OCR
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GCSE

Mathematics A

General Certificate of Secondary Education **J562**

OCR Report to Centres

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

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OCR REPORT TO CENTRES

Overview

General Comments

Standards on Unit A continue to impress with many candidates performing at a high level, particularly at the Higher Tier of entry. Due, in part, to the more challenging nature of some of the questions in Unit B, standards on the whole were slightly below the November series at both tiers. However, it is pleasing to be able to report that most candidates, on both units, were well prepared and entered at an appropriate tier. Work was, in general, of a good standard with candidates showing what they know and can do.

Much of the work marked was well presented with a clear method shown. This enabled marks to be awarded for a correct method even when the final answer was incorrect. Candidates should consider their presentation before committing it to paper to facilitate a clear, structured solution. With more problem solving questions and questions rewarding the quality of written communication, the presentation of work becomes an important issue for candidates and centres. When working or answers are replaced, earlier attempts must be crossed out clearly. It is imperative that questions are read carefully. This series, there are many cases where candidates have misread information or not followed instructions accurately and consequently lost marks unnecessarily. Candidates must be able to recognise and understand the trigger words given in questions like ‘estimate’, factorise’ and ‘simplify’.

In general, it appears that most candidates had access to a calculator and geometrical equipment where appropriate.

Statistics and Geometry and Measures questions continue to show candidates’ best work. At Higher Tier, Algebra work is improving with processes well understood. However, this is not the case at Foundation Tier where Algebra continues to be a difficult topic area for many; techniques such as ‘trial and improvement’ and ‘flow diagram’ methods to solve equations are often seen. Arithmetic continues to be a cause for concern at both tiers. Even though techniques are generally known and understood, the execution of the basic numeracy processes like addition and multiplication are done with little care and confidence.

Centres requiring further information about this specification, details of support materials and details of training sessions in the coming year should contact the Customer Contact Centre at OCR.

A501/01 Mathematics Unit A (Foundation Tier)

General Comments

Overall, the paper was well done with most questions attempted by most candidates. There were very few really low marks and some pleasingly high marks.

Candidates appeared to have sufficient time to complete this paper.

By comparison with previous series, the algebra questions in particular were poorly attempted. The number of arithmetical errors suggests that some candidates did not have access to a calculator.

The use of geometrical instruments is another area where there is room for improvement.

Comments on Individual Questions

1 All parts were done well. A few candidates gave an answer of 60 000 in part (a), while incorrect answers to part (b) were rarely supported by any working. In part (c) 250 280 and 25 208 were common wrong answers. The spelling in part (d) was not always correct but the meaning was usually clear.

2 Part (a) was well answered by most candidates, although the row provided in the table for Irises was not always completed.

In part (b)(i), most candidates added the numbers correctly in the calculation of the mean, and there were many fully correct answers. By contrast, the range proved more difficult. Answers such as 20 (the median) and 13 (the middle value of the unordered numbers) were common.

3 Most candidates gave the correct pattern in part (a) but a few left a gap in the middle. There was a varied set of responses to the number of dots in part (b), but many got the correct value of 28. Candidates had great difficulty in describing the sequence, and the mention of triangle numbers was extremely rare.

4 This question was well answered. Most candidates got the correct total cost of £205 and most gave the correct working though a few put the order prices in the item price column. Some added the quantity value to the item price to make the answer in the order column.

5 In part (a), most candidates were able to measure and write down a value in the acceptable range of 5.5 cm to 5.7 cm. A good number were then able to convert this to a correct actual figure in centimetres. However, far fewer were able to convert this figure to metres.

In part (b), many candidates did not use a ruler. Despite the instruction in the question to “Draw accurately”, there were many inaccurate drawings, particularly if candidates did not start a side on a grid line. Nearly all placed the objects in “suitable positions”.

6 Candidates often seem to find these charts difficult to use. Although most found the correct mileage of 47 in part (a), part (b) proved to be trickier. The correct values of 160 and 91 were often seen but poor arithmetic meant that many did not get the correct answer.

7 There were few completely correct answers but those candidates who showed working managed to gain method marks. There was confusion over the conversion between litres and millilitres and 0.568 litres was ignored and replaced by 1000 ml. Many candidates just added the 20 and 8 rather than multiplying by 16 and 4 respectively.

