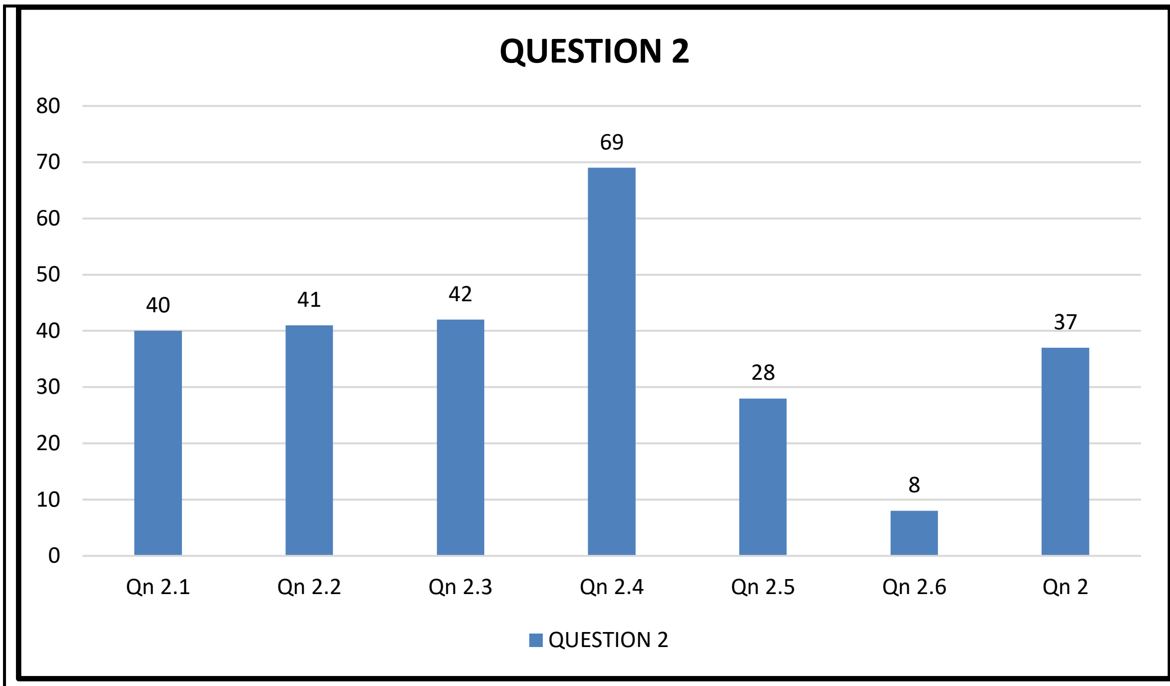
2.5 The company manager decided that all employees who travel for an hour or more will be allowed to work from home for part of the day. What percentage of the employees will be allowed to work from home for part of the day? (2)

2.6 Employees work 8 hours in a normal working day. The manager decided on the following rule for time to work from home:

- An employee is allowed to work half an hour from home for each time interval of 20 minutes, or part thereof, above an hour taken to travel to work.

On a certain day, an employee takes 110 minutes to travel to work. Calculate the number of minutes that this employee will be allowed to work from home on this day. (2)

[10]



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

Generally, question 2 was poorly answered because candidates failed to read the scale on the given graph appropriately. Question 2.4 was well answered because of CA (consistency accuracy) marking. The previous questions were used to draw the box and whisker diagram.

Question 2.6 was poorly answered because the examiner wanted candidates to understand the term part thereof, which required candidates to treat 10 minutes as full interval of 20 minutes.

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

Candidates failed to read the scale properly, instead of counting in 2s, they were counting in 1s. Candidates lost 4 marks because of that. However, candidates were able to use their wrong answers correctly in question 2.4 and they scored high marks. In question 2.6, some candidates lost marks when they did not use the concept of part thereof to be a full interval.

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

Teachers must expose learners to reading information from the graph. Learners should be able to analyse the scale that is being used on the graph. There are no specific answers, when using graphs, so learners must be informed that answers should be within a certain range of the accurate answers for example the answer for question 2.1 was 65 but any answer in the range within 64 to 66 was accepted.

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

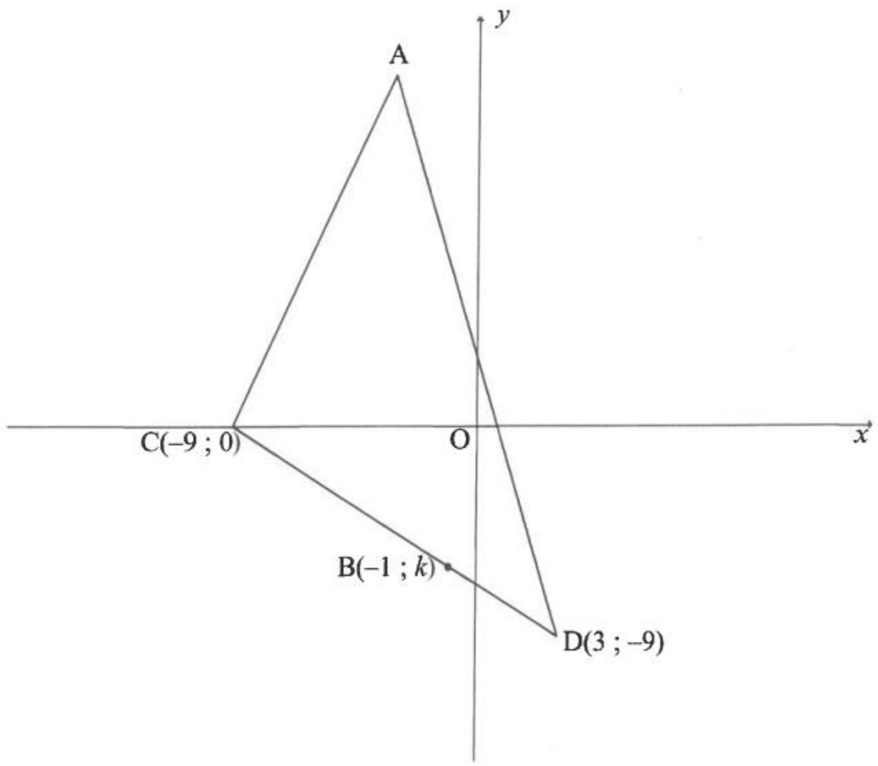
The learners must be assessed more in graph interpretation. Teachers are encouraged to have PLC (professional Learning communities) and assist each other with challenging topics.

1 + 9 workshops are encouraged where teachers meet and plan together, the topics that will be taught in the following 9 days.

QUESTION 3

QUESTION 3

In the diagram below, ΔACD has vertices A, D(3 ; –9) and C(–9 ; 0), where A is a point in the second quadrant. B(–1 ; k) lies on side DC.



