GCSE

Mathematics A

General Certificate of Secondary Education **J562**

OCR Report to Centres

November 2013

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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.

OCR will not enter into any discussion or correspondence in connection with this report.

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OCR REPORT TO CENTRES

Overview

General Comments

There was a much smaller entry for J562 papers this autumn. However, the standard of work in all Units and at both Tiers continues to be high; candidates have been well prepared by centres and entered at an appropriate tier of assessment. All papers were accessible to candidates, with most attempting every question set.

Presentation of work continues to improve, with working clear and well set out. This is particularly important in longer and QWC questions where good reasoning and communication skills are essential. It is important, for these questions, that candidates stop and review their working and answer and ask themselves some critical questions. Is my work clear and concise? Have I *answered* the question? Have I justified the method I have adopted? Is my answer reasonable and in the context of the question? Is my answer in the correct units and to the required degree of accuracy? Pleasingly, some candidates have started to do this.

It is clear that, in general, candidates have access to a calculator and geometrical equipment. These have been used accurately and carefully. It is pleasing to see fewer candidates using non-calculator methods when answering a question on a paper where a calculator is allowed.

Work on Algebra continues to improve at Higher Tier where better candidates are showing high skill levels. Both Foundation and Higher tiers show improvement in the standard of arithmetic. Data Handling and Shape, Space and Measures continue to show candidates' best work.

Centres need to be aware that from June 2014 one paper from each of the three Units must be taken at that exam session. Each Unit will still be assessed on a limited, specified content. Candidates can still be entered at a mix of Foundation Tier or Higher Tier for the three Units.

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

A501/01 Mathematics Unit A (Foundation Tier)

General Comments

The entry for this session was very low. Some candidates were prepared well and displayed a sound understanding of the work. A few showed little knowledge of the specification, and perhaps should have been considered for entry in summer.

Algebra continues to be troublesome for many candidates, as do imperial units.

As ever, the overlap questions with the higher tier paper proved to be a step too far for most candidates.

Most candidates attempted every question and had sufficient time to tackle the paper to the best of their ability.

Comments on Individual Questions

1 Good attempts were made in all parts. However, candidates were less successful in parts (b) and (c) than in (a).

2 Most candidates were correct with the direction in part (a) although an answer of "North West" was not uncommon. The majority managed to use the scale successfully in part (a)(ii).

Part (b) was well done by many, whereas the conversion from km to miles in part (c) proved rather more troublesome. Answers of 80, 800 and even 8000 miles were seen frequently. It appears that the "standard" conversion of 5 miles to 8 kilometres is not well known.

Parts (d)(i) and (d)(ii) however proved to be straight forward for most candidates.

3 Part (a) was usually correct, with few errors in any of the boxes.

In part (b), many candidates scored only one out of the two marks, either getting the number of circles right but for the wrong reason or vice versa. 40 was a common wrong response for the number of circles, found by doubling the number of circles corresponding to 5 squares.

4 The first two parts of (a) were often correct. Identifying the prime number in (a)(iii) proved to be a problem with incorrect answers of 25 and 27 being common.

Parts (b) and (c)(ii) were answered well but answers to part (c)(ii) suggest that many candidates are not totally familiar with the correct order of operations.

5 Reading information from the table of distances in part (a)(i) was usually done well. However, the calculation of the number of minutes per mile in part (a)(ii) proved more difficult. Both sections of part (b) were good discriminators with the better candidates scoring all 6 marks while weaker candidates struggled to get more than 2 marks.

6 This question proved to be difficult for most candidates. In part (a), the correct answer of 4*c* was often "decorated" with extra symbols such as *t* for total cost.

An answer of 8*ab* was quite common in part (b)(i), while in part (b)(ii) *3a+7b* and 5*a*±*kb* with *k* not equal to 3 were often seen.

7 Correct answers for the list of ingredients in part (a) were the norm. It was apparent, however, that some candidates were working on a recipe for 8 or 12 people rather than 6.

Part (b) was more troublesome. The modal mark given was 1 for adding the three given quantities. Many candidates did not realise that the total amount of courgettes needed was 435×4.

8 There were many good, accurate constructions in part (a), and these were matched by the accurate angle measurement in part (b).

The majority of candidates recognised that the angle was obtuse in part (c), although one of the three incorrect options was chosen from time to time.

9 There were many correct answers in part (a).

Part (b) was less well done. It was not uncommon in part (b)(i) to see just numbers rather than an algebraic expression. Even those candidates who knew what they were doing sometimes lost the mark because they used a different symbol from *n*.

