



GCSE EXAMINERS' REPORTS

**MATHEMATICS
GCSE**

NOVEMBER 2023

Introduction

Our Principal Examiners' reports offer valuable feedback on the recent assessment series. They are written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and detail how candidates have performed.

This report offers an overall summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It goes on to look in detail at each question/section of each component, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.ⁱ

The information found in this report can provide invaluable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	Eduqas offers an extensive annual programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.eduqas.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that past papers are published to WJEC and WJEC Eduqas public websites between 1 st and 31 st December, the year after the examination has taken place.	www.wjecservices.co.uk or on the Eduqas subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the overall subject, rather than for each component that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results and Grade Boundaries (eduqas.co.uk)

Exam Results Analysis	WJEC provides information to examination centres via the WJEC secure website. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	www.wjecservices.co.uk
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.eduqas.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	www.wjecservices.co.uk or on the Eduqas subject page.
Become an examiner with WJEC / Eduqas.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with invaluable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Exam Marking jobs Examiner & Moderator Vacancies From Eduqas

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Subject Officer's Executive Summary

With the November series being a resit opportunity the number of entries for higher tier are small.

There was an improvement in the accuracy of money notation used by candidates. It was rare to see the incorrect 0.09p instead of either £0.09 or 9p. Many candidates showed their working clearly. When comparing two things, the answer lines were often split with a vertical line and side by side comparisons made.

Candidates should be encouraged to annotate diagrams with angles/lengths etc to aid them in answering questions.

Candidates are still employing non-calculator partitioning methods for calculating a percentage of an amount in the calculator paper. This frequently led to errors.

Candidates need to practise drawing lines of best fit, it is not from corner to corner nor from first point to last point.

The additional formula sheet is an aid for candidates, but many did not use it for the formula for area of a circle or the trigonometric ratios.

Areas for improvement	Classroom resources	Brief description of resource
Best buy calculations	<u>BEST BUY CALCULATIONS</u>	Blended learning
Scatter diagrams – lines of best fit	<u>RECOGNISE CORRELATION</u>	Blended learning
Writing expressions	<u>WRITING EXPRESSIONS</u>	Knowledge organiser
	<u>WRITING EXPRESSIONS</u>	Blended learning

MATHEMATICS

GCSE

November 2023

Foundation tier: component one

Overview of the Component

In this paper candidates are assessed on their ability to use and apply standard techniques. They must reason, interpret and communicate mathematically as well as solve problems in mathematical and other contexts.

To do well in this examination, candidates needed to interpret each question carefully and make sure they have used all the given information, particularly key words, and phrases, in their solution. They should have shown all their methods. The candidates who used efficient methods and presented their work in a neat and logical way were generally more successful.

Many candidates were able to access a good proportion of the paper. However, a significant number of candidates struggled to access those that are common with the higher tier paper, such as calculating density, factorising and tree diagrams.

All candidates seemed to have sufficient time to answer those questions that were within their capabilities.

Comments on individual questions/sections

- Q.1 (a)(i) Most candidates were able to multiply two multiples of 10.
- (a)(ii) Most candidates were able divide a two-digit number by a one-digit number.
- (a)(iii) Most candidates were able to calculate the fraction of an amount.
- (a)(iv) Most candidates were able to calculate the percentage of an amount.
- (a)(v) Most candidates were able to correctly add two numbers with a different number of decimal places.
- (b) Just under three-quarters of candidates were able to write a percentage as a decimal.
- (c) Approximately a half of candidates were able to correctly complete the statement. Some incorrect answers of 4 were seen, whilst some gave decimal answers.