8 A significant number of candidates did not use of a pair of compasses to locate the point C in part (a). Even those who did know to use two compass arcs rarely scored any marks because of poor measurement.

In part (b), candidates invariably measured angle B correctly.

9 Full marks for this question were rarely awarded. It seems that at this level candidates find it hard to know how to manipulate the figures that they are given. Many put a list of 7 days in a week, 24 hours in a day, etc, but then could not proceed further. There was a lack of clarity shown in the working and answers of 25 × 9 were common. A number of candidates decided that there were 100 seconds in a minute and/or 12 hours in a day.

10 In part (a), many candidates just gave an answer with no calculation. A common error was to use the difference of two cans and the 35p rather than using a conversion. Some candidates worked out correct prices per can or numbers of cans per pound but did not then indicate clearly which offer was the best.

By contrast, in part (b), a variety of valid reasons were offered, particularly with regard to health matters. A number of candidates misinterpreted the question in part (b) and used the answer space to justify their answers to part (a).

11 Many candidates found the correct answer of $5a$ in part (a), but answers of $6a$ were common as were unsimplified expressions such as $6a–a$.

In part (b), very few candidates seemed to understand the meaning of "Factorise".

12 This question rarely earned full marks. The most common answer offered was 2.30 rather than 2.31 but there were many other rounded or truncated versions seen. As well as no use, or incorrect use, of brackets when using a calculator, candidates also failed to round their answer correctly to two decimal places.

13 Even when candidates did the correct working, many failed to use correct money notation. A common incorrect approach was to divide 28 by 2 and/or by 3 rather than by 5. Two randomly chosen numbers totalling 28 were often seen.

14 Pythagoras' theorem was known and applied correctly by only the better candidates. Many just added the lengths. Some stated they were going to add the squares but then subtracted them. Others, who knew they had to square the sides often doubled them instead, thereby obtaining an answer of 3.

15 It was rare for candidates to score at all in part (a). Guesswork was prevalent in this part although some did manage to gain marks once they had reduced the equation to something more manageable. Forgetting to multiply the –1 by 3 was quite common as was writing $3 \times 2x = 5x$.

In part (b)(i), a final answer of 65.84 from $(3 \times 2.6)^2 + 5$ was very common, while in part (b)(ii) the most common answer was –43 from $3 \times –(4^2) + 5$.

A501/02 Mathematics Unit A (Higher Tier)

General Comments

This paper allowed candidates to demonstrate their knowledge while retaining an element of challenge in places and including appropriate functionality and problem solving in some questions.

Candidates had sufficient time to complete the paper and almost all showed working in the appropriate places. The use of calculators was evident throughout and although there were some weaker candidates there were many excellent scripts where candidates had been well prepared for the examination. Most candidates set out algebraic manipulation well. If candidates restart questions it is very important that they show a clear selection of the method they have used by deleting redundant work. There is evidence that many candidates are unsure of the order of operations when approaching a staged calculation with their calculators. Premature approximation part-way through calculations spoilt the accuracy of the final answers for some candidates in questions 6, 8 and 13.

The strongest areas of content were: prime factors, use of scale, solving linear equations, sequences and *n*th terms, use of Pythagoras' theorem, reasoning with measures and means and drawing a box plot. Weaker areas included: order of operations when using a calculator, measuring a bearing, substitution and evaluation of negative value into a squared expression, knowledge of reciprocal, reasoning involving comparisons of average and spread from a cumulative frequency graph and box plot, constructing the perpendicular to a line, rearranging formulae, functions and identities.

Comments on Individual Questions

1 The ratio was often simplified correctly. A variety of methods were used, as indicated in the mark scheme. The most common was gradually simplifying 2000 : 750 until 8 : 3 was reached. Very few candidates started from 2 : 0.75 but those who did only needed to multiply 2 and 0.75 by 4. Those who failed completely often used 200g in 2kg.

The answers to part (b)(i) were usually given correctly in grams, with a few lacking units.

A surprising number of candidates did not find the correct number of jars in part (b)(ii), with 8 instead of 9 as a common wrong answer. Sometimes working was not shown.

