RECOGNISING ACHIEVEMENT

GCSE

Mathematics A

General Certificate of Secondary Education **J562**

Examiners' Reports

June 2011

J562/R/11

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General Certificate of Secondary Education

Mathematics A (J562)

EXAMINERS' REPORTS

Chief Examiner's Report

General Comments

It is pleasing to be able to report how well candidates at both tiers have coped with this series of exams. Though the style of questions, on Unit B papers in particular, is different from that in the legacy specification, centres have adapted well and prepared candidates to produce work of a creditable standard. Candidates found the papers accessible and were able to demonstrate their mathematical knowledge. Most were entered at the appropriate tier.

On the whole, the presentation of work was good and allowed examiners to award marks for a correct method even when the final answer was wrong. Some candidates still need to be made more aware of the importance of clear, concise working. This should avoid multiple attempts scattered around the page and multiple answers. Where this does take place, unwanted working and answers should be deleted and never overwritten. It is always essential to check that, in the context of the question, an answer is realistic. With the introduction of QWC questions on Units B and C, presentation will become more of an issue.

It was clear that many candidates did not have access to the appropriate equipment when answering some questions. Drawing equipment is essential if candidates are to receive full credit for constructions. Questions requiring the use of a calculator are part and parcel of the specification requirements and without a calculator candidates can rarely hope to achieve full marks for a question even when they know the required method. Many candidates would see a significant increase in their scores, and consequently grades, if equipment was made available to them.

Where explanations and reasons were needed, the response was good. It is more important now, that candidates can structure a mathematical argument; this needs further attention. Arithmetic skills are still a cause for some concern. Across the whole ability range, some candidates regularly fail to deal with even the most basic of calculation. Most questions were answered with confidence and a sound display of the mathematical knowledge required.

Centres requiring further information about this syllabus, details of support materials and details of training sessions in the coming year should contact a Mathematics Qualifications Manager at OCR.

A501/01 Mathematics Unit A (Foundation Tier)

General Comments

The paper was of an appropriate level for most of the candidates. Even weaker candidates were able to attempt most of the questions and there were very few candidates who gave no response for the majority of the questions. While many candidates did show sufficient working, many others did not do so particularly in the later questions.

The questions allowed differentiation between abilities and there seems to be a good spread of marks. Although there were marks in the 50s, there were few very high marks suggesting that able candidates are being entered for the more appropriate Higher Tier paper.

Algebra continues to be a difficult topic for many candidates regardless of overall ability.

It was noticeable that quite a few candidates sat the paper without a calculator. This put those candidates at an immediate disadvantage as the paper was written so that calculators would be necessary for some questions. It was equally clear that some candidates did not have compasses, protractors and even rulers.

The quality of handwriting continues to be a problem for a sizeable minority of candidates, making some responses difficult to read.

Comments on Individual Questions

1 The whole question was well answered by most candidates. Common errors were "Woking" in part (a) and some very poor spelling in part (b). Some candidates earned the M1 in part (d) for showing the correct values.

2 Parts (a) and (b) were usually correct but reversed co-ordinates were a common error. Part (c) was less well answered, and again reversed co-ordinates were common. D placed at (−2,0) was a common wrong answer.

3 Part (a) was generally correct, although Nuuk was occasionally seen. It was also not uncommon to see −10 (the actual temperature for Montreal) as the answer. Part (b) was reasonably well done but many gave 14 as the answer although they often gained the M1 for 22 and −8 seen. Part (c) proved to be more fruitful than part (b). Virtually all candidates scored either 2 or 0 as very few showed working and consequently the M1 was rarely awarded.

4 Part (a) was well done, particularly the first two parts. Working backwards for the third part was less successful. Part (b) proved challenging although many gained the M1 mark for an answer between 10 or 15 in part (b)(i). A common wrong answer here was 11.25 from 45/4. Part (b)(ii) proved impossible for most, with answers of 4.5, 450, and even 4500 seen. Correct answers in part (c) were offered by all but the weakest candidates, although often not supported by working. The mark scheme enabled many to earn at least some of the marks even if only for a 1 decimal place answer. The special case was seen several times. In part (d) both parts were generally correct.