- Q.2 (a) In this part, candidates had to identify the number between 13 and 19 with an odd number of factors. Some candidates confused factors and prime factors, whilst others made errors listing factors and were unable to find the correct answer.
- (b) Most candidates were able to write the first three even multiples of 7. Some simply wrote the first three multiples of 7.
- (c) Candidates found this part challenging, with few fully correct answers seen. Some candidates were awarded 1 mark for writing 3 of the 5 possible numbers which would round to 25, but often they wrote 1 or 2.
- Q.3 This question was well answered by candidates. Some gave the fraction of the following shape that is shaded and didn't go any further, whilst others attempted to convert the fraction to a percentage but made numerical errors. A common incorrect answer was 32%.
- Q.4 (a) Most candidates were able to complete the key, table and pictogram. Some made mistakes finding the value of the key but follow through marks were available for candidates who correctly used 'their key' to complete the table and pictogram.
- (b) Most candidates were able to identify the modal choice using their table and pictogram, but some clearly confused mode with median.
- Q.5 (a) Most candidates were able to find the numbers which were both square and had a difference of 12. 25 and 36 was a common incorrect answer, whilst some didn't seem to have awareness of square numbers.
- (b) Less than half of candidates were able to explain why two odd numbers couldn't add to 21. Some responses suggested confusion between odd and even numbers.
- (c) Over a half of candidates were able to write the given numbers in ascending order. It appeared that some have the misconception that the more decimal places a number has, the larger the number must be.
- Q.6 (a)(i) In this part, candidates were given a partially completed tally chart which they needed to finish off. This was well answered by candidates.
- (a)(ii) Some candidates were able to write the proportion of students as a fraction but many were unable to write it as a percentage.
- (b) Less than a quarter of candidates were able to identify the issue with Lindsey's response boxes was the overlapping intervals.
- Q.7 (a) Most candidates were able to use the scale in this part to find the actual length of the flowerbed, but many found it challenging to convert their length in centimetres to metres, with some dividing by 10 or 1000.

- (b) Some candidates were able to find what fraction of the flowers were daffodils and simplified their answer correctly, but some didn't cancel their answer down fully. A few candidates wrote the number of tulips over the number of daffodils, $60/240 = 1/4$ was occasionally seen.
- (c) This part was well answered by candidates. Integer values were required for the ratio, but some answers of $0.5 : 0.5$ were seen.
- Q.8 A few candidates were able to correctly work out which of the bottles gives the best value for money, However, many tried to compare the cost of the 1000 ml bottle with 3×300 ml bottles.
- Q.9 (a) Many candidates were able to solve this basic equation.
- (b) More than a half of candidates were able to correctly substitute a negative value into the expression.
- (c) Candidates found this part very challenging, with few fully correct responses seen. The candidates who correctly expanded the bracket were usually able to simplify the expression correctly.
- (d) Over a half of candidates were able to correctly write an expression in terms of t . Some gave a value to t and attempted to substitute this into their expression.
- Q.10 (a) Candidates were very successful with this number machine question, where they were given the input and needed to find the output.
- (b) Candidates were slightly less successful with this part, where they were given the output and needed to find the input.
- Q.11 (a) Most candidates were able to find how much money Adele saved. Some candidates lost the final mark for writing their answer as 0.40p.
- (b) This part was answered less successfully than part (a). Most candidates followed a method which would lead them to a correct answer, but numerical errors were often seen when candidates were working with multiples of 1.25.
- Q.12 Some fully correct answers were seen in this question, but many candidates struggled to work with the 20 minutes, with some simply multiplying 390 by 2, 2.5 or 2.2.