3.1 Calculate the gradient of DC. (2)

3.2 Determine the equation of DC in the form $y = mx + c$. (2)

3.3 Show that $k = -6$. (1)

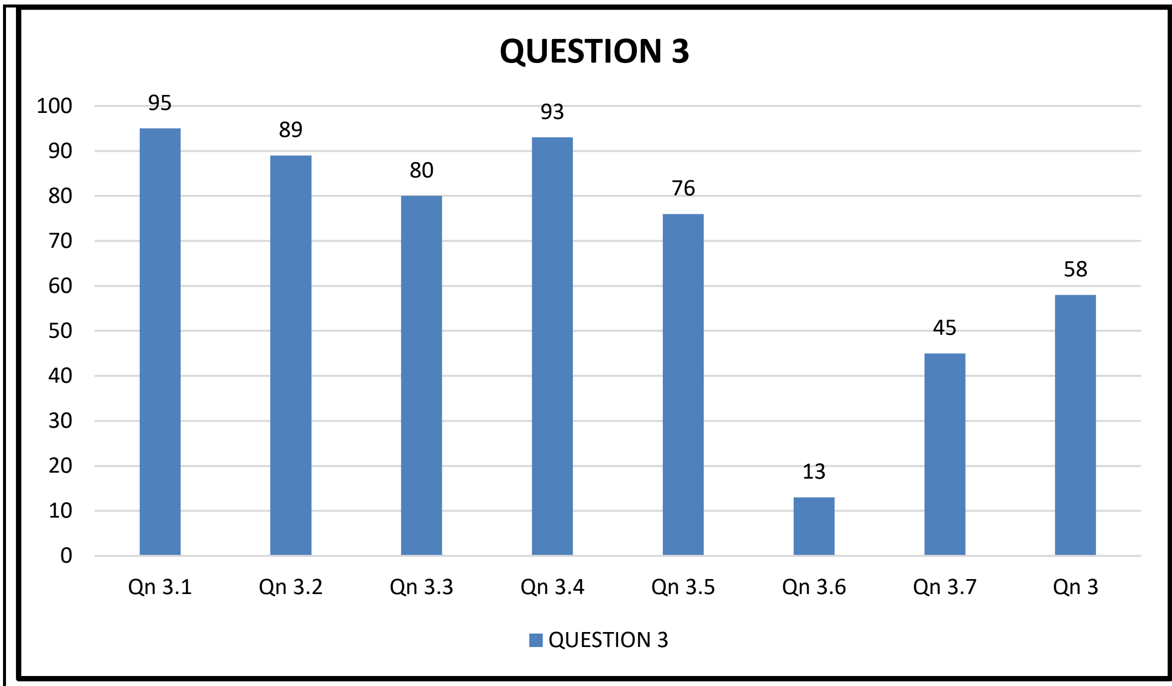
3.4 Calculate the length of DC. (2)

3.5 Calculate the ratio of $\frac{DB}{DC}$. (2)

3.6 If M is a point on AD such that AC || MB, calculate the ratio of $\frac{\text{Area } \Delta MBD}{\text{Area } \Delta ACD}$. (4)

3.7 If it is further given that the gradient of AD is -4 and the length of AD is $\sqrt{612}$ units, calculate the coordinates of A. (6)

[19]



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

Question 3.1 to 3.5 were well answered by most candidates. Question 3.6 was poorly answered.

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

There was poor performance because the questions were integrated from Euclidean Geometry, which is a challenging topic to most learners.

Most candidates lost marks because they assumed that AN was half of AD without calculating the length of AN and compare to AD.

There are some candidates who used the wrong formula to calculate the area of triangles instead of area rule.

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

After teaching the basic concepts of Analytical Geometry, teachers are encouraged to integrate topics especially Euclidean Geometry. Candidates lost marks because of the phobia of Euclidean Geometry. Learners should be encouraged to write down all the information related to the question being asked, they must not assume answers.

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

Teachers should be encouraged to integrate topics. Analytical Geometry is one topic where integration should be done.

Subject advisors and Teacher development must collaborate and ensure that the content gap workshops conducted by teacher development are impactful in making sure that learners pass the subject.

Teachers are encouraged to have PLC (professional Learning communities) and assist each other with challenging topics.

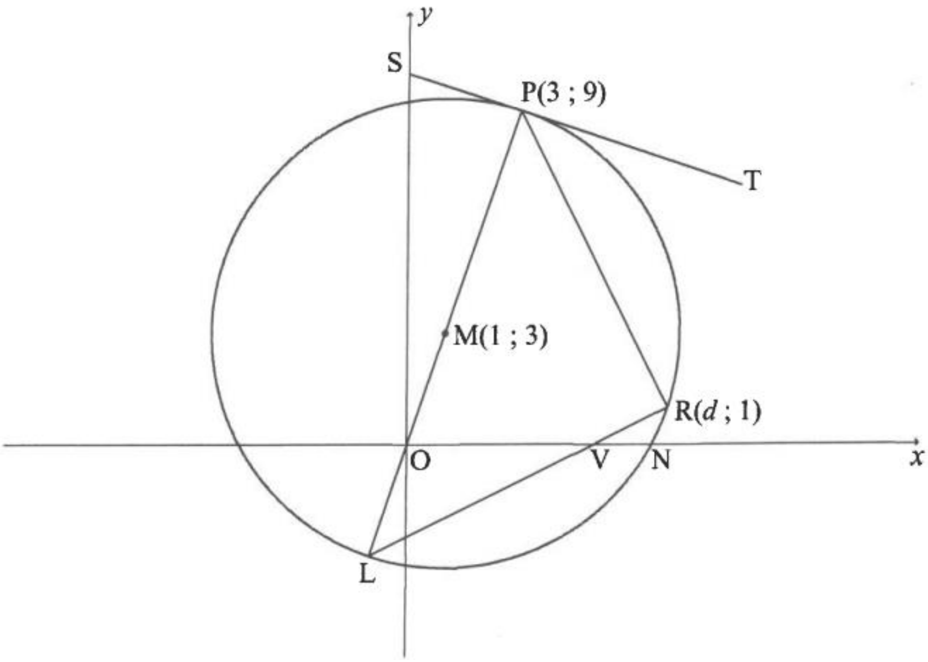
1 + 9 workshops are encouraged where teachers meet and plan together, the topics that will be taught in the following 9 days.

Analytical geometry should be assessed more often even if the topic has been covered. Teachers should make sure that their short tests will integrate concepts from other topics. Analytical geometry is a topic where learners must collect maximum marks in Paper two.

QUESTION 4

QUESTION 4

In the diagram, M(1 ; 3) is the centre of the circle. The circle cuts the x-axis at N. ST is a tangent to the circle at P(3 ; 9). R(d ; 1), with $d > 0$, and L lie on the circle. O and V are the x-intercepts of PL and RL respectively.