5 Part (a) was usually correct although an answer of "13 and 6", unresolved, was a common error. In part (b), there was little evidence from the majority of candidates of calculation of angles and similarly not much evidence of drawing angles with a protractor. There appeared to be much guesswork followed by either lucky or just unlucky angle drawing. Some attempted divisions round the circumference and usually got close enough for at least one of their angles to score. The final B1 for the labels in approximately the right order was often gained suggesting many candidates have an understanding of the proportions in a pie chart even if the accurate drawing is beyond them.

6 This was a good question for most candidates and answers were generally supported by the required working. In part (a), even weaker candidates gained marks although they found the answer of 28.9 on their calculator difficult to interpret and gave an answer of 9p or revised their total to 28.09 in an attempt to deal with it. In part (b), most candidates appreciated what was required and gave sensible answers supported by calculations.

7 There were surprisingly very few correct answers to part (a) seen. The square root of 2197 (46.8...) was the common error, but also 1.06... was seen several times (this is the cube of 2197 in standard form ignoring the power of 10). Part (b) proved much more successful although wrong calculator use leading to 14.6 was a common error.

8 This question was well answered by many candidates, with some well set out methods shown. Various approaches were employed, enabling candidates to gain some of the marks. Most were able to cope with the change of units needed and gained the M1 for that. Others got to 1050 g without too much trouble but then failed to complete the argument convincingly. Only the very weakest candidates seemed totally lost, often with just an unsupported answer of yes or no. A common error was to do 300 × 14 which if then converted to kg could still gain 1 mark. Another common error was for 1050 g to be given as 1.5 kg. Those who worked in grams sometimes fared better.

9 This question proved difficult for the average candidate because of lack of knowledge of constructions and lack of essential equipment, i.e. compasses. Part (a) had more construction arcs shown than part (b), and were generally within tolerance. Those answers without arcs still often managed to get D close to its correct position and so gained 1 mark. The angle bisector in part (b) was less well understood and very few correct constructions or even attempts at constructions were seen. A common error in part (b) was to simply join B and D.

10 There were very few correct formulae seen in part (a), although some better candidates gained M1 for $70n$ in some form. Writing an equation in part (b) was beyond most candidates, and hence the first of the three available marks was rarely awarded. However the average and better candidates were often able to use common sense and work out the 45 and thus gain 2 marks. A common error was 47 after ignoring the 150. Weaker candidates attempted a build-up process but rarely managed to get to 45. Some gave confused answers with 45 incorrectly embedded which could not score.

11 Part (a) was well done, but some gave 13 as the answer and 5 was a common error being the mode of the frequencies. Part (b) was rarely fully correct. Common errors were to draw histograms or plot at the upper class boundaries rather than the class midpoints and then not join these with lines. Many earned just one mark for four or five correct heights. Some of those who formed a correct frequency polygon then lost the last mark by joining the first point to the last.

12 Only the better candidates earned marks here. Part (a) proved particularly difficult with very few correct answers seen in either part. Many attempted part (b) but very few correct expressions were seen with +4 being a common error.

A501/02 Mathematics Unit A (Higher Tier)

General Comments

The paper differentiated well between the candidates, with all questions being attempted successfully by some candidates. Time did not seem to be an issue with this paper.

Significant numbers of candidates lost marks as they were reluctant to show any working. Where candidates were attempting questions beyond their comfort zone, there was frequently confused working as they made varied attempts as to how to start – this was particularly evident in the problem-solving (AO3) proportion question 4 and the changing the subject of the formula question 10.

Comments on Individual Questions

1 Many used their calculators correctly in part (a), although there were some who used brackets or the order of operations incorrectly, such as obtaining 14.6 as the answer in part (a)(i). Inserting brackets in part (b) was mostly correct, although occasionally extra bracket(s) appeared which sometimes did not affect the result. Some had made several attempts, whilst some made no attempt. Candidates had less success in part (c). The very common error was to assume that 3.85 minutes was 3 mins 85 secs leading to $(3 \times 60) + 85 = 265$. A few changed 3.85 mins into 4 mins 25 seconds then $4 \times 60 + 25 = 265$. Others wrote $3 \times 60 = 120$ and then either added 85 or sometimes 51 to this.