- Q.13 (a) This part was answered correctly by over a half of candidates who realised that an extra pack of water was needed. It was common for candidates to multiply 11 by 8 to get 88 and realised that Ben would be 2 bottles short.
- (b) This part was answered less well, with fewer than a quarter of candidates giving a suitable explanation of what was wrong with Ben's method. Some identified that he should have divided by 5 (instead of 4) but neglected to state that he would have needed to then multiply by 4 in order to work out the larger share.
- Q.14 (a) Some candidates were able to correctly complete the table of values, and many were able to find the value when $x = -1$, but not when $x = 1$ or $x = 2$. Very few substitutions were seen, instead candidates subtracted 2 from the previous y -value in the table.
- (b) Most candidates who completed part (a) correctly were able to draw the line in part (b). Others picked up a B1 for correctly plotting the points from their table.
- Q.15 Most candidates were able to show that there was another colour ball in the bag as the total of probabilities in the table was 0.9, but few were able to get the second mark by showing this meant there were 10 balls missing of this other colour as there are 100 balls in the bag.
- Q.16 (a) Some candidates were able to write the ratio of petrol cars to diesel cars and simplify it correctly, but often numerical errors were made.
- (b) Candidates found it challenging to find the percentage of cars which are diesel, many used the values in the question, rather than using their ratio from part (a) and made numerical errors or wrote it as a fraction.
- Q.17 (a) Most candidates attempted to use the partitioning method to calculate 12% of 750. Some numerical errors were seen, but a few candidates worked out 11% instead of 12%.
- (b) Some fully correct answers were seen in this part. Candidates who engaged with the need to work with equivalent fractions, typically went on to get the correct answer, but the incorrect answer of 5/10 was frequently seen, obtained by subtracting the numerators and denominators.
- Q.18 Candidates found this volume problem challenging. Many were able to find the height of the water at 11:00 (8 cm) but few could go any further and work out the volume in litres.
- Q.19 Most candidates who engaged with the height of the bars in the grouped frequency diagram were able to answer this question correctly, but many didn't seem to know where to start with this question.

- Q.20 This question was answered very poorly. Many candidates just labelled the angles on the diagram, without stating the angle rules which they used. Lots of poor angle notation was seen. Those candidates who tried to identify their angle rules they used often stated the wrong angle rule or used basic angle rules instead.
- Q.21 (a) Some candidates were able to correctly explain why Dylan and Asif agreed on the conditions to measure the leaves, but many just wrote 'so that they measure accurately'.
- (b)(i) Most candidates selected Asif but were unable to give a reason for their answer.
- (b)(ii) Approximately a half of candidates were able to draw a correct line of best fit on Asif's scatter diagram. Some just draw a line from the bottom-left corner to the top-left corner of the graph. Others joined all the points together with a zig-zag.
- (b)(iii) Less than a quarter of candidates were able to estimate the width of a leaf with length 7cm. Some attempted to use their line of best fit but weren't accurate enough with their readings.
- Q.22 Some candidates were able to use the ratio to find how much pineapple juice was in Ivy's class. A few candidates divided 330 by 10 but did not multiply their answer by 2.
- Q.23 This question was very poorly answered. Very few candidates seemed to have awareness to calculate the area of the circle, despite the formula being provided. Some who seemed to show awareness of the formula, often substituted in the diameter instead of the radius.
- Q.24 This question wasn't well answered, with some candidates attempting to divide 700 by 7.5, instead of multiplying the values. Those who attempted to multiply them often made numerical errors.
- Q.25 Many candidates had a good attempt at this question, with some fully correct answers seen. Some candidates wrote their answer as a product of prime factors but were unable to write this in index form for the final mark.
- Q.26 Some candidates gained marks in this question for setting up the two equations, but few were able to solve both equations correctly.
- Q.27 This part was very poorly answered by candidates. Some incorrectly multiplied $\sqrt{2}$ by 3 to get $\sqrt{21}$ but all sorts of unusual methods were seen in responses to this question
- Q.28 Some fully correct responses were seen to this question, but most marks were awarded to candidates for partial factorisation of the expression.
- Q.29 Few fully correct answers were seen in this standard form question. Many candidates wrote both values out in ordinary form but were unable to go any further.

- Q.30 (a) Most candidates correctly labelled the 'does not go on a train' branch, but very few did anything of credit after that. It was very unusual to see a fully correct tree diagram in this part.
- (b) Very few candidates were able to calculate the probability that Kate did not go on a train and did not go to the theatre. This is despite their tree diagrams from (a) being followed through in this part. Some tried to add the probabilities instead of multiplying them.
- Q.31 This question was very poorly answered, with many candidates unsure of what they needed to do and simply tried to solve both equations.
- Q.32 Some candidates were able to find how long it would take to empty 2 of the tanks (30 minutes) but very few fully correct answers of 1 hour and 30 minutes were seen.