Correct answers to part (b)(ii) were rare, and then were usually obtained by trials rather than by algebra. Fully correct algebraic solutions were seen from only a handful of candidates.

10 While there were many fully correct pie charts, there were also many where the candidates appeared to have just guessed the sizes of the angles. It was rare to see the angles actually being calculated.

11 As might be expected from the performance of candidates on similar questions in the past, Pythagoras' theorem appears to be a topic few candidates at this level understand. Only the best candidates were able to score any marks in part (a), and even fewer provided a valid reason in part (b).

A501/02 Mathematics Unit A (Higher Tier)

General Comments

There was a much smaller candidature for this paper than in previous sessions. There was enough on the paper to enable weaker candidates to be able to answer some questions, whilst stretching good candidates with a couple of the later questions.

Using the wrong order of operations was common. This was seen not just in the question on inserting brackets but also sometimes in the use of trigonometry in question 11, or in the working in question 9. However, nearly all did use the correct order in the calculation in question 7(a).

As usual, the work on functions was poor, with some candidates clearly not familiar with the notation. Some of the weaker candidates had no idea about histograms. Question parts that were done well included the first part of the ratio question, the number puzzle, constructing the pie chart, the first part of the Pythagoras' theorem question, completing the construction of the quadrilateral and finding the highest common factor.

Comments on Individual Questions

1 In part (a), most converted the units correctly and were able to simplify their ratio at least partially, although a few left units in their answer. Some candidates misread 1.1 kg as the total weight of all the ingredients, and received credit for their method in both parts.

In part (b), although many candidates coped confidently with the ratio there were more confused attempts, with some just adding 120 g, for example. Quite a few candidates forgot to give the units as requested.

2 Part (a) was nearly always correct.

Writing the equation in part (b) was often done well, but weaker candidates sometimes omitted this or gave answers such as 6 + 4 or $6x + 4$ instead of the correct $6n + 4$.

The equation in part (c) was often solved correctly, though there were usual errors on occasion. Some successfully used trials to gain the correct answer of 7.

3 The pie chart was usually drawn correctly, although a few candidates had no idea of how to work out the angles they needed.

4 Most candidates made a good attempt at Pythagoras' theorem, with many gaining full marks in part (a). Some confused attempts at trigonometry were seen, but none concluded successfully.

The comment in part (b) was found more difficult and was sometimes omitted. However some very good explanations were seen which clearly demonstrated their appreciation of why the angle was more then 90°.

5 The completion of the quadrilateral was done well, with nearly all candidates showing proper construction arcs.

In part (b), fewer candidates knew how to interpret the information and then how to construct an angle bisector. A follow through for the length of the path allowed credit in part (ii) for those who had achieved a line BE with E on AD.

6 The correct terms 2, 6, 12 were seen often in part (a), but sadly so were the terms 2, 5, 10 from using $n^2 + 1$ instead of the given $n(n + 1)$. The second term was also occasionally obtained as 5 from 2 × 3.

In the second part (b) relatively few gave the correct $10 - 3n$. Although reaching $-3n$ or $3n$ was quite common and gained partial credit, the incorrect $n - 3$ was seen frequently and received no marks.

7 In part (a), most candidates knew that they needed to insert brackets or work out the denominator of the calculation first.

Part (b) was not well done and was sometimes omitted. Wrong brackets such as $9 + (3 \times 7) - 5 = 24$ appeared as frequently as the correct $(9 + 3) \times (7 - 5) = 24$.

In part (c), the HCF was found reasonably often, but was sometimes confused with the LCM. The majority used a factor tree approach, although some used lists of factors or multiples. The repeated division approach to expressing a number as a product of its prime factors was seen very rarely.

8 In (a), many candidates knew how to obtain a median, but the error of reading off at 30 instead of 26.5 or 26 was quite common.

Many candidates completed the cumulative frequency graph successfully in part (b), but frequency graphs were also common.

Part (a) depended on a cumulative frequency graph, and the usual errors in finding an interquartile range were often made. Very few candidates gained all 3 marks here.

9 In part (a), candidates often managed to simplify the left hand side to $11x - 21$, but seeing the connection with a and b was rarer. Sometimes b was given as 21 instead of -21. Some candidates used the wrong order of operations and attempted to work out the left hand side as $(5x + 3)(2x - 7)$.

Some good solutions were seen in part (b), but candidates often did not know how to approach it. Partial credit was gained for evaluating the left hand side correctly as 23, but candidates sometimes did not proceed beyond $23 = cx + d$, not realising that they needed to substitute 4 in the right hand side as well.