2 There was some poor drawing in completing the quadrilateral in part (a). Arcs were usually drawn but some lacked accuracy on one of the arcs. Others made several poor attempts at arcs and often joined to the wrong arc. Some had no arcs but a correct point and lines drawn, having used trial and improvement – these attempts earned partial credit. A few drew correct arcs that did not cross and joined their lines to points on the arcs but not forming a quadrilateral. In drawing the angle bisector, many acceptable answers were seen with correct arcs crossing once or twice. A few spoilt this with a poorly drawn bisector line that did not go through B or the crossing point. Some joined corner B to the opposite corner of the quadrilateral. Weaker candidates who did not know what to do were more likely to omit this part than part (a).

3 Writing a formula was done well by most candidates. Some forgot to include the 70 and gave $n + 150$. A few gave $150n + 70$. The equation was often not written down as requested, thus losing a mark but the problem was usually solved correctly. Methods used were usually informal rather than a structured algebraic method.

4 This was an AO3 question about the cost of fuel for a journey and many did not reach a final answer. Candidates seemed to try different routes and often gained the first method mark in several ways, but combining this result with the next element proved difficult. Often, numbers were everywhere with little explanation and frequently quantities were combined in ways that made no sense at all. Many candidates managed to pick up a mark from multiplying their litres by 121.9 or multiplying 121.9 by 4.5 to find the cost in pence of a gallon. Some split the 70 miles into 42 + 28 and tried to find out the cost of the latter, usually unsuccessfully. Most struggled with the concept of proportion. Some had no concept of a sensible answer and gave the answer as £914.25 while a few others had journeys costing thousands of pounds.

5 The modal class was usually correct. Some candidates gave 5 or 13 as an answer whilst a few attempted to find the mean. In drawing the frequency polygon, the majority scored at least one mark for correct heights, though many plotted at the upper end of the intervals. Most connected their points with straight lines, although there were some curves in evidence. A few candidates joined the first and last points to create a polygon. Bar graphs of the correct height were common.

6 Finding the first term of the sequence proved no problem to stronger candidates. Weaker candidates seemed to think the first term could not be 0; the correct substitution was frequently seen but not completed. Some answers included a multiple of n. The tenth term was also often correct. Common wrong answers were 49.5 and 4.5. In part (b), finding the nth term of another sequence was answered well. Those who did not score any marks had usually written '+4' alongside the sequence and did not seem to know what to do next. Common wrong answers included $n + 4$, $4n + 2$ and $2n + 4$.

7 Often, at least 1 mark was gained for the expansion but there were not as many full marks as might have been expected, with 5x2 − 10x or 6x2 − 10 seen quite frequently. A special case mark helped those who interpreted the x outside the bracket as a multiplication sign. In part (b), again 1 mark was scored quite often for some partially correct factorisation. Of those who scored no marks, most seemed to have little idea of what to do.

8 Finding the midpoint was done quite disappointingly, with (3, 6) and (4, 9) being common answers. The integer x-coordinate was the most likely to be correct. There was also evidence of some candidates constructing the perpendicular bisector of AB to find the mid-point. Although there were quite a few correct answers for calculating the length of AB from well-prepared candidates, the question was left unattempted by others. A few picked up the first mark for identifying 4 and 9 but then gave answers such as 13 or even 4.9. 4.4 (cm) was also common, being the length of the actual line on the diagram. A small number used Pythagoras on the wrong values and received some credit for their attempt.

9 The incorrect answer of 88 was almost as common as the correct answer of 12. A few candidates had something different, such as 11, 13 or 22 – all probably arising from inaccurate reading of the graph or an arithmetic slip. The correct inter-quartile range was given by nearly half of the candidates. Those who scored only 1 mark usually stated or used the correct lower quartile. There was a disappointing level of response in part (b). In spite of the instruction to give numerical values as evidence, these were often absent. In part (b)(i), for instance, many simply repeated the wording of the question and said that Delta had the larger average. When the word 'median' was not used, 'average' gained no credit unless numerical values indicated that they were using the median.

10 The changing the subject of a formula was a challenge for most candidates, with the majority earning just the first mark for expanding the brackets. Surprisingly few understood the second step: the need to collect c terms to one side and the other terms to the other side. Only the very good candidates understood the need to factorise; most were doing some very suspect algebra which involved incorrect division by d. Many did not demonstrate knowledge of function notation, in spite of its inclusion in last January's paper. About two-fifths of the candidates gained the mark for the 8 in part (b)(i). There were a number of candidates who treated f as a variable, giving an answer of 2 in part (b)(i) from $f4 = 8$, and an answer of $fx + f$ in part (b)(ii). Very few candidates knew what to do in part (b)(ii) and it was omitted quite frequently.