MATHEMATICS

GCSE

November 2023

Foundation tier: component two

Overview of the Component

To do well in this examination, candidates needed to interpret each question carefully and make sure they used all the given information, particularly key words, and phrases, in their solution. They should have shown all their methods. The candidates who used efficient methods and presented their work in a neat and logical way were generally more successful.

Many candidates were able to access a good proportion of the questions. However, a lot of candidates did struggle to attempt those that are common with the higher tier paper.

Candidates were able to use a calculator for this paper but sometimes chose to use non-calculator methods. For example, on question 10(a) some candidates used a partitioning method to find 37% of £2500 instead of an efficient calculator method. Similar methods were observed on question 20. When this approach was used, there were often numerical errors.

There were two clear areas in this paper where there was a lack of content understanding. Question 15 showed a travel graph and candidates had to interpret it to answer various questions. It is important that candidates can read a scale accurately and understand the features of a travel graph to interpret and calculate average speed at different stages of a journey.

Question 16 required candidates to read and draw bearings but very few showed any understanding of this topic.

All candidates seemed to have sufficient time to answer those questions that were within their capabilities.

Comments on individual questions/sections

- Q1 Most candidates answered all parts of this question well. They were able to pick the correct values from the table and choose the appropriate calculation to answer the question.
- In part (a), it was common to see the correct answer. Some of the incorrect answers that were observed came from adding the cost of a 1st and 2nd class small letter whereas some mis-interpreted the question and calculated the cost of two 2nd class letters and one 1st class parcel.
- Part (b) was mostly answered well; however, a small number of candidates added the costs of the three large letters and three small letters instead of subtracting them.
- In part (c), most candidates chose to do trials to find the correct answer instead of division, which would have been a more efficient method. This mostly led to the correct answer but, on some occasions, candidates chose the incorrect number of letters following trials or repeated additions.
- It was pleasing to see so many candidates able to answer part (d) correctly and provide a good explanation to support their answer. The most common example shown was the cost of five 2nd class small letters = £3.40.

- Q2 Candidates found this question difficult. In part (a) it was common to see a rectangle drawn instead of a square. A 7 x 5 rectangle was often the one they chose. In part (b)(i) it was clear that most candidates knew how to calculate the perimeter of a shape, but it was not always done correctly. Not all the sides were always included in their calculation, 20 was a common incorrect answer. In (ii), rectangles were drawn most of the time (if attempted) but not always with the correct perimeter. It was common to see a 6 x 4 rectangle, which has an area of 24 instead of a perimeter of 24.
- Q3 (a) Fairly well-answered. However, there were some candidates with poor knowledge of place value and gave answers such as 6 500 20 000.
- (b) This was well answered, 6 triangles were shaded a pleasing number of times.
- (c) Candidates performed well on this part and the correct answer was often seen. Some candidates did not write the division the correct way around, e.g. $6 \div 24 + 4$ and so were not awarded the mark.
- (d) Candidates were more successful rounding to the nearest ten than the nearest thousand. Whilst (i) was often correct, in part (ii) it was common to see answers rounded correct to the nearest hundred or ten thousand.
- Q4 (a) Most candidates were able to answer part (ii) correctly, however in part (i) it was common to see an answer of 'likely' instead of 'even chance'.
- (b)(c) Both parts were answered well.
- Q5 (a) A good number of candidates were able to answer this correctly whilst other candidates gave an answer of 180° .
- (b) It was common to see an answer of 270° where candidates only completed the first step of the process, forgetting to divide by 5.
- Q6 Candidates were mostly confident at plotting point D and when this was the case, most could also give the coordinates correctly. Occasionally the coordinates were seen reversed. In part (c), candidates found reflecting the shape difficult, there were many attempts at rotations and shapes were commonly seen in the fourth quadrant.
- Q7 (a) Common errors on this question were usually in the temperatures for the warmest and coolest months incorrectly read off the graph in part (ii). Some did not read the scale correctly for either month so were not awarded any marks, some were able to read one of the values correctly, usually the 12. A small number of candidates misinterpreted the question and found the mean of the two temperatures.
- (b) This was not answered well, it was rare to see the correct answer. Often, the 1.8 in the formula was ignored and candidates gave an answer of $25 + 32 = 57$.