10 Some good attempts were made at part (a), with many successful solutions to $f(x) = 1$ found. More common, however, was simply finding f(1) or not knowing what the function notation meant.

A few candidates knew what to do and simplified correctly, but most floundered, with quite a few treating f as a variable and expanding $f(1 + 2x)$, for example. Occasionally f^2 terms appeared.

11 The explanations in part (a) were generally poor. However, some clear correct statements involving 'tan' were seen, and some correctly showed that
$h = e$ + the opposite side of the triangle, often sensibly using a diagram.

The calculation in part (b) was often correct, although using the wrong order of operations was also quite common. Some did not use the given formula but attempted other calculations instead.

In part (c), dealing correctly with the tangent function was a step too far. Few candidates gained all three marks. Some candidates penalised themselves by not showing intermediate steps in their rearrangement, but those who did often gained a mark for correctly obtaining $h - e = d \tan a$. The next step was often division by 'd tan' instead of division by d.

12 Some weaker candidates omitted this question. However those who knew this topic often correctly found the frequency in part (a).

In part (b),some were unable to begin, but a common helpful strategy was to find the frequencies of all the intervals, which gained a mark. Some then found the mean or mode instead of the median and some reached 15–20, but gaining both marks was rare.

A502/01 Mathematics Unit B (Foundation Tier)

General Comments

The paper appeared accessible to the vast majority of candidates almost all of whom completed the paper.

Even some weaker candidates picked up marks towards the end of the paper.

Arithmetic skills appeared to be quite good and the performance on QWC questions was satisfactory. Those candidates who understood what was required of them showed clear working to support their responses.

A disappointing number of candidates did not know the number of sides in a hexagon.
Many candidates lost marks for not reading questions carefully enough.

Comments on Individual Questions

1 Part (a) was well done with only a few candidates making slips when adding £1 and 1p. A disappointing number used poor notation for money, such as [£]1.01p.

In part (b), a minority of candidates used multiple stamps of the same value and some gave one answer spread over two lines. Questions must be read carefully.

Part (c) was well answered but a sizeable minority gave the answer 28p, resulting from only one of each stamp. Some gave the wrong answer 0.08[p].

2 This question was well answered and very few reversed coordinates in the first part or gave the wrong length in part (b). 5 mm was a common wrong answer.

Most candidates completed the rectangle but a few drew only a triangle.

3 Many good answers were seen to the whole of this question. Part (a) was very well done with no pattern to the wrong choices for "semicircle". A common wrong answer in part (b) was 8 m. In part (c), more than half the candidates gave the correct answer, which was pleasing. $3 \times d = C$ was not an uncommon way to write the formula. Common errors were $3Cd$, $C = d^3$ and $3C = d$.

4 Part (a) of this question was often well done, many gaining full marks. Candidates often made errors with 6^2 (=12), 10% of 310 (=3.10) or 20×1.5 (= 20.5) as well as other errors. A few candidates did not give any working and so scored no marks.

Responses to part (b) of the question were polarised. Some ingenious methods were used to compare the scores but most who answered correctly used percentages. Where errors were made, the majority were in converting 18 out of 25; 75% was a common wrong answer.

Most of the candidates who scored no marks concentrated only on how many questions were wrong.

5 A disappointing number of candidates did not attempt to estimate an answer in part (a) but tried to work out 2.9 × 61p. Of those who did, 3 × 60 = 180p earned marks quite easily.

The first part of (b) was very well answered, though many weaker candidates could not work out 4 × 2.50 correctly.

In the second part of (b), the second QWC question, very few presented a reasonable answer based upon the maximum weight of a potato. Plenty of working was seen but it often concentrated on the minimum weight of a potato.

Part (c) was reasonably answered and some candidates realised that they needed to approximate 365 to a multiple of 3. Most candidates attempted to divide 365 by 3 and some multiplied 365 by 3.

In part (d), a disappointing number of candidates could not read the scale to give the coordinates of one of the anomalous points; (2, 184) was a common wrong answer.

However, most described the correlation and named it correctly.

6 Few knew how many sides a hexagon has but many could name one special property of a regular hexagon. Common wrong answers were to say that the exterior angles added to 360° or that it had 6 sides. Very few said that the sides were the same or the angles were the same!

Many correctly worked out the interior angle although 300° and 240° were both seen.

In part (c) some made the right choice though "Less than" was a common wrong answer. Where evidence of angles was seen, 90° sometimes appeared in the wrong position on a sketch and the response for a hexagon was commonly 120° and not 60°.