4.1 Write down the coordinates of L. (2)

4.2 Determine the equation of tangent ST to the circle at P. (4)

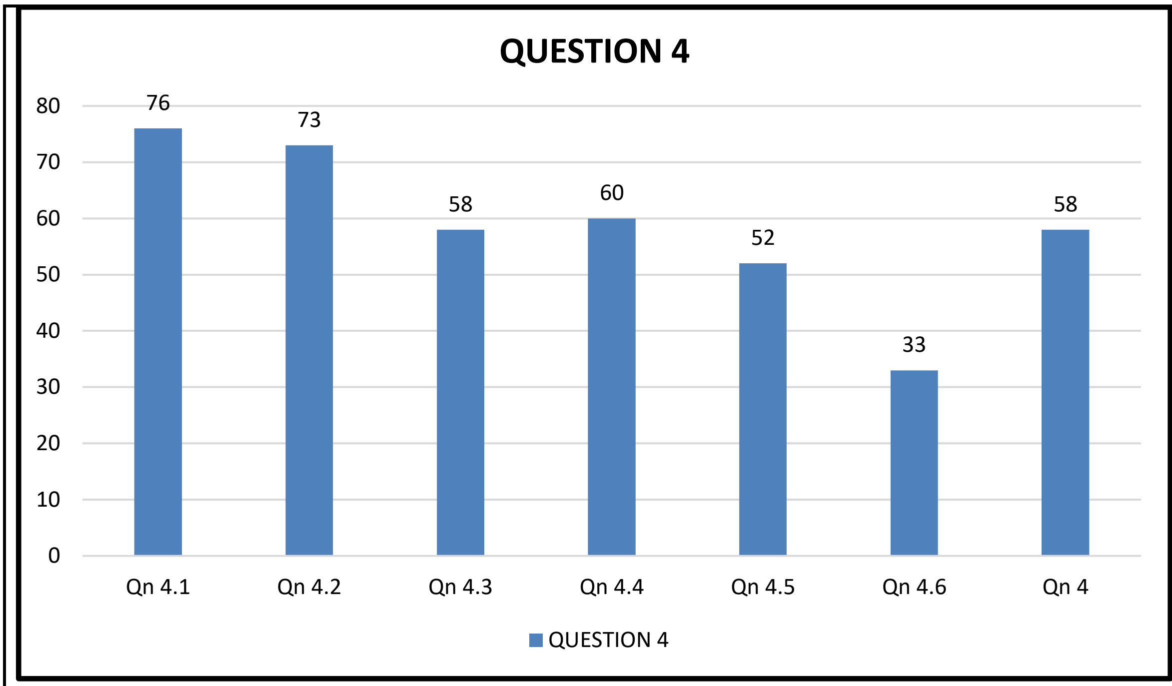
4.3 Show that the equation of the circle with centre M is $x^2 + y^2 - 2x - 6y - 30 = 0$. (4)

4.4 Show that $d = 7$. (2)

4.5 Calculate the size of $\hat{L}$ (5)

4.6 TR is a tangent to the circle at R. Prove that PT $\perp$ RT. (3)

[20]



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

Candidates scored good marks in question 4.1 and 4.2. Question 4.6 was poorly answered by most candidates because they failed to apply the tan chord theorem, perpendicular lines and parallel lines. The question had many options, but candidates failed to score good marks.

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

The question was poorly answered because candidates failed to integrate Euclidean Geometry into Analytical Geometry. In question 4.3 some candidates completed the square on the given equation of the circle instead of starting by calculating radius of the circle first and then substitute into the standard equation of a circle.

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

Teachers are encouraged to prepare thoroughly for teaching and expose learners to higher order questions. Teachers must avoid teaching concepts only; they need to assess learners on questions that will provoke learners' minds to think critically.

Integration of topics must be encouraged especially when teaching Analytical geometry. Thorough teaching and assessment with immediate feedback to learners must be done regularly. Regular assessment of the topic will boost learners' confidence.

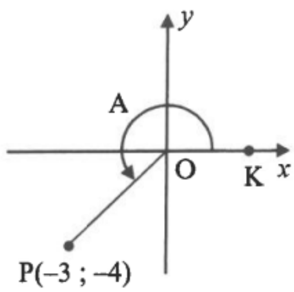
All teachers are strongly advised to attend 1 + 9 workshops in their districts before they start a new topic. Subject advisors should effectively monitor curriculum coverage. Teachers must make sure that all learners have their own calculators.

(d) Describe any other specific observations relating to responses of learners and comments

that are useful to teachers, subject advisors, teacher development etc.
Subject advisors should monitor curriculum coverage effectively and make sure that all concepts that are supposed to be taught have been taught. They should also, encourage teachers to assess learners regularly. Teachers must generate their own question papers and not rely on tests that are shared on social media. They must assess learners based on what they have taught them. CAPS and Examinations Guideline must be used regularly during the year.
QUESTION 5

QUESTION 5

5.1 In the diagram, line OP is given with P(–3 ; –4). $K\hat{O}P = A$.



Determine, **without using a calculator**, the value of:

5.1.1 $\cos A$ (2)

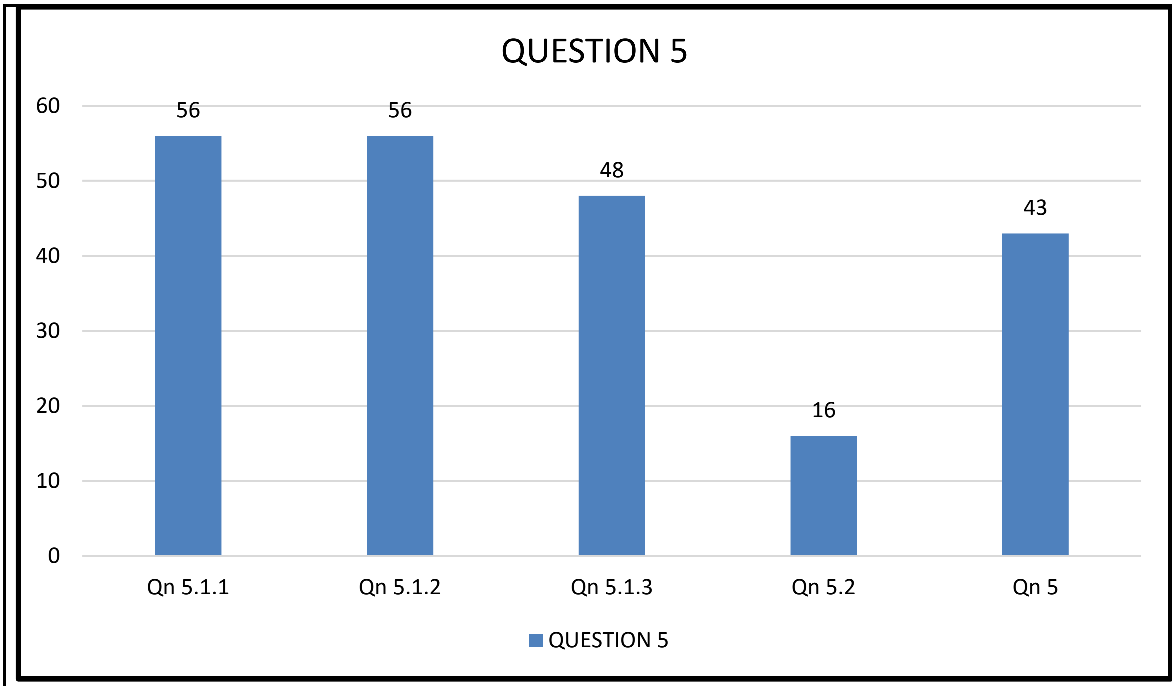
5.1.2 $\cos 2A$ (2)

5.1.3 $\sin(A-B)$, if it is further given that $\sin B = \frac{4}{5}$ and $90° < B < 360°$ (4)

5.2 If $\cos\alpha = p$, express the following expression in terms of p:

$$\frac{\cos\left(\frac{\alpha}{2} - 45°\right)\sin\left(\frac{\alpha}{2} - 45°\right)}{2}$$

(4)
[12]



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

Question 5.1 was fairly answered, but question 5.2 was poorly answered by most candidates.