- Q8 This was answered well, it was pleasing to see so many candidates being awarded 3 marks. Some of the errors that were observed; candidates performed the division the wrong way around for the cereal bar leading to an answer of 80p. Others were able to find the cost of one cereal bar correctly but forgot to take one cereal bar away from Alex's total cost before dividing by 3.
- Q9 Part (a) was well answered. Most candidates were able to do the substitution and perform the calculation correctly. Although part (b) was also well answered, there were more errors here than in (a). Some candidates subtracted £64 from £271 but didn't go any further. Whilst others had the correct calculation but did not use brackets and so arrived at the incorrect answer, e.g. $271 - 64 \div 11.50 = 265.43$.
- Q10 (a) Most candidates were able to gain the first mark in this question by taking away the money Jarrad had spent from the £3000. Candidates that went on to choose an efficient calculator method to find 37% of £2500 could usually finish the whole question accurately. However, many candidates used a partitioning method to calculate 37% made various errors (usually in calculating 1%) which led to incorrect answers. Some candidates interpreted the question incorrectly and calculated 37% of the money he spent leading to a final answer of £37.
 $0.37 \times £500 = 185$, $185 \div 5 = £37$
- (b) A common response was calculating the difference $3000 - 600 = 2400$, sometimes followed up by an answer of 24%.
- Q11 (a)(i) Most candidates were successful in getting one of the terms correct, but some left their answer as $6a + -2b$, $6a - -2b$ or $6a + 2b$, these were only awarded 1 mark.
 Another common incorrect response was $5a^2 - 2b$.
- (a)(ii) An answer of 3 was rare. $3w$ and $3w^2$ were the most common answers.
- Q12 Candidates engaged well with this question. The most successful candidates labelled each part of their method and showed full workings as they came to a final cost.
 Common errors included:
- a final answer of £1440 for 'pay separately', candidates did not multiply the cost of the accommodation per person by 7.
 - £3744 came from multiplying the food cost per person by 7 as well as the accommodation.
 - £2952 was the cost for 'pay separately' when candidates calculated the cost for four people instead of three.
- Q13 (a) In part (i), most candidates were able to list some of the remaining seven outcomes. Occasionally there were outcomes omitted or repeated. Those candidates that had a logical listing strategy e.g. HHT, HTH, THH, were the most successful in gaining both marks.
 In part (ii), where a fractional probability was given, it was usually correct. Some chose to describe the probability using words. Unlikely, was a common response. This was not awarded the mark.