7 Pleasingly, this question was well answered.

The common errors on the diagram in part (a) were to reverse the inequality or to include 33 (or 34) as the endpoint.

In part (b) candidates made a variety of slips, sometimes just giving the answer 8.

In part (c), many gained a mark for showing 5.6 or a complete substitution.

However, 5 was a common wrong answer.

8 The work on transformations seemed better on this paper than in the past. Many used a ruler to good effect. However, untidy diagrams still appeared.

The most common answer in part (a) was the reflection in the wrong axis. In part (b), few gave the correct transformation but many gave a "correct" rotation about the wrong centre to score a mark.

The translation was the worst answered part with few giving the correct transformation. There was no pattern to the errors though it may have been to go one square too far in each direction. However, enlargements, rotations and reflections were all seen.

9 This question, that was common to Higher and Foundation, was well responded to. Candidates were generally able to read and use the scale well and so scored marks for correct plotting.

They did, however, lose marks for making assertions such as, “Saturday is higher than Thursday” without saying that this was only “generally” so. Marks were lost for carelessly describing trends. Only a few made comments to the effect that “He had a lot of data” or that “It showed trends well”.

10 This, second common question still saw candidates scoring marks.
In part (a), those who did not complete the table correctly scored 1 mark for getting one coordinate correct, often (y =) 4.

Many struggled to follow through their values and plot them on the grid. Some who had worked out coordinates such as (0, 3) plotted the point at (3, 0).
Only correct ruled graphs scored full marks.

In part (c), the few who gained marks did so for indicating the use of $\frac{\text{Change in } y}{\text{Change in } x}$. In many cases, however, candidates did not recognise that the gradient was negative.

A502/02 Mathematics Unit B (Higher Tier)

General Comments

The majority of candidates had been well prepared for this paper with many scoring well. Numeracy skills were soundly demonstrated in questions 1, 7 and 10 whilst sound algebra was shown in 6, 8 and 11. It was pleasing to see rulers used appropriately and working shown clearly. Most candidates could score on the Quality of Written Communication question (13) with many scoring full marks although many candidates could not quote the alternate segment theorem appropriately.

There was no evidence of candidates being short of time.

Comments on Individual Questions

1 Part (a) was generally well answered with only the weakest slipping up.

There were a few answers of 100 in part (b) from candidates who did not read the question carefully.

Similarly there were a surprising number of candidates who gave the answer '50 and 50' for part (c) suggesting that they had not appreciated the emboldening of difference. Candidates should be encouraged to take special note of any instructions written in bold type as they are usually crucial to the understanding of the question.

2 The first two parts were generally answered well. However, many candidates struggled with reflecting in $y = -1$ and commonly seen answers had been reflected in $x = -1$ or one of the axes.

Part (c) saw many correct solutions but the weakest candidates did not know how to start. It was pleasing to be able to award method marks to those who showed evidence of adding the four vectors even if they did not reach the correct resultant.

3 Nearly all were able to complete the time series graph correctly in part (a).

In part (b), however, many failed to score by stating things that were not *always* correct such as 'Robin sold more on a Saturday' or 'The sales on Thursday always increased'. Using *usually* or *generally* would have turned these into correct statements.

4 This was probably the least well answered question on the whole paper with many candidates unable to name one item correctly.

5 This question was answered very well.

6 Most candidates could complete the table of values in part (a), plot them in part (b) and draw the line.

Part (c) proved more challenging with only the strongest candidates able to calculate the correct fraction for the gradient and realise it should be negative. There was no evidence of candidates rearranging the equation to find the gradient.

7 Most candidates were able to use 'long multiplication' in some form with the most common method being a grid showing 50 × 70, 50 × 9, 8 × 70 and 8 × 9 although some struggled with lining up equivalent place values when adding. The best solutions tended to ignore the decimal point until the last step focusing instead on multiplying 58 × 79.

Common errors were confusing which digits to multiply doing 50 × 8 and 70 × 9, misunderstanding the units and attempting the product of the cubes of the two values and also some struggled with 8 × 9 giving answers such as 71 or 81. The weakest candidates multiplied the tens and then the units adding 50 × 70 and 8 × 9 usually getting to 35.72.

8 The majority of candidates could solve the inequality correctly and represent their solution appropriately on a number line although weaker candidates struggled with subtracting 6 from –4, often getting to 2. Only a few answered as an equation.