Candidates struggled with expansion of double angles or compound angles.

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

The question was poorly answered because candidates failed to apply the formula given in the information sheet to the question. Some candidates struggled to identify the correct value of x and r.

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

When teaching Trigonometry, teachers must inform learners to effectively use the formula sheet at the end of the question paper. Trigonometry carries 50 marks in paper two, therefore learners must be thoroughly taught and prepared for the examinations.

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

Some candidates drew the diagram in the first quadrant instead of second quadrant and failed to substitute and simplify Pythagoras theorem. There are some that failed to choose the correct value for x. There are candidates who failed to apply reduction formulae properly. In question 5.1.3 there are some candidates who failed to write the correct compound angle.

In question 5.2 candidates failed to expand $\frac{cos\left(\frac{\alpha}{2}-45°\right)sin\left(\frac{\alpha}{2}-45°\right)}{2}$ correctly.

The topic must be thoroughly assessed and revised. All topic tests must include Trigonometric questions.

QUESTION 6

QUESTION 6

6.1 Given the identity: $\cos(x-y)=\cos x\cos y+\sin x\sin y$

6.1.1 Use the compound angle identity given above to derive a formula for $\cos(x+y)$. (2)

6.1.2 Hence, or otherwise, show that:

$$\frac{\cos(90°-x)\cos y+\sin(-y)\cos(180°+x)}{\cos x\cos(360°+y)+\sin(360°-x)\sin y}=\tan(x+y)$$ (6)

6.2 Given: $f(x)=\sqrt{6\sin^2 x-11\cos(90°+x)+7}$

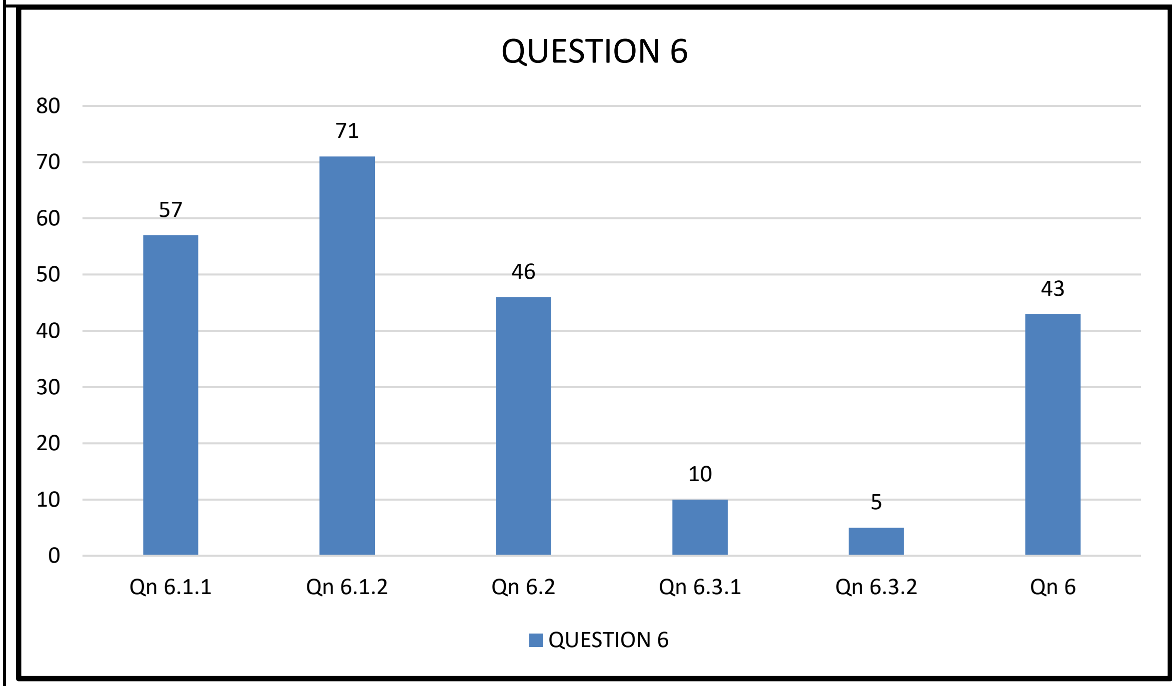
Solve for x in the interval $x\in(0°\,;\,360°)$ if $f(x)=2$. (6)

6.3 Consider the function: $g(x)=\dfrac{4-8\sin^2 x}{3}$

6.3.1 Calculate the maximum value of g. (3)

6.3.2 Write down the smallest possible value of x for which g will have a maximum value in the interval $x\in(0°\,;\,360°]$. (1)

[18]



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

Question 6.1.2 was well answered but question 6.3 was poorly answered. In question 6.2 candidates are failing to do the reduction and they failed to score maximum marks because of that. In question 6.1.1 candidates failed to use the given expression of $\cos(x-y)$ to expand $\cos(x+y)$.

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

The question was poorly answered because learners were not properly taught compound angles. Teachers must emphasize to learners that derivation of compound angles is examinable using $\cos(x-y)$. Learners must be drilled on how to derive $\cos(x+y)$, $\sin(x-y)$ and $\sin(x+y)$ from $\cos(x-y)$.

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

Trigonometry carries more marks in paper 2, therefore proper teaching of concepts should be done. Regular assessment of the topic should be done. The topic is covered in term one as a last topic and usually once learners start writing Controlled test, teaching is disturbed. In term two, teachers must have strategies to cover up and prepare learners adequately before they write examinations.

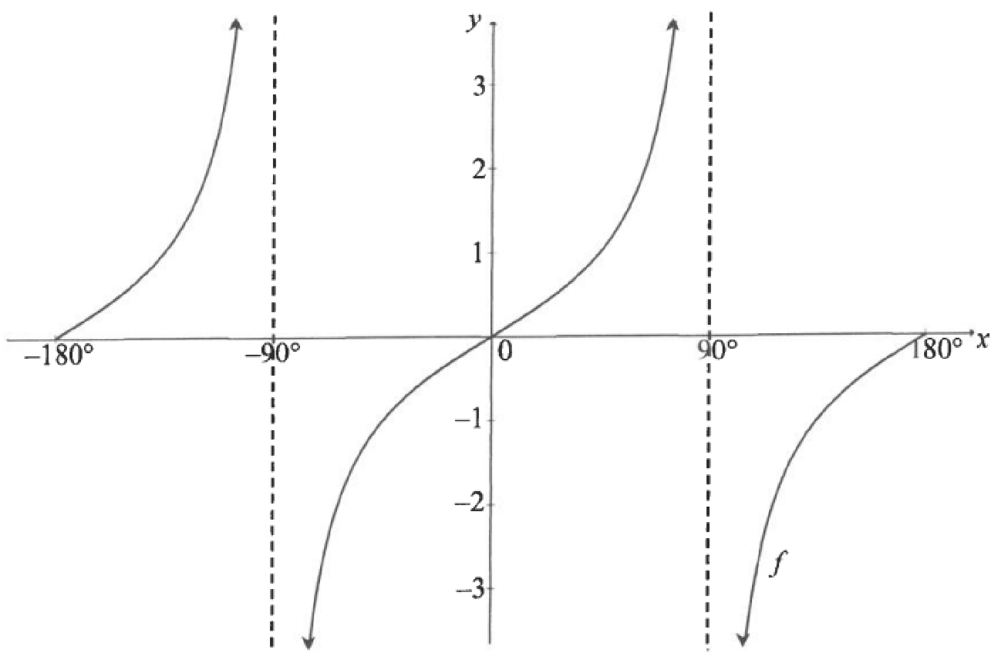
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Content gap workshops must be organised and assist teachers who are struggling. Teachers who have good results are supposed to attend such workshops and share their good practices.