2 Most candidates managed to get at least 2 of the factors, often from a factor tree. A number of candidates had a complete tree or correct division but then only stated two of the factors, commonly omitting the 17. A few others only got as far as 2, 51. Some candidates were let down by poor arithmetic.

3 There were many good answers here but a number of candidates could not cope with the bearing and failed to measure it clockwise from North. Quite a few measured in an anti-clockwise direction. Those candidates who understood what was required usually managed to determine the point within the limits of accuracy set by the mark scheme.

Part (b) was done well. Several candidates who made an error with the distance in part (a) coped well with the measurement and conversion in this part. Very few candidates wrote the measured distance down; most just wrote down an answer and, as a consequence, the method mark was rarely given.

4 In part (a), most candidates set about solving the equation by multiplying out the brackets first with the occasional error of getting $6x - 1$ instead of $6x - 3$.

The common error in part (b)(i) was to multiply 2.6 by 3 and then square. A similar error also occurred in part (b)(ii), with the additional error that some thought that squaring a negative number produces a negative result.

5 The correct answer in part (a) came from either working through the terms up to 1280 and counting the number of terms, or from working backwards dividing by 2. Sometimes the number of terms was miscounted and an answer of 8 was given but where working was shown the method mark could be awarded.

Finding the second and third terms of the linear sequence in part (b) was done well. The formula for the *n*th term was usually correct from good candidates, although not done well by weak candidates, who were more likely to give '$n + 7$' than the correct '$7n - 3$'.

6 The majority of candidates coped well with Pythagoras' theorem, with clear, correct working shown. However, as usual with this topic, weak candidates tended to flounder, perhaps getting as far as adding squares. A few had no idea how to proceed.

7 Part (a) was done well by most candidates. Many correctly reached 542.8 while a few calculated the extra weight available. Some did not make a decision after a correct value. A few mistook the total weight of 7 people to be 65.4 and added 85 to this, giving 150.4, while others did not add anything to 457.8.

Part (b) was also done well. Those candidates who had got 150.4 in the first part often then divided by 8 (not 2) to give an answer of 18.8.

8 Although there were many correct answers in part (a), some candidates only managed to obtain a mark for reaching 481.89… but then cubed or trebled this rather than finding the cube root. Many did not show intermediate steps and went straight to an incorrect answer.

Most candidates gained at least one mark in part (b) but rounding errors were frequent; 2.3 or 2.30 were often seen. Some did not carry out the operations in the correct order on the calculator, arriving for example at 203.18.

In part (c) the meaning of 'reciprocal' was often not understood and even those who did understand had difficulty. $\frac{5}{4}$ was often given instead of $\frac{4}{5}$. Some had the right idea but left the reciprocal in the form $\frac{1}{1.25}$ without evaluating it.

9 Candidates generally had a clear idea of what was expected in part (a). The median line was usually correct but lines at 5.1 and 10.1 were sometimes inaccurate. Whiskers sometimes did not 'end' in vertical lines but this was condoned, and some candidates mistakenly 'boxed' from minimum value to maximum value which was not condoned.

In part (b)(i) almost all candidates interpreted the cumulative frequency graph correctly and gave an answer of 2. Any errors tended to be scale misreads. A few gave 28.

Very few candidates gained full marks in part (b)(ii). The values/comments regarding the average were better attempted than those regarding the spread. Medians were often correctly quoted but the range/IQR was often not correct and sometimes the two were confused (eg using LQ with max value rather than with UQ). A common error was to give the range as 4.2 to 10.1 rather than 5.9 and no credit was given for these data in such cases. Some comments contradicted the values given. There were quite a number of candidates who did not attempt this part.

10 Constructing the perpendicular from a point to a line was badly done by many candidates; there appeared to be confusion between a perpendicular to a line and the perpendicular bisector of a line. Arcs were often randomly drawn with seemingly no idea of the correct construction. Some candidates drew a line from P to the midpoint of AB. Of those that were successful, the same number used the kite construction method as used the more conventional arc from P method.