In part (c), many understood the significance of the hollow circle as a strict inequality and 2 was the most common wrong answer. There were many answers such as 2.1 or 2.01 indicating misunderstanding of the word 'integer'.

9 The context in parts (a) and (b) seemed familiar to most candidates although in (b) often the correct answer of 10^4 was found in the working but the answer then given as 4. Only a few tried to write the numbers out in full, rarely with success.

In part (c), many candidates did not understand the relevance of the fraction or negative index with common answers of 50 or –50. A few realised that the negative index meant reciprocal but applied it to 100^2.

10 There were many well-presented, correct solutions to this question. Weaker candidates could not convert the division to a multiplication or confused their working by finding common denominators. Only the weakest did not convert to improper fractions.

11 Generally, this question was well answered with candidates showing their algebra clearly. Some forgot about the money context and lost a mark for giving their cost of the blinds as £2.5 rather than £2.50.

12 The majority of candidates could score well on this question with only a few writing their answers as column vectors.

In part (b), the weaker candidates gave conclusions about the vectors or the parallelogram, rather than about the *points,* hence failing to score.

13 This question assessed candidates' Quality of Written Communication (QWC), so they were expected to give reasons for their conclusions. Many candidates scored full marks usually for finding RPQ first often quoting 'alternate angles' rather than the less precise 'Z-angles', then using the alternate segment theorem to give PQR and finally angles in a triangle. Most candidates got as far as the correct answer for *e* but only the strongest were able to quote 'alternate segment' correctly. Some candidates gave long explanations of this theorem often with extra diagrams but they did not get the final mark without quoting 'alternate segment' (although the abbreviation 'alt seg' was condoned).

A503/01 Mathematics Unit C (Foundation Tier)

General Comments

The large majority of candidates were well prepared for the exam and it was encouraging again to see such a large number of good scripts at this level. Most schools had clearly carefully considered their entry for this session and were more cautious, only entering candidates where there was a likelihood of success. Work was well presented and logically set out in many cases. There were several longer questions that gave candidates the opportunity to demonstrate their problem solving and communication skills and on the QWC question many made an excellent attempt showing full justification for their answer and communicating their solution well within the context of the problem.

Many candidates answered most of the questions well and there were a large number scoring very high marks. There were fewer weaker areas including the topics of language and properties of 3D shape, ratio in context, factorisation and problems involving processing fractions and problems involving finding scale factors.

A calculator was allowed for this unit and there was a much better use of calculators in this session with only a few attempting non- calculator methods for calculations.

Comments on Individual Questions

1 Part (a) provided a straightforward start for candidates and this was very well answered. The last number machine involving fractions caused some problems, however.

Part (b) was also well answered. A few did not fully simplify however and left their answer as $\frac{6}{10}$.

Part (c) was usually answered very well but there were the occasional errors where the correct order of operations was not adhered to.

$(3.7 + 2.5)^2$ was sometimes calculated in part (i) and $7.6 - \frac{0.35}{0.25}$ in part (ii).

2 Most coped with the area by counting squares but there were some errors in finding the perimeter.

3 Part (a) was reasonably well answered but some candidates are still unsure of the conversion facts between cm and m and g and kg.

Part (b) was more challenging, but the more able candidates had few problems with this.

Weaker candidates struggled with the idea of the different units and an answer of 69.14 cm was a common error. A few did not give units with an otherwise correct answer.

Part (c) involved some simple problem solving and a number chose a longer trial and improvement route rather than a division. There were errors again with the unit conversion in the problem with a number of candidates converting 12 litres to 1200 millilitres rather than 12000. A few were unable to interpret the answer in the context of the problem and gave an answer of 85.7 or 86.

4 This was well done, most scored all 4 marks, a few made errors with the probabilities of an odd number chosen and a number less than 17 chosen.

5 Candidates found this question harder. Some had not read the question and only gave one corner that joined to G while others did not seem to be able to visualise how the 3D shape would be formed. Naming the shape also proved difficult for many and some spoiled an otherwise correct answer of 'prism' by adding other incorrect information such as 'cuboid prism'. Candidates had more success with the number of faces of the prism but many did not know the number of edges with visualisation being the issue.

6 This was very well answered in parts (a) and (b).

Some struggled to get the point C positioned correctly but they were usually able to write down the coordinates of their point. The majority who answered the question correctly normally had AC and BC equal rather than AB and AC.

7 This question was very well done in all parts.

Part (c) probably caused most difficulty where a few chose Moscow and London but reversed the order.

8 In part (a), more able candidates usually scored all 4 marks and were able to match expressions correctly. Others typically had problems in matching $4d \times d$ with $4d^2$ and $8d \div 2d$ with 4.