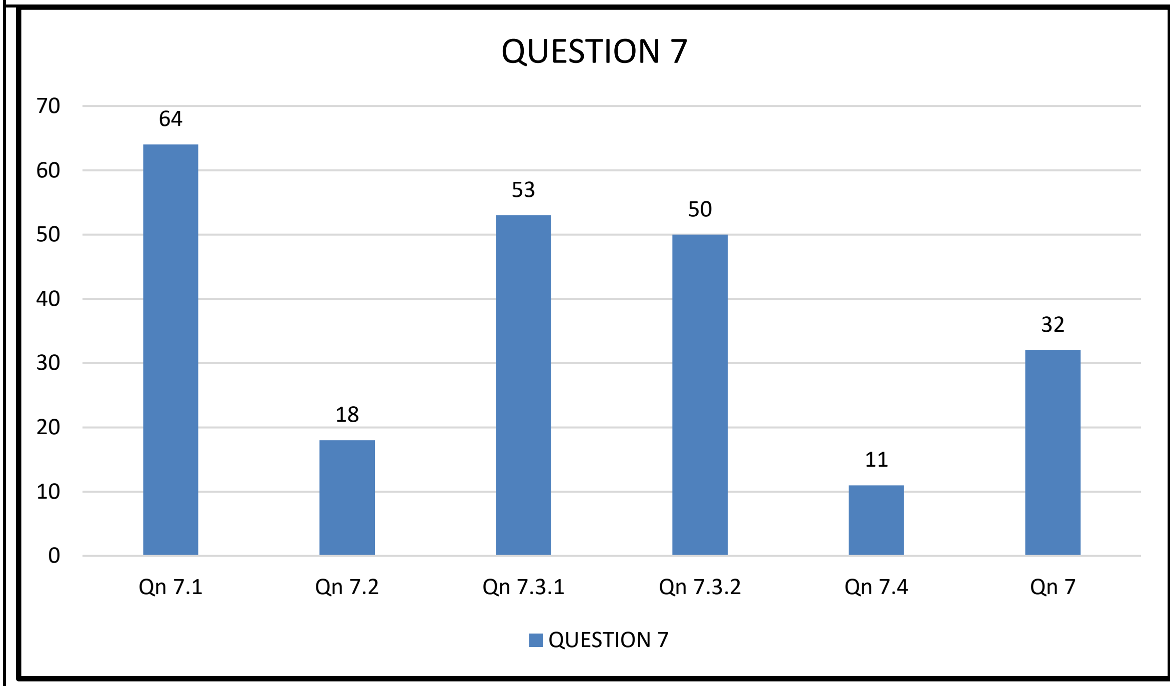
QUESTION 7

QUESTION 7

In the diagram below, the graph of $f(x)=\tan x$ is drawn for the interval $x \in [-180°\,;\,180°]$.



7.1	Write down the equation of the asymptote of f in the interval $x \in [0°\ ;\ 180°]$.		(1)
7.2	Write down the values of x in the interval $x \in [-180°\ ;\ 0°]$ for which $f(x) \le 0$.		(2)
7.3	Given: $g(x) = \cos 2x + 1$		
	7.3.1	Write down the period of g.	(1)
	7.3.2	On the grid given in the ANSWER BOOK, draw the graph of $g(x) = \cos 2x + 1$ for the interval $x \in [-180°\ ;\ 180°]$. Clearly show the intercepts with the axes as well as the coordinates of the turning points.	(3)
7.4	Use the graphs to determine the general solution of $2\cos^3 x - \sin x = 0$.		(4) **[11]**



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

Question 7.2 and 7.4 were poorly answered. Quite a few candidates, struggled to sketch the trigonometric graph. Question 7.1 was well answered, though some candidates failed to read the instruction that was given on the restriction.

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

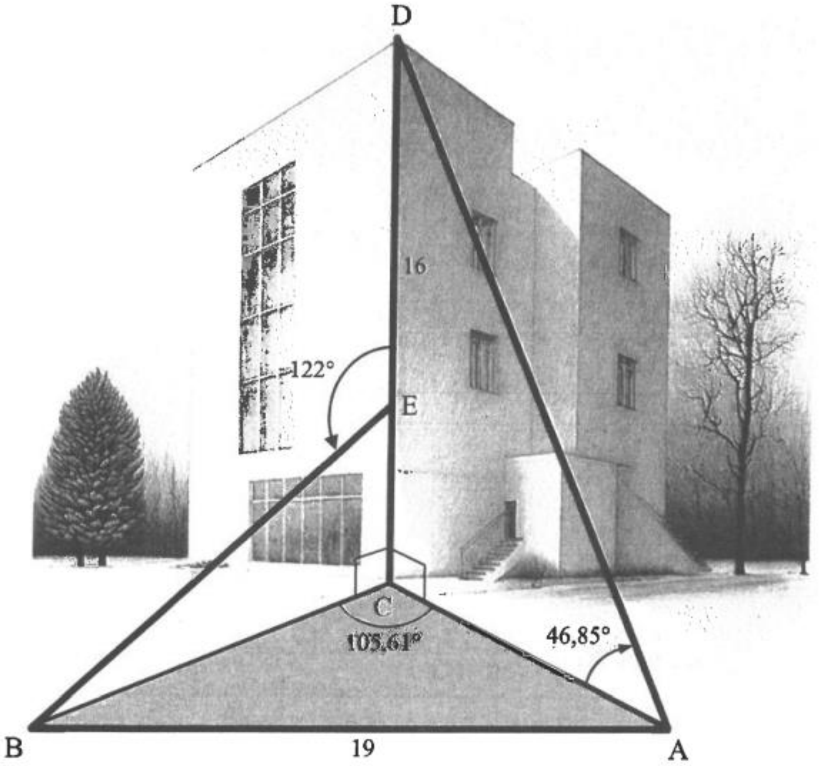
In question 7.2, the closed brackets were not read properly by most candidates, and they failed to write down the other required solution which $-180°$.

In question 7.4 candidates failed to outline the relationship between the given expression and the graphs drawn. Some candidates lost marks because they failed to show step five of the marking guidelines, they replaced $2cos^2x\ with\ cos2x + 1$, without subtracting 1 from both sides.