11 Many candidates knew how to draw a histogram and over half obtained two or three marks, with some others drawing bars of correct width but clearly confused as to how to calculate frequency density. There was often some evidence of statistical calculations, such as finding the mean.

12 In this problem-solving question, most were able to split the 180° into the correct angles and most went on to draw a triangle with 6 cm as the hypotenuse. The need for trigonometry was the crucial step that many missed – scale drawing was not acceptable in obtaining the shortest side since calculation was requested. After obtaining the shortest side, many did not complete their argument successfully by comparing their ratios sufficiently. Most just arrived at the step of writing their two ratios under each other and stated that they are not the same. Finding that using the angles ratio, the shortest side would be 2.4 cm was an alternative approach successfully used by some, including some weaker candidates. There were a few candidates who used Pythagoras' theorem to show the ratios were not the same, which was a nice approach. However, they were unable to score full marks because they did not find the length of the shortest side, which was asked for, within their argument.

A502/01 Mathematics Unit B (Foundation Tier)

General Comments

Most candidates appeared to have sufficient time to answer all of the questions. Almost all candidates who made a sensible attempt gave some answer to the final question.
Some candidates showed orderly working in questions which made it very easy to award method marks. It also helped them tackle the QWC question. However, many candidates failed to show full working to all questions.

It was very helpful when candidates drew in pencil and, where necessary, rubbed out wrong drawings. Redrawn pen lines made it difficult to determine some candidates' intended final drawings and the use of a pencil and eraser is recommended. Some candidates appeared not to have access to a ruler.

Work with scatter diagrams appeared quite good although knowledge of correlation was patchy.

Many candidates appeared to be unsure whether they were measuring in millimetres or centimetres and the relationship between the two.

Many candidates struggled to use decimal place value and also failed to apply basic (non-calculator) arithmetic processes accurately. Many candidates showed poor understanding of multiplication and division by 10 and powers of 10.

Calculations with simple fractions was not well understood and some candidates did not know how to apply the processes.

Many candidates failed to use appropriate algebraic notation for instance using 4^d for $4d$.
Some candidates appeared to have been entered too early for the unit and they would have benefited from more preparation.

Comments on Individual Questions

1 In part (a), many correct answers were seen but around 25% of candidates failed to answer correctly. Many who did not answer correctly failed to use vertical layout or showed no working. In part (b), a very few candidates gave 0.6, following their response to part (a). Most recognised that a new start was required but almost half of the candidates failed to align decimal points correctly and did not score full marks. In part (c), better candidates scored 2 or 3 marks but many seemed not to realise what the question was asking them to do and treated the calculations as a series of 'sums'. Marks were often awarded for the first line correct and sometimes for the second. In some cases this pattern was reversed.

2 In part (a), many candidates simply wrote $\frac{1}{8}$ and moved on. However, weaker candidates clearly had no understanding of the question and attempted to apply other, poorly understood, fraction rules. In these cases a denominator of 24 was not uncommon. In part (b)(i), both weaker and average candidates answered this question poorly. Where methods were shown, it was clear that many candidates did not understand the simple process of finding the value of one fifth and doubling it. A common wrong answer was £2.50 from halving and halving again. In part b(ii), the same pattern of marks was seen as in part (b)(i). Some candidates attempted to find the fraction from the money values. Candidates who understood the process simply wrote the correct answer.

3 Part (a) was well answered and few reversed coordinates were seen. Part (b), was not so well answered and wrong responses such as 4.3 (probably cm, but not shown as such) or 30 were seen. In part (c), the geometric element confused some candidates. Point D was usually shown although sides were not often drawn. Many candidates earned 1 mark for the correct coordinates of a wrongly marked D. In part (d), a variety of responses were seen. "Triangle" was a common wrong answer although names of other geometric shapes were common. "Obtuse" had some interesting spellings. The allowed alternative of "interior" was rarely seen.