Part (b) was answered well. Some gave answers of 25 or 28 after mis-calcuating the squared term or not substituting $x = 5$ into $3x$ as well as x^2.

9 The QWC question was answered very well. Most showed clear working with correct interpretation of the data in the table and then correct written calculations with a conclusion.

A few candidates made errors in the arithmetic which could have been avoided by using their calculator. Other common mistakes were to only include one bag for Budget Lines or to miss out the credit card charge.

Candidates who scored only 2 marks made a mistake with either Budget Lines or Dream carriers and it was usually because they did not interpret the special offer correctly. A common mistake was to work out the cost for two people and then to halve that value rather than halving the cost for one person and adding it on to the cost per flight.

A small number of candidates still need to ensure that on these questions they are detailing exactly the calculations they are doing to communicate the mathematics clearly.

10 Parts (a), (b) and (c) were answered very well by most. A few attempted trial and improvement techniques to solve the equation in part (c) and usually could not arrive at 3.75.

Other errors included answers of 12.5 in part (a) and 10.5 in part (b).

11 This question on ratio in the context of mixing screen wash for a car was not well answered. The context appeared to distract from the work with simple ratio and many gave answers of 1.5 or tried to use both the given ratios in their solutions.

12 This was very well attempted, particularly the first three parts (a), (b) and (c) with candidates able to read and interpret information from the distance-time graph. There were very occasional errors in interpreting the horizontal and vertical scales of the graph.

Part (d) was harder for candidates but many were successful. It was often possible to award one mark for one of the correct sections of the graph.

13 Many candidates scored all 5 marks with clear presentation of their method. The most successful method was to find the area of the wall before subtracting the area of the door and then multiplying by 12.50. Some accurately worked out the area of the wall to be painted but then thought that they had to have a whole number and so rounded 15.8 to 16 before multiplying. Others attempted longer area methods and often omitted an area or included one twice. Quite a number mistakenly were looking at perimeters or lengths of edges and only scored a mark for multiplying ‘their area’ by 12.5. Others attempted to multiply but used non calculator methods and made arithmetic errors.

14 Candidates appeared familiar with the cost of mobile phone calls and texts and many were able to work out both answers to parts (a) and (b) accurately. The errors were usually associated with the change of units between pence and pounds. Some who attempted to work in pounds at the start and thought that 9p was £0.9 lost out on the accuracy mark in both parts. Many worked in pence throughout, which was a successful strategy. Candidates who had worked out part (a) correctly did not always get part (b) correct as they had worked in pence in part (a) and in part (b) did not convert £15.84 (cost of texts) to pence before trying to work out the number of texts.

15 Many candidates did very well with this question and were able to systematically record the 4 outcomes before giving correct answers as fractions or decimals.
A few gave repeats in their table but were able to then follow through from their table to the probabilities.

Some candidates gave probabilities as ratios or used the words 'likely', 'evens', etc which did not score. A few candidates gave percentages and these were usually candidates who scored high marks and so were often correct.

16 This was very well answered and many candidates scored 4 marks here and showed the full relevant working. A few reached 45 but then did not give the answer as a fraction as required. Some candidates thought that the fraction would be over 100 rather than the total of the men and women.

Those that struggled were the few that tried to add the fractions $\frac{1}{3}$ and $\frac{3}{4}$ and did not consider the different totals for men and women.

17 Only the more able candidates scored well on this question.
A common error in part (a) was to write 2 and omit the *x*.

In part (b), it was more common to award one mark for 12 in the first expression than for the 2 in the bracket. A number omitted this question.

18 Part (a) was almost always answered correctly with a few candidates slipping with one or two entries. A very small number had little idea how to complete the table.
In part (b), the majority were successful in choosing the correct probability words, the only common error was to choose likely rather than unlikely for the second word.

A large number were correct in part (c) and some earned one mark as they had either the numerator or denominator correct, a few had just failed to cancel to a fraction in its simplest form.

Candidates found part (d) harder with many thinking there were only 2 numbers that were a multiple of 5, presumably the two fives and had not included the 15.

19 Part (a) was very well answered with only a few finding surface area rather than the volume of the cuboid.

In part (b), most candidates were able to access marks on the drawing with many getting full marks or scoring two marks as they showed the hidden edges of the cuboid as solid lines.

Candidates who made errors usually had one correct face. Most were able to use the dotted paper accurately.