(c) Provide suggestions for improvement in relation to Teaching and Learning
Trigonometric graph is a concept that learners are likely to score high marks if they are taught well. Teachers must attend workshops organized by the district subject advisors to address content gap in the topic. 1 + 9 workshops can be utilized to assist with preparation of the topic before it is taught.
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
Content gap workshops must be organised and assist teachers who are struggling. Teachers who have good results are supposed to attend such workshops and share their good practices. Revision of trigonometric graphs must be done with learners before they sit for June examinations, Trial examinations and Final examinations Learners must be trained to use calculators to do reduction so that they score high marks on reduction questions.
QUESTION 8

QUESTION 8

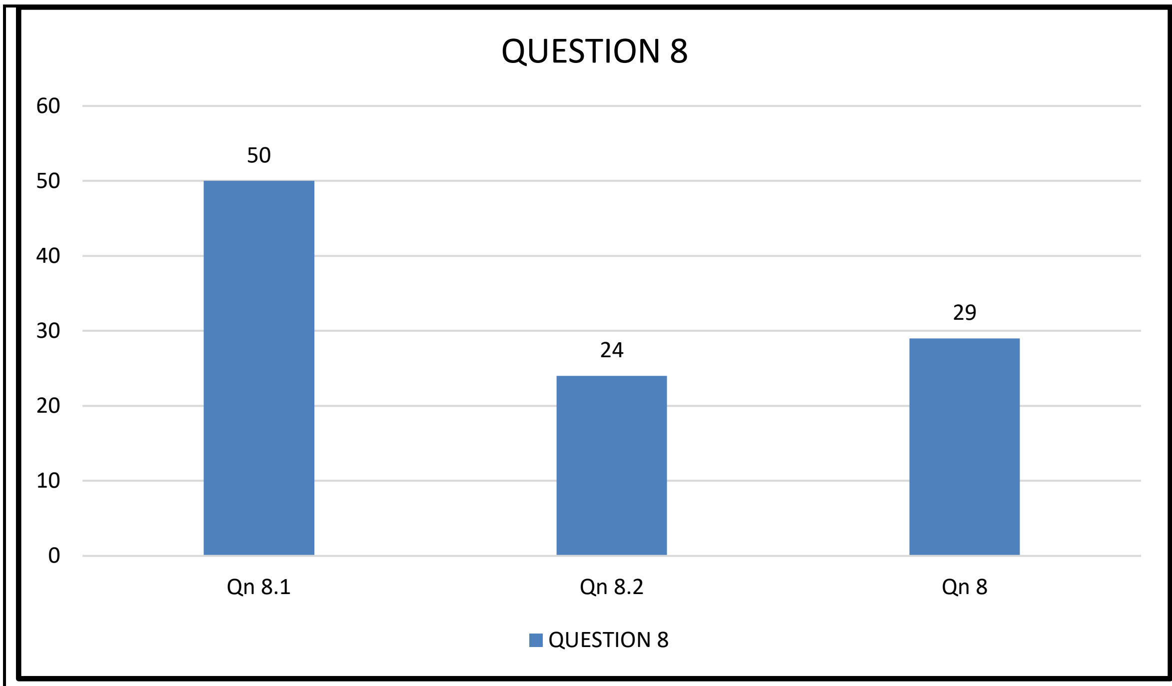
In the diagram, C is the foot of a vertical building and D is the top of the same building. The height of the building, CD, is 16 m. Two observers are standing 19 m apart at points A and B, where A, B and C lie in the same horizontal plane. A painter is working at point E on the building. The angle of elevation of D from A is 46,85°. $D\hat{E}B = 122°$ and $B\hat{C}A = 105,61°$.



8.1 Calculate the length of AC, the distance between the observer at A and the foot of the building. (2)

8.2 Calculate how far the painter at E is from the top of the building. (7)

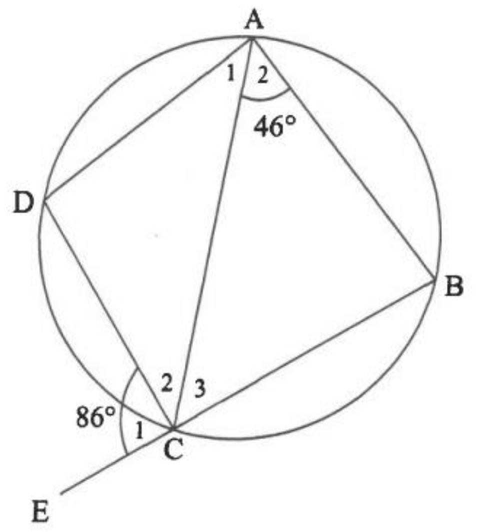
[9]



(a) General comment on the performance of candidates in the specific question. Was the question well answered or poorly answered?
Question 8.1 was well answered compared to question 8.2.
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.
Candidates failed to identify the appropriate triangle to work with. The question was poorly answered probably because the topic was not thoroughly taught in class. The concept is supposed to be addressed properly in grade 11.
(c) Provide suggestions for improvement in relation to Teaching and Learning
The 2 D Trigonometry should be thoroughly taught in grade 11, and more exercises should be given when learners are in grade 12 including 3 D Trigonometry.
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
Most candidates failed to read the information given and analyse the 3 D diagram. Many failed to recognize and use the right-angled triangle. Most candidates were not able to choose the correct angles and sides to apply in the cosine rule and sine rule. Application of algebra in other topics must be emphasized to learners. Learners must always be aware that simplification of expression or solving equations can be applied in any topic.
QUESTION 9

QUESTION 9

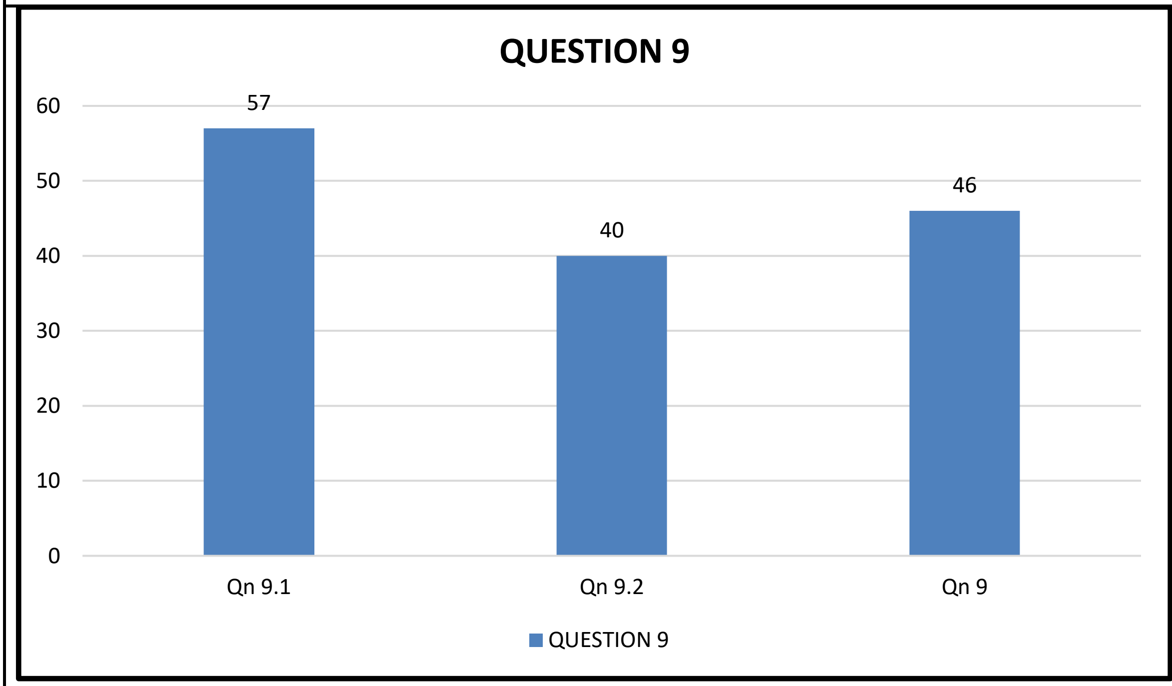
In the diagram, ABCD is a cyclic quadrilateral. BC is produced to E. AC is drawn.
$\hat{A}_1 = \frac{1}{2}\hat{B}$, $\hat{A}_2 = 46°$ and $\hat{C}_1 = 86°$.