- (b) Well answered. However, some incorrect responses included $136 \div 0.375$ or $136 - 0.375$. Occasionally 0.625×136 was calculated.
- Q14 (a) Most candidates were able to start the method off correctly and were awarded the first 2 marks for calculating the total cost for gas. Following this, many candidates completed the division the wrong way around and came to an answer of 11.1....
When a correct answer was found, sometimes this was written incorrectly (0.09p) and so the accuracy mark was lost.
- (b) Many candidates engaged well candidates with this question. Although it was not common to award 5 marks, some marks were often awarded. Candidates were usually able to calculate the total cost of the electricity but struggled to find the cost of the service charge.
Even when the total cost before VAT was incorrect, candidates were able to gain the remaining 2 marks for increasing their amount by 5%. Successful candidates used an efficient method to find 5%, either by multiplying their total cost by 0.05 and adding this on, or by multiplying the total cost by 1.05. There were often non-calculator attempts at calculating 5%. Many candidates found 10% and then attempted to half this to find 5%. This frequently led to inaccuracies.
- Q15 Candidates found this question challenging. It was rare for all parts to be answered correctly. In part (a) answers were sometimes rounded to the nearest 5, it was common to see 20 or 25 minutes.
In part (b) a response that described the steepness or incline of the line before the puncture was what was required.
In part (c)(i), some candidates drew lines that continued to travel further away from the starting point. Where lines were drawn coming back towards the starting point they usually did not finish in the correct place.
It was very rare to see a correct response for the average speed in (ii), most candidates divided 45 by 5 and gave an incorrect answer of 9 mph.
- Q16 It was rare to award marks in either part of this question. In part (a), when an answer was given, it was usually 150° , the bearing of the park entrance from the reception. But a large proportion of candidates gave a length instead of a bearing. In part (b), very few candidates attempted to draw lines to find the location of the tent. Often a point was indicated on the map without any supporting lines.
- Q17 In part (a) candidates were able to sort some of the numbers into the correct sections of the Venn diagram, but a fully correct response was not common. In part (b) a correct response was sometimes given even though the Venn diagram was not correct. Some candidates were able to use 'their Venn diagram' to give a correct follow through probability. Whilst other candidates were only able to give a correct numerator or denominator for the probability. Some candidates did not include the numbers outside the circles when writing down their probability e.g. $2/5$.

- Q18 (a) Candidates struggled to describe the transformation of shape A. It was very rare to see a fully correct response. When candidates did recognise that a rotation had taken place, they did not always use the correct language to describe it. 'Turned 90° ' was used instead of 'rotated 90° ', this was not awarded the marks. The direction of the rotation was often omitted, and it was rare to see the centre given.
- (b) When this was attempted, many candidates drew the shape with a vertex starting at (-3,2) instead of translating in the vector given.
- Q19 (a) This was well-answered, $2/9$ was seen most of the time. But occasionally $2/7$ was seen, they did not include all three parts of the ratio for the denominator.
- (b) Fairly well answered but a common incorrect response was $1400 \div 3 = 466\dots$
- Q20 There were very few fully correct responses. Most candidates attempted partitioning methods to find 18% and 15%, some managed to find £10045 (the value after 1 year) but made errors following that step. Some only attempted the first year and didn't go any further. Those that attempted year by year calculations rarely got the correct answer due to errors part-way through. Of those candidates that did find the value of the car correctly, some subtracted the value from £10045 instead of the original value. Very few candidates were familiar with decimal multipliers or the formula for repeated proportional change.
- Q21 (a) This was not well-answered. Very few candidates were familiar with the method for estimating the mean. Candidates understood how to calculate the mean of a set of numbers but not from grouped data. Some candidates could find the mid-points but then found the mean of the mid-points. Whilst others were able to find the mid-points and multiply them by the frequencies correctly but then divided their answer by 5 instead of the sum of the frequencies. Some candidates simply found the mean of the frequencies.
- (b) Some candidates found the median group through incorrect logic, ordering the frequencies and then picking 17 as the middle number which led to 65-70. This was not awarded the mark. Other candidates selected the modal group, some used the mean instead of the median to select a group.
- Q22 (a) Very few correct answers. Common responses included $16 \times 10 = 160$, or $16 + 10 = 26$, using the radius as the diameter of the circle. Some calculated the area of the rectangle and then divided by the area of the circle, e.g. $60 \times 96 \div (\pi \times 6^2) = 50\dots$ leading to an answer of 50 circles.
- (b) This question was not always attempted and when it was attempted there was very little creditable work. Occasionally a mark was given for calculating the area of one circle. But often responses did not include the use of the area of a circle.