11 Rearranging the formula in part (a) was not done well by many. Some candidates who went straight to the answer without the intermediate steps gained full marks for a correct answer but 0 otherwise. Attempting to take the square root first was common, but few did so correctly. Another common error was subtraction used as the inverse of multiplication, with $S - 4\pi = r^2$ as the first step. Many candidates separated the 4 and π when it came to the inverse and made errors as a consequence. Some attempted to use a reverse flow-chart but rarely did so correctly.

More candidates seemed familiar with function notation this series, perhaps reflecting the expectation of being asked this type of question. Pleasingly, there were some good answers in the second part of the function question. However, some responses were spoilt by statements such as '$\frac{3}{0} = 0$' or '0 cannot be divided by 3'. Many candidates simply stated answers such as 'because it's a negative', 'because it's a decimal'. Almost a third of the candidates did not attempt this part.

12 Candidates struggled with both parts of this question, with many making errors in collecting the terms on the left-hand side. Those who did collect up correctly to get $8x + 3$, often did not realise what that implied and carried on applying some sort of algebraic manipulation.

Some better strategies were seen in part (b), but it was very disappointing to see even good candidates fail to expand the brackets correctly. Many substituted 2 into the left-hand side but obtained 16, 17 or 39 rather than 19. Many candidates seemed intent on making this question more difficult than it actually was.

13 It was pleasing to see the more able candidates making an excellent attempt at this multi-step problem and showing a clear strategy with structured correct working. Most candidates realised that they needed to find BD to proceed but weaker candidates often did not know how to do this. Those who correctly found BD were also usually successful in finding CD. Many multiplied by cos35 (for BD) and sin35 (for CD) instead of dividing, even when they had written a correct initial trigonometrical statement with the unknown as the denominator of a fraction. Some used longer methods, finding AD first using tangent and then using Pythagoras for BD. Those using such methods were more likely to make a premature approximation for the lengths within the calculation and risked losing accuracy before the final answer.

A502/01 Mathematics Unit B (Foundation Tier)

General Comments

Candidates appeared to have sufficient time to answer all of the questions.

Scatter diagrams appeared to be well understood by many candidates but drawing a straight-line graph and changing a fraction to a decimal were not.

Candidates are advised to rub out wrong drawings and leave only the single drawing that is their answer. Many freehand drawings were seen, despite candidates appearing to have a ruler.

Candidates generally showed working and so gained method marks when errors were made.

Some candidates did not produce an argument or present mathematical facts to support an answer to QWC questions.

Knowledge of geometry, such as the definition and properties of a quadrilateral or the definition of an obtuse angle, was an area that candidates found difficult.

Comments on Individual Questions

1 Part (a) was often well answered.

In part (b)(i), most candidates gave the correct answer and only a very few failed to make an attempt.

In part (b)(ii), many candidates found giving two alternative responses challenging and stopped at $72 \div 9 = 8$, possibly not perceiving $72 \div 8$ as a different calculation.

2 Many candidates scored well in part (a) though quite a few candidates were not able to add 3.40 and 12.75 correctly.

In part (b)(i), many candidates reached £1.20 but again errors often occurred, usually in the calculation of 2.80×4.

In part (b)(ii), a pleasing number of candidates showed that 10% of 80 was 8 and so 7 was less than this. Some did try to work out 7 as a percentage of 80 and were unable to proceed.

3 In part (a), the majority of candidates thought that angle *p* was obtuse.

Many correct answers of 142 were seen in part (b). Errors in subtraction frequently meant that only a method mark was earned. Candidates who got an incorrect answer and showed no working failed to score.

4 Many candidates appeared unable to link the question to the use of “square” and “cube”. In part (a), where a diagram was given, wrong answers were common. Frequent wrong answers for the other parts were 16 or 32, 25 or 225 or 2.25, *h* and 60 or 100 or 600.

A few candidates wrote $\sqrt{225}$ but did not evaluate or failed to evaluate correctly in part (c).

5 Many candidates read correctly from the graph in part (a) although 1950 was a common wrong answer. The line clearly indicated a date before this.
Many good answers were seen in part (b). Some candidates restricted themselves to saying “the temperatures rose”, even though this alone was unlikely to gain them 3 marks.

6 Regrettably few candidates were able to respond to this test of their knowledge of the role of letter symbols and few were able to define the symbols used.
A common wrong definition of “*t*” was “Tessa” or “the sweets”. Similarly “*h*” stood for “halving”.