9.1 Calculate, with a reason, the value of $\hat{A}_1$. (2)

9.2 Hence, prove that AD = DC. (4)

[6]



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

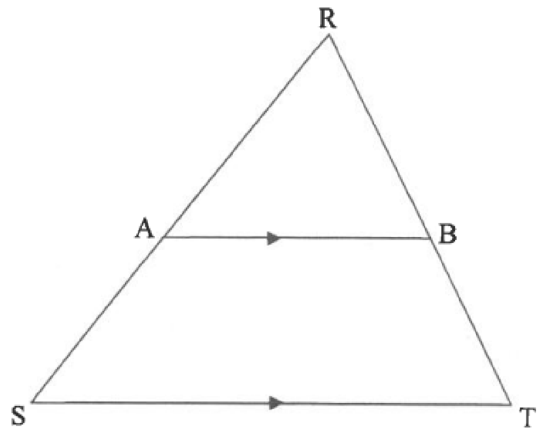
Question 9.1 was well answered but question 9.2 was poorly answered.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.
The question was testing candidates on application of exterior angle of cyclic quadrilaterals. Some are losing marks because they are not writing reasons.
(c) Provide suggestions for improvement in relation to Teaching and Learning
Learners must be trained to write reasons for any statement that they have written down and must not assume answers if it is not given.
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
Euclidean Geometry must be taught thoroughly and revised adequately for learners to get more marks. 1 + 9 planning workshops organised by subject advisors should be done on a regular basis. The use of technological applets, for example Geogebra must be used to make learners understand the topic better. Practice is the best way to master Euclidean geometry

QUESTION 10

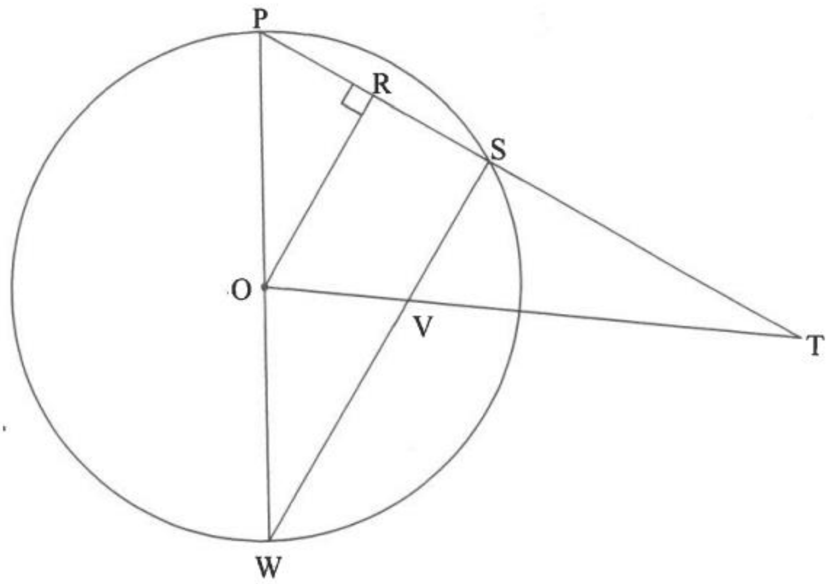
QUESTION 10

10.1 In the diagram, ΔRST is drawn. Line AB intersects RS and RT at A and B respectively such that $AB \parallel ST$.



Prove the theorem which states that a line drawn parallel to one side of a triangle divides the other two sides proportionally, i.e. $\frac{RA}{AS} = \frac{RB}{BT}$ (6)

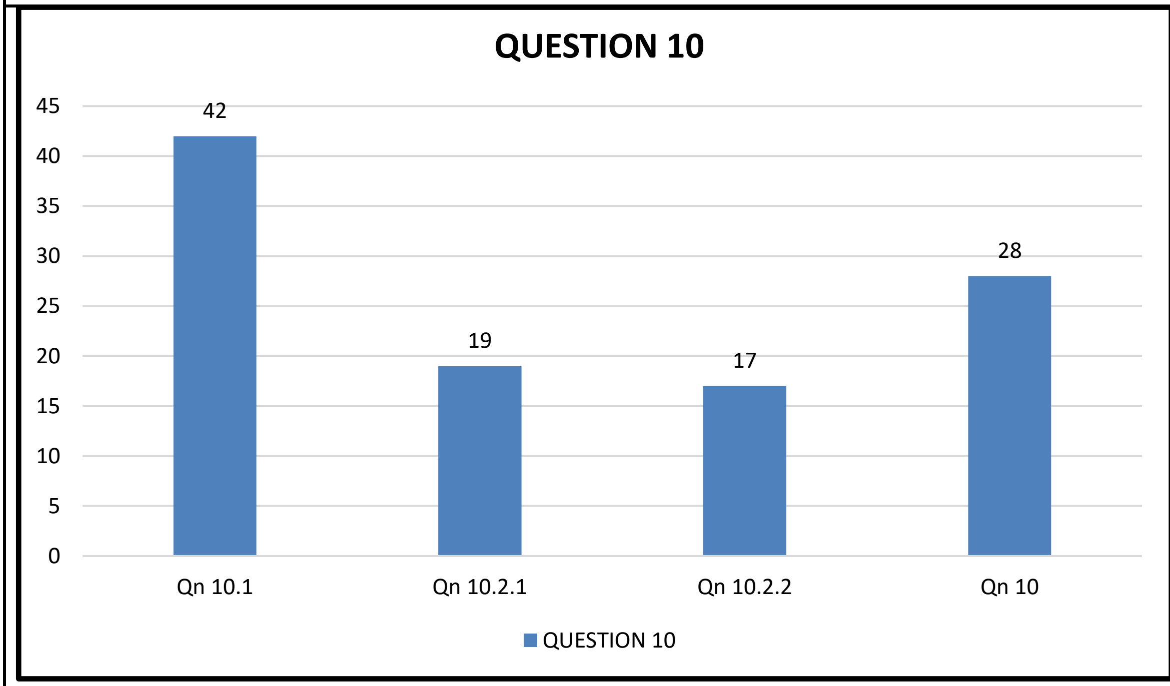
10.2 In the diagram, O is the centre of the circle. ΔPWS is drawn with P, W and S on the circle. $OR \perp PS$. PRS is produced to T. SW and OT intersect at V. $OV : OT = 1 : 4$



