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GCSE

Mathematics A

General Certificate of Secondary Education **GCSE J512**

Reports on the Components

January 2010

J512/R/10J

Oxford Cambridge and RSA Examinations

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GCSE Mathematics A (J512)

REPORTS ON THE COMPONENTS

Chief Examiner's Report

General Comments

There was a dramatic increase in the number of candidates sitting J512 this January. It is pleasing to be able to report that most of these were prepared well and entered at an appropriate tier. Work was, in general, of a good standard with only very few candidates failing to show what they 'know and can do'.

Much of the work was well presented with a clear method shown. This enabled marks to be awarded for a correct method being used, even when the final answer was incorrect. Candidates should be encouraged to try every question, and every part of a question, as often some of the marks may be gained even when there is not a complete understanding of what is required. It is imperative that questions are read carefully. In several instances this series, candidates have displayed the ability to cope with a topic but have misread information or not followed instructions accurately and consequently lost marks unnecessarily. The checking of working and answers is important; not just a casual glance but a more thorough analysis to eliminate unnecessary errors.

There is still some evidence that a small number of candidates do not have access to a calculator or other mathematical equipment. This is having an adverse effect on their scores. Further work is needed to develop candidates ability to deal with written, descriptive answers and when being asked for 'reasons'. These must be relevant, in the context of the question and never purely numerical.

J512/01 Paper 1 (Foundation Tier)

General Comments

The standard of work was generally high with no apparent lack of time although weaker candidates left some questions unanswered. Even though there were questions in the middle of the paper that weaker candidates did not understand or attempt, they continued to answer parts on later questions that allowed them to achieve extra marks.

Candidates should be encouraged to show working for calculations even those that they do 'in their head' as, in many questions, method marks are available.

Many candidates appeared not to have rulers and protractors and some solutions were difficult to read.

There was a large increase in entry and evidence was seen of candidates wanting to 'bank a grade C' presumably prior to sitting higher tier in the Summer. However, there were also many candidates who were not sufficiently well prepared to achieve at this level at this time.

Comments on Individual Questions

1 Candidates made a good start to the paper scoring well in this question. The division in (d) caused the most difficulty.

2 Part (a) was well answered by the majority of candidates. Where there were mistakes, 'tonnes' was replaced by 'kilograms' and 'metres' by 'kilometres'.
In part (b) some two thirds of candidates missed the crux of the question, that square metres is a measure of area not distance.
Typical misunderstandings were:-

- reference to 8^2 as 64 metres and therefore the elephant had good sight
- reference to the length of the elephant being 6 metres long so 8 square metres was poor sight

3 This question was usually well done.
In part (a) the majority of candidates gave the correct coordinates. However, a few candidates gave the coordinates in reverse order.
In part (b) most candidates scored well, but weaker candidates showed an inability to convert cm into mm giving an answer of 50.8.
The majority of candidates were able to identify the midpoint in part (c).
Part (d) was completed well, but a common incorrect answer was A to (3, 0).
Most candidates scored the mark in part (e) if a good line was drawn in part (d).

4 In part (a)(i) candidates were generally successful. The common error was not to complete the subtraction leaving the answer as 32 – 5 or 5 – 32. There was some careless arithmetic for the subtraction with answers of 28 or 17. Weaker candidates gave the mode (17).
In part (a)(ii) a large number of candidates scored both marks. This question was clearly accessible to all levels of ability. Failure to check their total frequency resulted in one or two of the values being incorrect – usually the final one was given as 5 or the second as 10. Some candidates were unaware of what a frequency table should look like, placing frequencies in the tally column and cumulative frequency (or relative frequency) in the frequency column. A few of the weakest candidates put in the tallies with no numerical values.
In part (b)(i) modal group was well understood.
There were some good explanations for part (b)(ii). Candidates should be encouraged to read their written responses critically as many candidates wrote self contradictory or meaningless comments.

5 Part (a) was well done by over 90% of candidates.
In part (b) weaker candidates gave answers of 3.4 or 0.34.
In part (c) some candidates missed the 'change' to fraction with 0.25 a common answer.
In part (d) there were a few more errors with the most common ones being 3% or 0.3%.