7 In part (a)(i), many candidates were able to draw a regular hexagon though not always the correct size and not always with a ruler. Some understood the context and showed the six tiles. A common wrong answer was to divide the entire hexagon into 1cm triangles.

In part (a)(ii), many candidates correctly shaded to give two lines of symmetry. A common error was to have only one line of symmetry or to shade the entire shape. In the latter case no marks were awarded.

In part (a)(iii), few candidates could work out the sum of the interior angles of the hexagon and there was little evidence that they knew any formulae or processes associated with this part of the specification. A few candidates did work out 720 but gave the answer 120.

Some candidates recovered in part (b) and drew a trapezium or a rhombus made from eight tiles. Drawings of any size were condoned. Some just drew a quadrilateral. Some candidates could correctly name their shape but there was some evidence that the names of quadrilaterals were not well known. Some unusual answers such “equilateral quadrilateral” were seen.

8 This QWC question was not well understood or answered. Candidates sometimes restricted themselves to saying who they thought was right (or wrong) but not supporting this with evidence. Some mentioned the sum of angles in a triangle was 180 and in a quadrilateral was 360. Some drew diagrams of shapes and indicated one or two obtuse angles. A few well presented cases were made with the essential geometric information included. Misunderstandings revolved around the number of sides and the “room inside the shape” to draw more angles. Answers that just repeated the assertions failed to score.

9 A small number of candidates knew the correct convention for indicating a recurring decimal. Degree signs were not rewarded but 0.1^r was allowed.

Even fewer candidates showed any understanding that $\frac{5}{6}$ became $6\overline{)5}$ and, of those that did, many divided the wrong way and gave the answer 1.2.

Some correct answers of $\frac{1}{4}$ or $\frac{1}{5}$ or $\frac{1}{8}$ were seen in part (c), but $\frac{1}{2}$ and $\frac{1}{6}$ were common wrong answers.

10 Many candidates plotted the required points on the scatter diagram but a degree of accuracy was needed to score full marks. Some candidates did not plot any points but answered the rest of the question.

A line of best fit was frequently correct although common errors were to think that the line had to pass through the "origin", (0, 10 000), or had to "join the dots". The latter was common amongst weaker candidates.
Many knew that the correlation was positive, although some negatives were seen. Most could give the price of the new car but a number failed to ring the cross representing the sports car.

11 This question was very poorly done. Candidates appeared not to know how to construct straight-line graphs. Very few tables of values were seen and, where they were, they were often wrong. A few cases of ruled lines through (0, 4) were seen although these often had a gradient of 2 and not –2.

Part (b) was rarely answered. Some candidates drew $x = 3$ instead of $y = 3$. A few candidates realised they were looking for a point of intersection. Others realised that the lines had to cross at a point with a y coordinate of 3 and gave this value as part of their answer.

A502/02 Mathematics Unit B (Higher Tier)

General Comments

It appeared that all candidates had sufficient time to complete this paper. Some of the questions on the paper were straightforward, either AO1 or AO2, and these were answered very well, examples being the first four questions and question 6. The questions aimed at functionality were also tackled well. However, the question on external angles of polygons and that on vectors were both poorly done. There were also questions which required a certain amount of problem solving and these were not answered well; questions 7 and 11 were two such examples. Some candidates' working was poorly structured and many did not use the information given correctly. Candidates need to read questions carefully.

Candidates did not need much equipment but rulers were essential in questions 1, 2 and 8. Many did not know how to draw the graph of a straight line given its equation.

There was a large range of scores with the majority gaining between 20 and 50; some gained well over 50. This paper had questions which differentiated between very able candidates and also did offer some easy questions, so few scored under 10 marks.

The weakness in candidates' responses was that some of the questions requiring the recall of knowledge were answered poorly, examples include the exterior angle of a polygon (Q5), multiplying fractions (Q7a), decimals to fractions conversion (Q9) and vectors (Q10a).

Comments on Individual Questions

1 In part (a), most candidates were able to gain some marks and many gained full marks. There were a few short lines with positive values of x only used or lines that were not ruled. Incorrect responses were often lines with equation $y = 4 + 2x$. Some candidates were not able to cope with substituting negative values into the equation and thus were unable to calculate any points correctly.