20 In part (a), many candidates knew the formula for the circumference of a circle. Some lost marks however as they did not follow the instructions on the front of the paper and did not use the π button on their calculator or the value 3.142. Other errors included finding the area or using the radius instead of the diameter.

Candidates found part (b) harder as they were not always sure what they were supposed to write on the answer line. Some rounded the value to 2 for the scale factor, presumably thinking it had to be an integer and they did not show a more accurate value. Some appreciated that the two values should be the same if they had made an error with the first part. Many started again with the circumference and so scored the final mark but not the mark for the scale factor.

21 For some this was a very straightforward question involving the use of a calculator with fractions. For many others this proved challenging

The most common correct answer given was $\frac{1}{30}$.

Many did not give the value 5. Some had $\frac{8}{3}$ instead of $\frac{3}{8}$.

It was often possible to award a follow through mark for the final square on the grid from the product of the candidates' incorrect entries.
The question was omitted by a number of candidates.

22 Many candidates scored full marks on this last question. Some candidates scored one mark for calculating 0.48 and frequently they either gave that as the answer or divided by 2. Of those who scored no marks it was not uncommon to see candidates dividing 0.52 by 3.

A503/02 Mathematics Unit C (Higher Tier)

General Comments

Candidates continue to perform very well on this paper. They were well prepared by centres and appropriately entered at the Higher Tier. There were many high scoring candidates showing an excellent knowledge of the Mathematics being tested.

The presentation of work continues to improve. However, many still have difficulty in marshalling their efforts on unstructured questions. It is here that candidates must think first and then plan their answer before committing work to the page. This would prevent solutions – often multiple attempts – being presented randomly around the answer space.

In algebra it is clear that some still do not understand the key words in a question. If they did understand, they would not, for example, after being asked to expand brackets, go on to equate their result to zero and solve the ensuing equation. Even so, the quality of response to algebra questions is much improved with many showing high skill levels.

It is of some concern that, on an exam paper where a calculator is allowed, many candidates still revert to non-calculator methods. This invariably leads to error and a failure to show a complete, correct method.

Candidates had sufficient time to complete the paper. Very few failed to attempt every question.

Comments on Individual Questions

1 The table was invariably completed correctly in part (a).

In part (b), the majority correctly chose ‘certain’ for the first response but a number incorrectly chose ‘likely’ for the second.

Parts (c) and (d) were usually correct. Mistakes arose mainly through counting the number of outcomes incorrectly. It was pleasing to see very few writing probability in an inappropriate form.

2 Very few could not find the volume of the cuboid. A small number misread or misunderstood the information and found the surface area.

It was common to see a correct isometric drawing in part (b). Some included the ‘hidden’ edges as solid lines (which was penalised) and others included them as dotted lines (which was condoned). A small number misread the original diagram and drew a cuboid of height 3 cm instead of 4 cm.

3 A number of candidates ignored the instruction to ‘write down an equation in x and solve it’ in part (a). Most found their solution using arithmetic and consequently lost marks. A few did try to write an equation but rarely successfully. The most common response was to give $x + 6 \times 1.24 = 34$ as their start – or as an afterthought – and then ‘fudge’ their solution but giving the correct answer.

There were many correct answers to part (b). Few used the straightforward calculator method and followed a non-calculator approach. Those not using their calculator often made arithmetic errors or rounded their intermediate answers incorrectly.

4 There were very few errors in part (a). Weaker candidates found the area of the rectangle.

Even when part (a) was incorrect, most went on to complete part (b) correctly. Some misunderstood the instruction to 'Give your answer in its simplest form.' and, after a correct answer, went on to divide through by 2 or equate to zero and solve.

Part (c) also proved accessible to most candidates with many fully correct answers throughout. In part (c)(i), a small number found the area of the circle while others used 15.5 cm as the radius of the circle. There were many correct answers to both parts of part (c)(ii). Some of those who thought that part (c) was about area gave the scale factor as 1.8^2.

5 Those familiar with the fraction facilities on their calculator faired best on this question. There were those who insisted on doing pencil and paper calculations to find their answers and they did less well. A surprising number inappropriately wrote 1/2.6 for 3/8.

6 This question was answered very well by most candidates. A few carelessly worked out $0.48 \div 2$ or $0.52 \div 3$.

7 There were many correct answers to every part of this question. Nearly everyone knew what 'factorise' meant and could perform the manipulation in part (a).

The request to 'simplify completely' caught out some weaker candidates in part (b). In both parts, after a correct response, these went on to do further work. A small number of others wrote $2x^2$ instead of x^3 in part (b)(i) and a few made errors in one or other of their expansions or incorrectly combined the constants in part (b)(ii).