6 Most candidates scored some marks in part (a). Answers of 1020 using a jump every second or 170 using 100 seconds in 1 minute were common. Many also calculated Lizzie jumping for 2 minutes giving an answer of 132.
The majority of candidates were able to score at least 1 mark in part (b)(i) for the pairings with one or more pair omitted or a U in the second column. Some candidates did not understand the columns giving SK or SKU in one column.
Part (b)(ii) was not well answered. Many candidates gained a mark for 2/number, but this was then often subsequently lost by poor notation of the probability. Use of words such as 'unlikely' was also common and, provided the correct answer was present, this was condoned.

7 In part (a) about half of the candidates were successful but there were also many answers of 7.7 or $7.\dot{7}$ or moving the decimal point 1 place to give 77.77.
Only ¼ of candidates had any understanding of what was required in part (b). Common wrong answers were to halve 40, giving 20, and to give a whole number answer of 6 or 7, not realising they could improve the accuracy of their answer. A large number of candidates gave the answer as 4 (or 400) and 1600 was also seen. A few candidates tried to simplify by using surds. Weaker candidates often left this blank.
Poor arithmetical skills were shown in part (c) and the working was often disorganised to the extent that no credit could be given to over half of the candidates. There was little understanding of how to start a long division with 8 or 6 often the first digit of the quotient. Weaker candidates failed to gain much credit as there was simply a long string of 18s interspersed with some totals but there was no link between the number of 18s and these totals. A common error using 'chunking' was to find 18 × 10 = 180, 2 × 180 = 360 then 3 × 180 = 720. A few spotted the more efficient way of dividing by 2 first but then spoilt their calculation by doubling 38 as their final step. The weakest candidates attempted to combine a division by 10 with one by 8 or tried to set it out in the grid method for multiplication. More able candidates were able to show correct and concise solutions.

8 The area of the shape in part (a)(i) was calculated correctly in most cases. Weaker candidates did it by counting the squares, while stronger candidates drew extra lines to complete a rectangle. Some then calculated 4 x 6 for the area without removing the additional part.
Nearly everyone knew where to put the line of symmetry in part (a)(ii). Very few candidates left it blank, and it was rare to see an incorrect line.
In part (b) ¾ of candidates were able to give the dimensions of a rectangle to give an area of 24 cm². The diagram in part (a) possibly led candidates to use 6 x 4 but 8 x 3 and 2 x 12 were also quite common.
However, only ½ of candidates could then give the associated perimeter in part (b)(ii). Quite a few weaker candidates wrote references to 'inside' and 'outside' the shape on their way to correct solutions.

9 Part (a)(i) was generally well answered, as was part (a)(ii). However, in part (ii) some candidates spoilt their answer by giving the final answer as 16*vw*.
Part (b)(i) was generally correct, although several candidates embedded the answer ie writing 10 × 5 = 50 on the answer line. It is worth noting that while this was condoned on this occasion, this may not always be the case.
The majority of better candidates scored both marks in part (b)(ii). A significant number scored 1 mark for 10 + 7 or 17; however, a small number failed to score the mark as they had written 10 – 7. A significant number also converted 17/2 to 8.1.

10 This whole question was generally answered well.
In part (a) common errors from weaker candidates included giving an obtuse angle or, more surprisingly, 180° or 360°.
In part (b) some candidates lost the mark by giving the answer to the nearest 10° thus being more than 2° out.
In part (c) there was a good understanding of what was meant by a reason (i.e. 'Angles on a straight line = 180°') and fewer candidates gave long calculations for their reasons. Quite a few got the reason mark despite making arithmetic slips with the size of the angle.

11 Most candidates seemed comfortable with this question. However a significant number added up the total number of vegetables incorrectly to 14 despite being told at the beginning of the question that the box contained 15. Generally answers were given as fractions, but some candidates lost a mark for poor notation by using a ratio or saying 'out of' instead of the required notation. This is a point that should be stressed to candidates.
Most candidates were able to pick out the 6 carrots in part (b), and the notation in this part was much better. However, the cancelling of 6/15 was quite poor, with 3/5 a very common wrong answer.