- Q23 (a) Common errors included $x^2 + 10x + 10$ (adding final two terms instead of multiplying), $x^2 + 21$ (only multiplying the first and last terms), similarly $x^2 + 10$ was seen.
A correct answer was sometimes incorrectly simplified to $11x^2 + 21$, this was not awarded full marks.
- (b) Some candidates attempted to collect like terms instead of solving the equation, $11x + 13$ was often seen.
Those who did get to $3x = 1$ sometimes give an answer of 3, completing the division the wrong way around or they wrote 0.3 instead of $0.\dot{3}$.
- (c) This was rarely correct. Common incorrect responses were $y(y - 400)$ and $(y + 2)(y - 200)$.
- (d) Very few candidates had a method for solving simultaneous equations. Candidates often attempted to solve each equation individually by incorrectly attempting to take x's and y's from each side of the equation. Some candidates just attempted to solve the equations through trials of substituting numbers.
- Q24 This was rarely answered correctly. Most common incorrect answers were found by subtracting the corresponding sides then using the difference to calculate r and t, e.g. $15.6 - 10.4 = 5.2$, then subtracting 5.2 from 19.5 to find t and adding 5.2 onto 7.6 to find s. Leading to answers of 12.7 and 14.3.
- Q25 (a) Very few sightings of trigonometry, and when it was seen it was rarely used correctly.
- (b) There were some good responses seen. Candidates stated, 'he cycled the shortest route down', 'the surface was flat/smooth' leading to the effect 'the distance would be greater'.
However, others simply stated facts from the question, such as 'it's 800 feet above ground' or 'it's 48 degrees'.

MATHEMATICS

GCSE

November 2023

Higher tier: component one

Overview of the Component

This component assessed content from the full specification. The paper was set with questions of increasing demand and in a variety of styles accessing all three assessment objectives.

Questions within the paper were comparable with those asked previously, with the paper being a fair test for the candidates at this level.

Overall results showed that some candidates performed very well on this paper. Unfortunately, there were many candidates who did not perform very well at all. In terms of the latter candidates, and the probable negative experience they encountered, one questions whether these candidates were entered at the appropriate tier. Sitting the Foundation Tier would have probably enabled candidates to gain more confidence and achieve greater success.

Throughout the paper some questions were answered very well, while others proved to be more challenging. Questions that weren't as well answered were not necessarily related to their demand.

The lack of a calculator in this paper possibly led to many numerical errors. Checking processes were not always obvious to see, leading to errors not being picked up. As a result, the rest of the question was often made much more difficult by using incorrect values within subsequent working.

A number of candidates showed many attempts at working within the same question with no clear indication of which solution was being presented. In addition, a large amount of work presented did not indicate answers at the end of working but instead, embedded within it.

Comments on individual questions/sections

Q1 Ratio (juice)	Well answered with many candidates gaining full marks. Some candidates stopped at finding 1 part.
Q2 Area circles/square	Some lovely solutions seen but typical errors included: • Use of diameter instead of radius. • Calculating the perimeter as opposed to area. • Not realising there were 2 full circles.
Q3 Mass/volume/ Density	The misuse of the formula was seen frequently.

Q6 Solving equations	A number of candidates got full marks however quite a few tried to use a method of 'simultaneous equations'.
Q7 Surds	Very poorly answered overall in both parts. The incorrect answers of both $7\sqrt{2} \times 3 = 7\sqrt{6}$ and $2\sqrt{11} \times 11 = 22$ were often seen.
Q10 Tree Diagram	(a) Nearly all candidates correctly filled in the missing value on the first branch. However, many did not gain any more marks as they worked with 0.28 on the first branch on the second set of branches instead of $0.28 \div 0.4$. (b) Very few candidates gained full marks here even though FT from (a) was rewarded. Quite a number of candidates added instead of multiplying.
Q11 Proportion problem	A very small number of candidates got full marks here with many misunderstanding the concept that less pumps means more time and less tanks means less time.
Q13(a) Interpreting equations of straight lines	Some lovely solutions seen with rearranging and equating coefficients and final explanation. Most candidates attempted to rearrange and scale but some made errors in the process.
Q15(a) Factorisation of quadratic	Some candidates went on to unnecessarily attempt to 'solve=0' after factorisation.
Q16(b) Vectors	A surprising number of candidates misread the question and tried to find YZ instead of WZ .
Q17(c) Estimation	There was often an apparent disregard for the word ' estimate ' with many candidates not rounding initial values and so were unable to carry out further calculations.
Q18 Two way table	Several candidates left blank spaces in table and were then not able to find the required probability.
Q19(a) HCF	Many candidates had the correct prime factor decomposition for 504 but were unable to go on to find the highest common factor.
Q20 Angles in circle	The candidates that were successful in finding the missing angle often did not obtain the final mark due to missing or no reasons in their proof.
Q21 Histogram	(a) Needed to see the effect of combining two groups as opposed to the common response of 'the histogram not reflecting the table'. (c) Some candidates just compared one bar of the histogram as opposed to all students as mentioned in the question.