In part (b), many candidates were able to draw the line $y = 3$ correctly but a surprising number did not read the correct values from their intersection even though the y value was given. Some successfully solved the equations algebraically.

2 There seemed to be a lack of accuracy in plotting the points but most candidates correctly plotted one or two points. The scale on the x-axis seemed to cause more problems than on the y-axis with 2.2 often plotted at 2.1.

In part (b), most candidates scored the mark for drawing a line of best fit within the tolerance allowed. A few did not draw a line that was long enough and a handful attempted to join the points with a curve, or drew a straight line through the 'origin' (0, 10 000).

In part (c), it was very common to see the correct term 'positive' used although a few gave a description such as 'higher engine size, higher price'.

In part (d), most candidates stated a value within the given range although a few gave a value of the wrong order such as 1800 or 18.5.

In part (e), the majority of candidates indicated the correct point.

3 Part (a) was often correct but it was common for candidates to attempt to 'simplify' $10m + 2d$ to $12md$ or to $5m + d$. Other attempts equated $10m$ with $2d$ or used other letters not stipulated in the question.

In part (b)(i), there were fewer correct answers with the same errors of oversimplification and equating parts, such as $2t = t$.

Even those who completed part (b)(i) correctly often gave an incorrect answer in part (b)(ii), mistakenly doubling the 20 before squaring. Most candidates gave an answer of 40 from 2 × 20.

4 In part (a), many candidates used vector notation to describe the translation though some gained credit for the description of how the shape moved. Many candidates were not able to use the correct name for the transformation and either said that it had been 'transformed' or 'moved'. Common mistakes involved describing the transformation in coordinate form, getting the vector the wrong way round or describing the inverse transformation.

In part (b)(i), the majority of the candidates gave the correct answer. Occasionally there were answers of 90 and unnecessary information of 'clockwise' or 'anticlockwise' was included with the 180.

On the whole, part (b)(ii) was well done. The most common error was to put the cross half a square away from a vertex of either B or C. Another less common error was to put the centre of rotation of A onto C.

In part (c), the use of a geometrical term was often missing or was incorrect. The most common misconception with the scale factor was to think it was negative. There were some candidates who gave the scale factor as a range, such as 'less than 1', and did not realise that that range included values that were not acceptable for the scale factor.

5 Though some candidates correctly answered this question, most did not know to work out the exterior angle as a first step. Instead the common mistake was to involve angles at a point equalling 360 or to divide 360 by 162. Other methods attempted, which usually proved unsuccessful, were to build up with 162 to find a suitable polygon or to consider the interior angles of polygons being multiples of 180. Those who used the latter rarely got as far as 20 sides.

6 Estimation questions remain poorly answered. It was not the intention that candidates should do the full multiplication without a calculator and the demand in the question was quite clear with the word 'estimate' prominent. If full marks were awarded it was usually, but not exclusively, for those who had worked out 20% of 90 and then correctly subtracted 18 from 90. There were few candidates who had the confidence to round both 87.99 and 22 and then work completely with their approximation. Having found 20%, some candidates either went on to add an extra 2% or their reduction was then taken away from 87.99. For those candidates who used rounding only once, it was usually the value 87.99 that was rounded rather than the 22%. At other times, estimates were used and then these values were rounded during a calculation as well.

7 In part (a), several candidates completely misunderstood the task and decided to add the two fractions, thus $\frac{17}{30}$ was a common error. Those who did attempt to multiply sometimes worked out 1 × 2 as 3 and 6 × 5 as 36. Some were confused between multiplication and division and so they turned one of the two fractions upside down before attempting to multiply. Other methods which led to unnecessary difficulties were to rewrite both fractions with a common denominator or as decimals.

In part (b), many candidates simply started off incorrectly by trying to do $\frac{1}{6}$ divided by $\frac{2}{5}$. There were other errors, typically the wrong fractions turned upside down, 5 × 1 worked out as 6 and some, starting with $1\frac{3}{10}$, multiplying or dividing by $\frac{1}{6}$.