12 A number of freehand circles were seen in part (a) which were in tolerance. Some of the weaker candidates drew circles with radius 1.5 or 6 cm.
Most candidates made a decent attempt at part (b) although there was a distinct lack of the use of compass arcs seen. Many clearly used a ruler to gain the third point by trial and error. Hence 2 marks out of 3 was just as common as full marks.

13 Candidates usually picked up at least one mark in part (a) but a common mistake was to make $y = -3$ when $x = -2$.
Part (b) was generally well answered but there seemed a surprising reluctance to draw a line through the plotted points.

14 In part (a) candidates had a good understanding of how to use the isometric grid – the most common error was to draw solid lines at the back of the cuboid or to draw it as 8 by 3 by 3 or 8 by 3 by 1. Candidates should make it clear when there are incorrect lines on the diagram e.g. by writing 'do not mark' beside the incorrect lines – it would be even better if they had a rubber. A small number of nets were seen.
In part (b) most candidates forgot the units or wrote them as cm^2 or 48^3. A number of candidates gained full marks but answers were sometimes spoilt by careless arithmetic, especially 2 × 3 = 5. 2(8 + 3 + 2) or 4(8 + 3 + 2) were common mistakes and ($l \times b \times h$)/2 was also seen. A method mark for recording 8 × 2 × 3 was not earned by many candidates as little working was shown.

15 This proved to be one of the hardest of the last few questions with many candidates unable to demonstrate formal equation solving techniques.
In part (a) many candidates calculated 4 x 6 = 24 then divided by 4.
Part (b) discriminated well between those who had a clear idea of algebra and others who used trial and improvement. $10x + 1$ was a common error, which often became $11x$.

16 In part (a) many candidates were able to give 26/100 to obtain the mark, but some were unconvincing in their attempts to "show" the reasoning and a few thought that the closeness to 25% should be used.
In part (b) many candidates failed to recognise that part (a) was intended to help in this part and some who scored in part (a) failed to use similar techniques to convert the other two fractions to percentages. Many candidates scored 1 mark for the final answer but a number, who did not read the question correctly, failed to write their fractions as percentages, thinking that 30/100 etc was enough for them to find the correct order. 35% was more frequently seen than 30% with 90/300 converted to 33%.

17 Most candidates, even the weakest, were able to score full marks in part (a). There were very few blank answers and only the odd point plotted incorrectly. There were enough points already plotted in part (b) to enable candidates to answer the question regardless of their attempt in part (a). The stronger candidates recognised the 'negative' correlation here, though many qualified it with a wide variety of descriptors. Attempts that lost marks were either 'positive' or trying to describe the relationship between time and age.

18 Part (a) was well attempted by many candidates who worked out the cost of 1 bag, and then usually gave the 10 bags as the cheapest. Some worked out the cost of two 6 packs and tried to compare this with the 10 pack or just found the difference as 4 bags = 92p. There were a number of numerical slips on this question
In part (b)(i) a good number of candidates tried to compare the ratios, and many gained full marks. A common error by weaker candidates, who clearly did not understand ratio, was to reverse the ratio and give 2 bags of smokey bacon and 3 cheese and onion. Other candidates commented that there could be more bags, but did not score as no specific values were given.
Many candidates scored full marks in part (b)(ii). Of those who did not, some scored 1 mark for 160/5 or 32, but others did not understand the meaning of ratio and so guessed at two values which added to 160.

19 This question was the worst answered question on the paper with fewer than 40% of candidates scoring more than 1 mark out of 6.
In part (a) many candidates ignored the equation and simply used a linear pattern in the table to give answers of 10 and 20. Those attempting to use the equation often used $(5t)^2$. Also, 50 and 40 were quite common wrong answers. Only the strongest candidates gained two marks here.
Those attempting the plots in part (b) were mainly successful in gaining one mark but few attempted to draw a graph and those that did had little familiarity with a parabola and mainly used straight line joins. Very few candidates drew the correct curve.
Part (c)(i) was seldom answered correctly with 30 most commonly given as the answer, even those with a curve drawn between $x = 2$ and $x = 3$ opted for a value of 30.
Those candidates who did not draw the graph often guessed at 1.5 or even 4.5 as an answer to part (c)(ii), but those estimating a value from their drawn graph were often successful in scoring a follow through mark. A correct value between 0.5 and 0.9 was seldom seen.