4 Weaker candidates found part (a) very challenging and were unable to determine which pieces of wood were being referred to. Change of units was either not attempted or poorly done. Clear subtraction calculations were uncommon. 170 and 225 were common wrong answers. In part (b), many good responses were seen. The 'bill' was often surrounded by calculations. Marks were frequently lost through wrongly calculating the cost of each bracket or failing to indicate the units used. Another weakness was the calculation of the 10% delivery charge.

5 In part (a), many correct answers were shown and candidates appeared not to have problems with perimeter. They did, however, have great difficulty using correct algebraic notation. Common wrong answers were 4, 4^d and d^4. In part (b), 10% of candidates made no attempt. Consistent wrong notation, which was penalised in part (a), was condoned in part (b), and the wrong answer of 13*d* was given some reward for the misconception implied. Even so, many candidates failed to respond well to the demand. Candidates often failed to use sensible methods to solve part (c). Few added squares to the diagram (which was worth a method mark) to try to find the solution.

6 In part (a), many good answers were seen. Weaker candidates commonly wrote an answer that appeared 'plucked from the air' or attempted to subtract 90 and 63 from 180 but did so inaccurately. Arithmetic errors were common. In part (b), many correct answers of 131 were given to earn 1 mark. The second mark was frequently not awarded due to poor reasoning. Answers such as, "because a circle adds up to 360" lost the mark for failing to mention "angles". Some candidates failed to give a reason but wrote out their working instead. Part (c)(i) was included to give a lead into the QWC in part (ii). Few candidates were able to answer it correctly or apply the information in part (c)(ii). Common wrong answers were to draw an angle of 135° or to draw a diagram with 6 or 7 sides and angles of 135°. Many did not appear to recognise that "show" did not imply a diagram but working. Good responses often used the sum of exterior angles being 360°. Candidates who attempted to divide the octagon into triangles were less successful. In part (c)(ii), many candidates scored 1 or 2 marks for mentioning that gaps between octagons would be square and for producing a more or less convincing diagram. Very few candidates scored well and few appreciated that an explanation required the use of figures. Almost no candidates used the clue from part (c)(i) to make use of the angles of the two shapes (135° and 90°) and even fewer thought to mention that the sides of the two shapes had to be the same length in order to fit. Diagrams were frequently drawn and a number of these showed hexagons rather than octagons. Candidates would benefit from practising how to approach this type of question.

7 This question was answered very well. Little working was ever shown but many completely correct matches were made.

8 In part (a), many completely correct responses were seen. Candidates sometimes confused negative and positive correlation. A number of candidates showed no comprehension of the topic and answers such as "spread out" and "scatter" were given. This is surprising, as the topic is one of a small number of statistical topics in the unit. In part (b)(i), plotting was sufficiently precise to earn 1 mark for most candidates and 2 for many. A sharp pencil would aid many candidates. In part (b)(ii), many good lines of best fit were drawn, some even in pencil. The predictable error was to join all the dots. In part (b)(iii), many candidates read correctly from their line of best fit. A common error was to read 31 as 30.1. Clearly some candidates need to practise reading scales. In part (b)(iv), many correct answers were seen. Common wrong errors were to choose the lowest or highest points.

9 Few candidates scored 3 marks in part (a). For many, the answer was, "It is an enlargement". Some candidates gained a second mark for describing the scale factor as "times by 3" but few used the correct term. Common errors were to mention enlargement and then a translation. This scored no marks, although marks could be gained for the scale factor. A lot of candidates scored 1 mark for drawing a rotation in part (b). It is a pity that so few of them used the correct centre.

10 Very few candidates used correct methods to answer part (a)(i). Most attempted to use some kind of drawing or sums of $\frac{3}{4}$ and 14 and 17 were frequent wrong answers. Few candidates either recognised or attempted to use $\frac{3}{4}\times 17$. Some very concise methods and correct answers were given in part (a)(ii). However, some candidates scored only 1 mark for using a correct method to find 15% of £2.60, although the answers were not always correct. A common error in trying to find 15% was to attempt to adapt the method for finding 25%. These attempts were unsuccessful. A common misread was to think that the price for ALL the pizzas had to be used. This was fully rewarded but, because of the difficulty of the arithmetic, many candidates failed to see this to a correct conclusion. In part (b), a small number of candidates simply wrote the correct answer. Very few candidates showed working although 10 was often seen, and sometimes 100, but rarely in any form of calculation. Frequent wrong answers were 324, 32.40 and 32.04.