10.2.1 Prove, with reasons, that $OR : WS = 1 : 2$ (5)

10.2.2 Calculate the length of PT if ST = 15 units. (4)

[15]



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

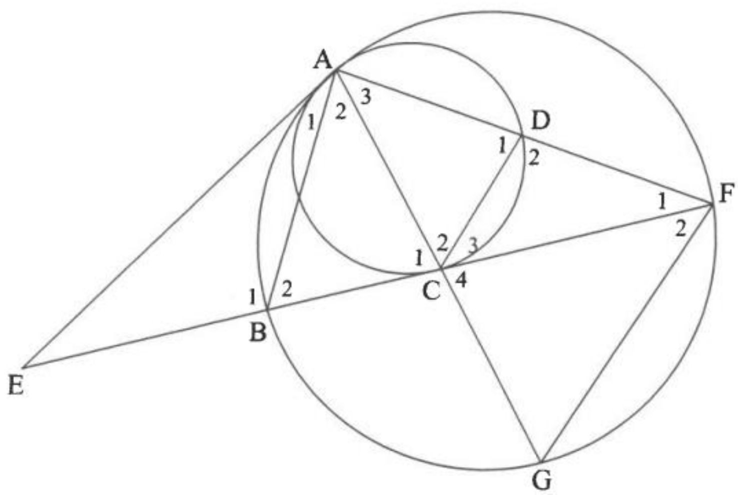
The formal proof in question 10.1 was fairly done but question 10.2 was poorly answered by most candidates. Application of proportional theorem was not well answered.

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

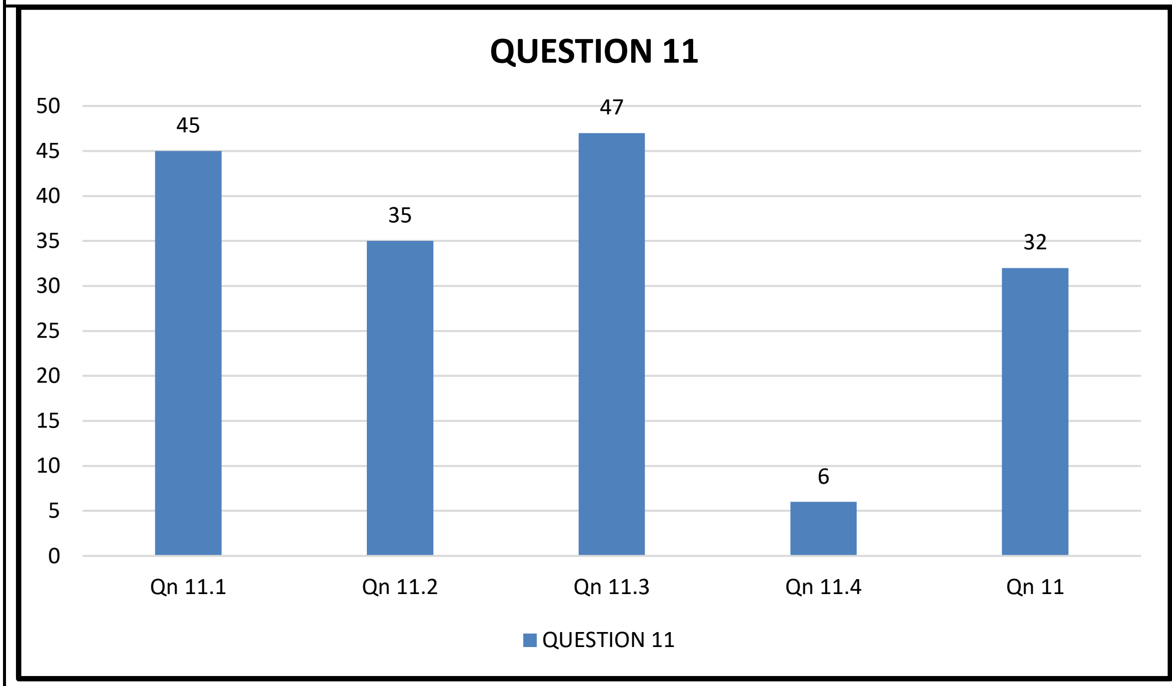
Candidates are losing marks in the formal proof because they are not doing the construction. If construction is not included, it is regarded as **BREAK DOWN** and will not be marked.
(c) Provide suggestions for improvement in relation to Teaching and Learning
Formal proofs should be over emphasized when teaching the concept. Solving riders must be done on a regular basis. If Euclidean Geometry can be taught adequately learners will be confident to solve riders. Subject advisors should arrange more workshops to cater for the content gap that teachers might have.
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
Candidates were mixing methods of answering midpoint theorem and proportional theorem. Please consult the CAPS and Examinations Guidelines for clarity and teach learners the correct mathematical concepts, otherwise they will lose marks. The use of technological applets, for example Geogebra must be used to make learners understand the topic better.
QUESTION 11

QUESTION 11

In the diagram, A, B, G and F lie on the larger circle. A smaller circle is drawn to touch the larger circle internally at A. EA is a common tangent to both circles. EBCF is a tangent to the smaller circle at C. AC is produced to G. AF cuts the smaller circle at D. AB, CD and GF are drawn.



11.1	If $E\hat{A}G = x$, determine with reasons, FOUR other angles that are equal to x.	(6)
11.2	Prove that $AG.AD = AC.AF$	(4)
11.3	Prove that $\Delta AGF \parallel\!\mid \Delta ABC$	(4)
11.4	Prove that $GF^2 = \dfrac{BC.FC.AF}{AD}$	(6)
		[20]



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

Questions 11.1 – 11.3 were well answered compared to question 11.4 which performed below 10%.

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

The probable reason why candidates failed this question is because it was higher order and learners failed to link the similar triangles.

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

Learners must be encouraged to use the diagram in the answer book to indicate all angles that they are working with. It must also be brought to their attention that workings can also be done on the diagram.

Naming angles in proving similarity must follow logical steps, a learner cannot start by writing third angle or sum of angles in a triangle before finding the first two sets of angles. Correct notation of angles must be emphasized to learners for example $F_1 + F_2$ must not be written as F_{1+2}

(d) Describe any other specific observations relating to responses of learners and comments

that are useful to teachers, subject advisors, teacher development etc.
Learners must be provided with acceptable reasons in the examination guideline, and they must use them regularly when practicing Euclidean Geometry. Teachers must be strict in emphasizing the reasons on examination guidelines and not allow their learners to use any reasons except the ones mentioned in the examination guideline. Teachers must thoroughly prepare learners for examination, and they also solve riders regularly. Construction is not allowed when solving riders.