20 In part (a) candidates were expected to recognise the need to calculate the required angles for the pie chart. With a total of 90 apple trees it was not a difficult process so many failed to record any working at all. To gain any marks in that case, they were reliant on being able to draw angles accurately.
For many, the only mark they gained was for labelling four sectors correctly, though some labelled four, but had a fifth unlabelled. A small minority used the frequencies given as the angles on the pie chart.
In part (b)(i) it was pleasing to see that many of the candidates were able to follow the example already plotted and managed to plot and join up the points correctly. Very few ignored the mid-interval and few had incorrectly plotted points.
Giving sensible comparisons, as is required in part (b)(ii), is a skill that is beyond many foundation candidates. Some tried to look for trends or to compare particular categories. Candidates did not achieve well on this part though a pleasing number were prepared to have an attempt.

J512/02 Paper 2 (Foundation Tier)

General Comments

Candidates were generally well prepared for this paper with most of them able to attempt a good range of questions. Even weaker candidates tried to answer all questions on the paper and as a consequence were able to receive some method marks on the later harder questions, even if they did not get the correct answer. This is encouraging.

Nearly all candidates appeared to have enough time to complete the paper.

A few candidates clearly did not have a calculator, which put them at a distinct disadvantage; many were able to use their calculator effectively. On the percentage question, the majority of candidates used a non-calculator method which was inappropriate for this paper. Those candidates who used a simple calculator method scored better as such an approach is much less prone to error.

Candidates need to be aware that if the result of performing a calculation on a calculator is given in the form of a surd or a fraction then this may not be an appropriate answer to a question and may need to be changed into a different form.

Comments on Individual Questions

1 Some candidates were confused between the meaning of the terms multiple and factor. The term prime was not always understood. A few candidates calculated 10^2 to be 20.

2 Many candidates were unable to put the decimals in the correct order in part (a). Part (b) was well answered.

3 In part (a) only a small number of candidates gave the correct name to both solids. A common error was to call the cube a cuboid.
Many candidates did not understand what was required to sketch a square based pyramid in part (b). Most scored one mark for either drawing a net or sketching a pyramid that did not clearly have a square base.
In part (c) only a few candidates could find the appropriate language to fully describe a cylinder.

4 This question was well answered with only a small number of candidates failing to spot the pattern in part (c).

5 Candidates had a good understanding of pictograms. Most of the few errors that were made came from carelessness.

6 Most candidates had a good understanding of place value and could give the change from £5 correctly.

7 Some candidates had a clear understanding of a method to find percentages that used their calculator effectively. Those who attempted to break the percentages into parts and find their sum often either did not fully understand the method or made errors and consequently scored few marks.

8 Many candidates did not understand how to find the mode from a frequency table and 0 or 10 were common errors. Most knew how to find the mean, although some found the median or the range.

9 Many did not understand what was required in part (a) and gave numeric answers rather than odd or even. It was pleasing to see that most candidates had an understanding of how to substitute into an algebraic expression with many scoring both marks in part (b).

10 Plotting of points was good and most lines were ruled. In part (b) the answer was read from $x = 31$ more often than from $x = 32$.

11 Most candidates could work out the missing angle in the isosceles triangle in part (a). There were many correct angle facts used to support their answer, although some were confused with the equal sides notation in an isosceles triangle referring to them as parallel.
There were many correct answers in part (b) and the remainder of candidates often partially completed the method to obtain a mark. Many gave only one angle fact to support their answer and consequently only gained one of the two marks.

12 This question was generally well done, although a few gave their answers in words rather than as a fraction as was required. There are still a very small number of candidates who gave their answer as a ratio. This scored no marks. Many of the explanations as to why the dice was biased in part (b) were correct.

13 There were many correct answers. Some candidates were not aware of the implied order of operations in the calculations and a few candidates rounded too early in their working. This led to inaccurate answers. Some calculators gave the answer in an inappropriate form such as a surd. This only gained one of the two marks available.

14 The majority of candidates enlarged the triangle correctly and were able to find the dimensions of the enlarged rectangle. Many did not consider the implications to the area of the enlarged square and simply gave the linear scale factor of 5.