A502/02 Mathematics Unit B (Higher Tier)

General Comments

The paper was generally accessible with most candidates scoring between 20 and 50 marks. There were some who were able to obtain over 50 marks (and thus differentiating between the good students and the most able students) and a few achieved full marks. Most of the candidates seemed to have been well prepared for the exam and were able to make attempts at the majority of the questions on the paper. It was noticeable that only the most able candidates were able to give solutions to the questions involving surds. There were some candidates who would have benefited from sitting the Foundation Tier paper rather than the Higher Tier paper.

Generally candidates were showing the working used to obtain their answers and so were able to obtain part marks for questions even when their answer was incorrect. The question relating to the quality of the candidates written communication showed the full range of quality. Many candidates could have improved their solutions by giving all the relevant reasons. It was encouraging to see that those candidates who wrote reasons normally did so with the correct spelling. Most candidates used rulers where necessary.

There were questions on the paper that addressed functional elements of mathematics and thus required candidates to give suitable answers for real life situations. Better solutions demonstrated the need for integer answers to Q1 (a)(i) and Q7 (b)

Comments on Individual Questions

1 In part (a)(i) many candidates successfully worked out that 13 pizzas were needed and so achieved full marks. It was rare that no marks were gained. A variety of methods were seen including $\frac{3}{4}\times 17$, a ratio method such as '4 scouts need 3 pizzas' etc and drawing of pizzas with many arriving at the correct answer. The most common error when calculating $\frac{3}{4}\times 17$ was to calculate $\frac{3}{4}\times\frac{17}{17}$. Using fractions in a context seemed to provide difficulties for weaker candidates and many missed the method mark for realising they needed to do a multiplication. Candidates should have checked back to the context of the question to ensure their answer was appropriate. In part (a)(ii) many candidates gained full marks. Sometimes simple arithmetic errors were made in calculations of 10% and then 5% to get 15% and, had working been clear, method marks could have been awarded. Sensibly, very few candidates used the multiplier method to find the percentage drop. As in part (a)(i) checking back to the context of the question would have been sensible for the candidates who left their answer as £0.39 or who worked out the price of 13 pizzas rather than just one. In part (b), the better solutions showed the need to use a factor of 100 to convert the units. However, some of these lost the final mark through incorrect multiplication such as $32.4\times 100 = 3200.4$.

2 Candidates were generally able to draw the correct line in part (a). Occasionally it was too short and the range of values should have been checked. Some candidates seemed to have drawn their line using intercept and gradient and these solutions could often have been improved by drawing a table of values instead. In part (b), most candidates were able to state the intercept but the gradient proved harder with 5*x* a common answer. Solutions to part (c) could have been improved by a clearer understanding of the terms 'gradient' and 'equation' as these confused many candidates. The condition for perpendicular gradients was not well known although some were able to give the negative reciprocal as $-\frac{1}{5}$, either on the answer line or in the working. Equations such as $y = -\frac{1}{5} + 3$ were seen a number of times.

3 Some candidates had difficulty reading the scale in part (a) even though the more pronounced lines on the graph were there to help them. The tolerance given in this question allowed many to score at least 1 mark even if they had not fully understood the scale. In part (b), candidates were usually able to make a comment relevant to the graph concerning the trend in recent years. The most common reason for not awarding the mark was when the candidate's reference was to correlation only, confusing this time series graph with a scatter graph.

4 This question assessing 'quality of written communication' (QWC) differentiated well across the ability range with many fully correct, well-presented solutions and even the weakest candidates able to make a start most commonly by finding OCE = 110°. Candidates should be encouraged to write down their angles systematically and state a reason every time as to why they have come to that conclusion. Candidates should label angles correctly (eg OCE, $O\hat{C}E$ or $\angle$OCE or use a single letter to label the angles on the diagram and so make reference to them in some way. Some weaker candidates were not familiar with 'angle in a semi-circle' but those that were, often went on to calculate *p* correctly. Generally the missing reasons accounted for lost marks in otherwise quite good answers. Some candidates quoted 'parallel lines' which was not sufficient to signify alternate angles.