8 In general, there were very few fully correct answers to this question. In particular it was observed that many candidates did not distinguish between <, > and ≤, ≥ both in writing, drawing and interpreting the inequalities. Another general observation was that candidates were less fluent in drawing graphs of the form $ax + by = c$ rather than $y = mx + c$.

In part (a), it was common to see the 50 and 60 plotted on the wrong axes ie the line joined (60, 0) to (0, 50) rather than the correct answer. Of those who did shade, many failed to shade the area 'not required' as asked for by the question.

In part (b)(i), there were some good responses. The most common errors were $x > 70$, $y > 70$, $x > 2y$ and $y > x$.

In part (b)(ii), a number of candidates went on to draw the correct lines even though they had not answered part (b)(i) correctly. They were less successful at shading the correct regions.

In part (c)(i), many referred to the information that 'there were twice as many child visitors as adults' even though they did not phrase it quite correctly and often omitted the 'more than'.

In part (c)(ii), there were a lot of correct answers though a significant minority wrote down coordinate pairs which lay on the lines eg (20, 40) which arose out of the lack of distinction between > and ≥ as mentioned earlier. If candidates went wrong earlier in the question then it was often hard for them to pick a correct pair of values.

9 In part (a), it was very common to see $\frac{45}{99}$ but this was not always simplified to its lowest term. Some candidates realised that the decimal needed to be multiplied by 100 followed by a subtraction but very few then went on to give this correctly as a fraction. The other very common approach was to give an answer of $\frac{45}{100}$ often simplified to $\frac{9}{20}$.

Part (b) proved difficult even for those who had scored in part (a). A common incorrect response after $\frac{45}{99}$ in part (a) was $\frac{45}{999}$ or $\frac{5}{111}$ after an answer of $\frac{5}{11}$. Some candidates did see the connection between parts (a) and (b) but did not give their answer in its lowest terms. Some candidates started again in this part, but assumed that the decimal needed to be multiplied by 1000 whilst others recognised the factor of 10 was needed then multiplied both numerator and denominator of their answer to part (a) by 10 for this part.

10 This topic was inaccessible for many candidates and was designed to test the very able. The weakest candidates did not attempt the question or showed a lack of understanding of vectors in this context. Some of the better responses in part (b) were marred by errors in the simplification. There are still some candidates who incorrectly write expressions such as $-6\boldsymbol{a} + 6\boldsymbol{b}$ in column vector form. Stronger candidates were able to answer part (a) correctly. A common mistake was to give $6\boldsymbol{a} + 6\boldsymbol{b}$ as the answer, but also some candidates gave answers that did not even contain vectors.

In part (b), few candidates used a correct method. Where candidates knew the method, errors such as $6\boldsymbol{b} + \frac{1}{2}\overrightarrow{AB}$ were common.

In part (c)(i), the stronger candidates understood the method but often did not simplify their expression.

In part (c)(ii), very few were able to make a realistic attempt at obtaining the expression and again there were some correct but unsimplified expressions.

In part (d), there were several candidates who thought that the points were on a straight line but usually this conclusion had not come from the vectors they had obtained previously. The most common mistake in this part was to say that the lines form a triangle. Some candidates made comments about distances but did not recognise that $\overrightarrow{OG} = \frac{2}{3}\overrightarrow{ON}$.

11 This question produced various challenges for candidates depending on their ability to analyse and solve. Some candidates did not even attempt to answer this question whilst others found the answer(s) by trial and improvement. A few determined that the ‘square’ must be negative from $3s + h = 3$ but took this approach no further. There were candidates who produced a number of equations but it was only those who established that two in particular were needed for a solution who proceeded to solve simultaneously with complete success. Most attempted to give the shapes a symbol, either writing these at the side as a key or actually on the shapes, or drew the shape itself in their equations and many focussed in on the 2 essential equations. Once these equations had been found, most knew that they had to equalise coefficients and did this well. The negative sign caused a few problems if they found the value of the square first, but if they found the value of the hexagon first there was usually no such trouble.

The question required good layout showing an explanation for each stage of the solution, such as ‘multiply equation <2> by 3’; this meant that not many were awarded full marks. There were, however, some excellent solutions well structured and concise showing all the benefits of a logical approach.

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