15 There was a good awareness of what was required in part (a), although some candidates could not manipulate the fraction calculation and others did not take account of the fact that the recipe was given for two children.
In part (b) only a very small number of candidates obtained all three marks. Again, most did not consider the full implications of the recipe being given for two children and the incorrect answer of six children was common.

16 Although most candidates had a good idea of what was generally required in this question, many did not take into account that the number of tins available at the end of the twenty first week was required to fully answer the question. They used twenty two in their calculations and consequently failed to get full marks.

17 Very few candidates had any idea as to what was required to design a two-way table and consequently many failed to score on this question.

18 In part (a) many candidates gave the correct value of x, although the reason some gave to support this was that the sum of the angles on a straight line is 180 degrees, suggesting that they had not fully understood this. Very few gave a correct reason such as referring to the properties of a parallelogram.
There were a significant number of fully correct answers in part (b). Very few candidates used an algebraic approach, with many using some form of trial and improvement. Inevitably, on a more testing question of this nature, some had little idea as to how to approach this.

19 Average and more able candidates managed to tackle this question. Part (a) was more successful than part (b)

20 This question was not well answered. Some candidates found the volume but many just did 'length × width' without involving π at all. A mark was given for rounding their answer to an appropriate degree of accuracy but this was very rarely gained.

J512/03 Paper 3 (Higher Tier)

General Comments

There was a pleasing improvement in the standard of scripts seen at a January sitting and most candidates scored marks in the range 30 to 80. At the top end, it is encouraging to see candidates coping with the A* specification content whilst at the lower end, a small number of candidates were clearly not in a position to cope with the demands of a higher level paper.

In general, candidates were accurate with straightforward numerical calculations and presented their answers with sufficient care to support the award of part marks where appropriate. The level of algebra continues to be a cause for concern with many still using trial and improvement to solve equations. Candidates must be encouraged to read questions carefully and to spend time on questions which initially may look daunting. Often this approach can lead to the securing of at least some of the marks on offer. Drawing was done with care and accuracy, for the most part. Written responses still pose a major problem to candidates. Thinking carefully about their answer and making sure it is relevant and in the context of the question is key to any response.

Candidates used their time well and most managed to attempt every question.

Comments on Individual Questions

1 Both parts of this question were answered well with many candidates scoring full marks. In part (a) some forgot to subtract 0.55 from 1 while some others thought that the values formed a sequence and gave an answer of 0.25.

2 Though most candidates are using algebraic techniques to solve equations, there are still a number who are just using trial and improvement. A high proportion of candidates managed to come up with the correct answers to all parts. $5x = 12$ was a common wrong step reached in part (a). Parts (b) and (c) performed better with just a few not being able to divide 24 by 3 or failing to multiply both parts of the bracket.

3 Part (a) was usually correct though candidates must ensure that they give sufficient detail even in a numerical explanation. A large number changed the values given in part (b) to equivalent fractions rather than percentages, as required by the question.

4 It was clear that many candidates did not know how to use compasses to construct the kite. There were numerous diagrams with spurious arcs drawn as an afterthought. However, the majority of diagrams were drawn neatly and accurately. The length was usually found correctly in part (b) though some forgot to scale their measured length. Less aware candidates thought that the longer diagonal was the 60cm line.

5 Very few candidates failed to score full marks on this question. Some missed the instruction in part (a) to plot the remaining points on the diagram. A small number thought that the correlation was positive and others tried to describe the relationship rather than state the type of correlation. Lines of best fit were drawn accurately and used appropriately.

6 Though there was some problem with arithmetic, candidates knew what was expected in part (a). The majority chose to compare the cost of 1 packet of each type. In part (b)(i), an answer of 'There would be more than 5 bags' was the most common response, ignoring the fact that if there were 6 bags, for example, they could not be divided in the given ratio. Very few failed to get part (b)(ii) correct. Weaker candidates divided 160 by 2 and 3 separately.

7 The majority did not know how to find density. Even those that did often failed, or forgot, to give the correct units. Most candidates scored one mark for finding the volume but then could not proceed. Of those going on, many multiplied 135 by their volume. Some candidates that divided 135 by their volume made a mistake in their arithmetic.