5 Part (a) was mostly correct. Conversion to a common denominator was usually attempted, with at least one term correct. Occasionally the denominator was common, but nothing was done to the numerators, leading to an answer of 1/20. Some weaker candidates gave an answer of $\frac{1}{1}$ or $\frac{1}{-1}$ by subtracting numerator then denominator terms. Some candidates converted to decimals and successfully added. However, this method is not to be encouraged as it would not work in cases like $\frac{2}{3}-\frac{3}{7}$. Many clear and concise solutions were seen to part (b) but either turning both terms or the fraction upside down were common errors. Again, decimal calculations resulted in some success but fraction manipulation is to be encouraged.

6 This was probably one of the best-answered questions on the paper with many candidates obtaining full marks. Those who didn't obtain full marks on part (a) had usually missed out or written the incorrect centre of the enlargement. Occasionally the candidates lost the first mark for the enlargement because they included another transformation – usually mentioning moving the shape or giving a vector for a translation. It should be emphasised to the candidates that the word 'single' is in bold as only one transformation should be given. Those who didn't obtain the correct scale factor often had 2 or 4 written instead. Part (b) was answered correctly by most candidates and those who didn't usually scored 1 mark for a correct rotation but the wrong centre. Very occasionally a reflection of the shape was given.

7 There was a mixed response to part (a). Some used additional letters other than just '*x*' but there were those who attached the '*x*' to the 25 and 2 rather than to the 7 and 5. Some candidates were able to write down $5x + 25$ and $7x + 2$ but were not able to link these together as an inequality and so left them as two separate parts. Of those who were able to write an inequality for the part (a), the majority were able to go on and score at least 2 marks in part (b). Some stopped at $2x < 23$, others at $x < 11.5$ and some gave just 11.5. Those candidates who gave their answer as a whole number were usually able to do so correctly and rounded down to 11 rather than up to 12. Weaker candidates were often able to obtain some credit using trial and improvement.

8 Many correct answers were seen to this question but some forgot to qualify the correlations with 'weak' and 'strong'. Solutions would benefit from using the appropriate words for correlation ie 'strong' rather than 'good' or 'close', and 'no correlation' rather than 'neutral' or 'scattered'.

9 This question differentiated well across the ability range with many fully correct, well-presented solutions. Most candidates appreciated the need to equate the coefficients of *x* or *y* and many did this successfully or with only one error in the equations. Most appreciated the need to either add or subtract the equations but not always in the appropriate way. It was common for candidates to get as far as $118x = 59$ but to follow this with $x = 2$. It is not uncommon for simultaneous equations questions to lead to fractional or negative answers. Occasionally more than one attempt was made at elimination without it being clear as to the one the candidate wanted marking. Candidates should be encouraged to cross out working that they do not want marked.

10 Most candidates were able to score some marks on this question but not many obtained full marks, particularly on the last part of the question. Part (a)(i) was the part that produced the most correct answers. Common errors were to give 0 or 17 as the answer. Most candidates could appreciate either the cube or the reciprocal in part (a)(ii) but only the best could put both together. Some candidates were let down by their inability to work out $4 \times 4 \times 4$ correctly. There were some correct answers to part (b)(i) but an answer of 4.5 was common as candidates arrived at $9^{\frac{1}{2}}$ and then calculated $9 \times \frac{1}{2}$. Occasionally $9^{\frac{1}{2}}$ was evaluated as 81. This is a question where working was important as those candidates who just wrote down 4.5 did not score. The best solutions showed clearly that 'to the power half' means 'square root'. Part (b)(ii) was more challenging and the best solutions started by demonstrating that the inverse of 'power half' was 'square'. The common error was to start with 12×2.

11 Surds proved to be a challenging topic for all but the best candidates with many not able to score in this question. In each part the best solutions were the ones where the candidate ensured their answers were fully simplified, although in each part the mark scheme allowed credit for partial simplification. Common errors included: in part (a)(i) $\sqrt{20}$ or $4\sqrt{5}$ and in part (a)(ii) $\sqrt{15}$ or attempting to rationalise the numerator. In part (a)(iii) some candidates obtained partial credit often for $\sqrt{200}$ or knowing $\sqrt{40} = \sqrt{5}\sqrt{8}$. An answer of $\sqrt{45}$ was seen quite often. Better solutions demonstrated that simplified expressions did not contain any multiplication signs.

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