8 Part (a) was done very well by many candidates. The most common error was the failure to divide by two when working out the area of a triangle. Some initially changed the measurements to centimetres but then failed to correctly change square centimetres back to square metres for their answer.

Correct answers to part (b) were rare. Most multiplied their area in part (a) by 100. A small number of others divided their answer by 10, 100 or 1000. Sensibly, some candidates, who did not know how to change m^2 into cm^2, went back to re-work their original calculation in centimetres.

9 There were many fully correct answers to all parts of this question. Common wrong answers to part (a)(i) were 1.025, 0.25, 25 or 1.48 (from 1.025^{16}). Part (a)(ii) was invariably correct.

Part (b) was usually correct also but a few just gave the interest gained rather than the value of the investment and others failed to round their answer to 2 decimal places.

10 It was surprising to see how many converted the standard form numbers into 'ordinary' numbers to decide the order in part (a). When this occurred there were often errors leading to an incorrect answer. It was not uncommon for candidates to have one of the values misplaced.

Most knew to divide the two values in part (b). However, answers suffered when candidates failed to use their calculator fully. Problems occurred when they failed to deal with the powers of ten correctly. Less aware candidates thought that the values should be subtracted.

11 Though there was some improvement shown in the solution of simultaneous equations, many still struggle with the basic algebra required. Invariably candidates could equalise coefficients of x or y but there was much confusion in the addition or subtraction of the ensuing equations. Though other approaches were seen, they too often failed due to poor algebraic skills.

12 Part (a) was usually fully correct.

All but the weakest candidates knew to multiply the individual probabilities. Good candidates scored full marks in part (b). Many others misunderstood the question. They overlooked that both batteries needed to work for the torch to work. Consequently, an answer of 0.04 appeared just as often as the correct one.

13 Many candidates correctly found the missing values in the table, often using the symmetry of the values to help them. –6 and –2 were common wrong y values for the two negative x values, possibly due to the incorrect use of the calculator or incorrect arithmetic.

Though points were plotted accurately, the joining of them with a smooth curve was less well done. This was particularly the case between (–1, 0) and (0, 0) where the join was often a horizontal line.

In part (c), many candidates gave one solution only, usually the positive one.

Part (d) was not answered well. Few knew to draw a straight line onto the graph and find the points of intersection with the curve. Many used algebra to find the values. Of those who did find values of x, many misread the vertical scale when finding the y values.

14 The quadratic formula was well known and could be used successfully. However, few scored full marks as they were unable to give their answers to the required level of accuracy. Most often, both answers were given to either one or two decimal places. Common errors that did arise included having x in the formula or writing the value of a as zero. Less aware candidates tried to factorise the expression and others tried to 'complete the square', with little success.

15 Only better candidates knew how to factorise the quadratic expressions in parts (a) and (b).

A surprising number of those who could answer parts (a) and (b) failed in part (c) to cancel the common factors. Some wrote their fraction upside down. Many candidates used very spurious algebra to simplify their fraction.

16 There were many correct answers here, though often these were obtained using a calculator. Most knew how to multiply out two brackets but many could not do this correctly. Frequently, negative signs were omitted and problems also occurred when collecting terms.

17 Candidates found this question difficult. Though the majority knew to divide the sack weight by the bag weight, invariably they chose an incorrect bound for one or both values. It was disappointing to see 25.5 kg so often written as 2550 g. Where candidates were unsure which bounds to use, the answer space was often filled with multiple attempts. Even when the correct bounds were used, candidates sometimes failed to round their answer down.

18 It was pleasing to see so many fully correct and well laid out answers to this question. The volume of the cone was, in general, found correctly. However, the volume of the cylinder was often wrong – many finding the total surface area. Most worked out that they had to multiply the total volume by 0.79 to find the mass, though a number mistakenly divided.

19 This was the QWC question for this paper. This requires candidates to present their work in a logical, coherent fashion and a small number were able to. Disappointingly, there were those who correctly found the length of a side of the cube but then found its volume instead of the surface area. Of the rest, most realised they needed to use Pythagoras' theorem but many got confused if they followed a 2-D method rather than a 3-D method. A trial and improvement method was seen on a number of occasions, often leading to a correct answer. It was common to see candidates assuming that AB was the diagonal of a square. Though an incorrect start, many went on to find a value for the length of the side of the cube and then the total surface area. Weaker candidates struggled to present correctly any correct form of Pythagoras' theorem.

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