Q24(a) Acceleration from graph	A drawn tangent was rarely seen with a few candidates inappropriately using equations of motion.
Q24(b) Distance from graph	A few attempted to find areas of the vertical strips but many made numerical errors with at least one strip.
Q26 Rearranging formula	A number of perfect solutions. However, despite not required for full marks, none included +/- in front of $\sqrt{}$.
Q27 Recurring decimal as fraction	A few candidates seemed to misread the question and thought the '3' was also recurring. It was disappointing to still see incorrect answers to '1000 – 10'.
Q28 Interpreting velocity/time graph	Most candidates did not properly engage with this question.

MATHEMATICS

GCSE

November 2023

Higher tier: component two

Overview of the Component

The paper was set to differentiate, with different styles of questions and a graduation in the level of difficulty.

Item level data is available to all centres by centre and for individual candidates with comparison of all candidates sitting these examinations. This report will focus on common errors and misconceptions to aid the interpretation of the data available rather than focus on whether each question was well answered or not.

A large number of candidates were only able to score a few marks on this paper. One does question whether these candidates would have developed greater confidence in their mathematical ability and consequently achieved greater success if entered for Foundation Tier.

As this is a calculator allowed paper, some candidates think it appropriate to omit stages in their working. If these candidates make errors it is then difficult to decide whether the correct method of solution has been adopted.

Candidates who attempt questions more than once need to make it clear which answer they wish to be marked. Without any further information, the final attempt is marked.

Unless otherwise instructed, answers on this paper should be decimals given to an appropriate level of accuracy and not expressions involving surds and/or multiples of π .

Comments on individual questions/sections

Overview of the Component

Comments on individual questions/sections

- Q2 Candidates need to appreciate that year-by-year methods are not appropriate here. The use of multipliers with the appropriate index is expected.
- Q3 A standard question. Many candidates were unable to calculate the mid-points correctly and many that did obtain a total length for all the fish decided to divide by 5 and not the total number of fish.
- Q4 (a) Despite the diagram, many candidates were unable to visualise the arrangement of the circles, 13 being quite a common answer.
(b) The formula for the area of a circle was given to candidates yet many failed to use it.
- Q7 (a) Trigonometric ratios should not be truncated to 2 decimal places.
- Q8 (b) The calculation of the volume of the cuboid should have been the obvious starting point.
- Q11 Only a few candidates were able to demonstrate any understanding of bounds.
- Q13 Many candidates used 60 as the total frequency, the top of the axis, rather than the 50 for the final point.
When asked to include an appropriate average in their comment, reference to the mean, median or mode (whichever is appropriate) is required. Similarly, when asked to include a measure of spread, the range or inter-quartile range must be referenced.
- Q14 Candidates should understand how the given formula for the volume of a cone can be used as an aide memoire for the volume of any pyramid.
- Q15 Probability calculations should be exact and not based upon rounded or truncated decimals.
- Q16 If an equation is given, candidates should attempt to solve it even if they are unable to derive it.
- Q18 Careful reading of the question is required. Many candidates worked with t being inversely proportional to m rather than inversely proportional to the square of m .
- Q19 The formulae for Sine and Cosine rules were given but were not used by many candidates.
- Q20 Candidates need to know the difference between a solid line and a dotted line when representing inequalities.
- Q21 Set notation is understood by very few candidates.

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ⁱ Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.