8 The plotting of points and the completion of the frequency polygon were done well. Many candidates failed to score in either part of (b). In part (b)(i) it was usual to see comparisons of the shapes of the graphs rather than interpreting what this meant. In part (b)(ii), few saw that there was a lack of evidence to make a decision. There was a common failure to appreciate the difference between the data given, which referred to the total weight of apples on a tree, and the weight of individual apples.

9 The idea of estimation is well known but division by 0.5 defeated many candidates. Some incorrectly rounded 0.46 to 0 while others did not read the question properly and tried to use long multiplication and division. Strong candidates only scored all three marks in part (b). Though there was some success by others with parts (b)(i) and (iii), there was little joy with part (b)(ii). Answers of -8 (from $-2 \times -2 \times -2$) or 0.002 (from 2×10^{-3}) or -6 (from 2×-3) for part (b)(ii) were common. Surprisingly, a large number of candidates got part (b)(iii) wrong giving 0 or 4 as their answer.

10 Candidates found the substitution into this formula difficult to evaluate. Many failed to arrive at the correct entries in the table. Though the plotting of points was accurate, few realised that their points should be joined by a curve and used straight lines. Even when a curve was attempted, many spoilt their effort by drawing a 'flat top' to it.

11 Most candidates knew the concept of upper and lower bound. There was, however, widespread 'fudging' to get the answer required. Commonly seen was '$10 \times 25 = 250$ which rounds to 255'. Some candidates are incorrectly being taught to use 25.49 as the upper bound. Part (b) was slightly better answered though some candidates failed to use the lower bound with one or both of the two parts involved.

12 In general, part (a) was done well by better candidates only. Many others still find great difficulty in following any algebraic routines. Correct triangles were seen frequently in part (b) though a number went on to divide the two numbers the wrong way round when finding the gradient. Candidates with an answer in part (b)(i) often went on to give an appropriate equation in part (b)(ii). Candidates invariably used the diagram in part (b) to help them find the midpoint in part (c). This, however, sometimes led to errors in the x-coordinate of their answer. Surprisingly, this final part was often left blank.

13 Many candidates spotted this as a reverse percentage question and could perform the calculation correctly. Some resorted to a trial and error approach to their solution, not always successfully. Far too many did not read the question properly and just found 120% of £320 giving an answer of £384.

14 Few candidates failed to show and use the correct formula for the area of a circle. Problems did arise in the arithmetic required. 60^2 was evaluated as 360 and $60^2 – 8^2$ was thought to be the same as 52^2. Once again, some candidates did not read the question thoroughly and substituted a value for π. Only better candidates managed to get to the correct answer.

15 Though there were many correct answers to part (a), a number of candidates seemed to think that the second set of probabilities involved some sort of 'without replacement' and consequently introduced 0.1 and 0.7 etc onto the second set of branches. Weaker candidates either had no idea how to proceed with part (b) or were adding probabilities. Even some of those knowing to multiply could not perform the calculation correctly.

16 There was a very disappointing response to part (a). Some candidates expanded the brackets, others only gave one possible value of x. Candidates were more successful in answering part (b). The main error in expanding the brackets was to write $2y \times 5y$ as $10y$.

17 There were some confident and concise answers to this question. These were, however, few and far between. Most candidates knew what congruence meant but did not know how to go about proving it. There were many incorrect references to isosceles and equilateral triangles as well as references to irrelevant facts such as symmetry or AB being parallel to CD. Of those who did know to identify corresponding pairs of equal sides and angles, few gave reasons for their equivalence and even fewer gave a correct congruence test reason.

18 This was very poorly answered and was the lowest scoring question on the paper. Only the very best candidates knew what to do here. Even then, when answering part (c), frequently only the positive solution was given. Those with some idea gave equations like $y = k/x$ or $y = kx^2$ as their starting point.

19 It was common to see a comment about the time intervals being different in part (a) but many candidates did not go on and relate that to the areas of the bars representing the frequencies. Good candidates went on in part (b) to find the sum of the areas required though some were let down by their poor arithmetic. Weaker ones just added the heights of the bars. Many left this part blank.

20 Pleasingly, a significant number of candidates made valiant attempts at both parts, with some success. It was clear that, with little knowledge of the topic, candidates could use a common sense approach to find solutions to the problems. Less aware candidates quoted ranges in part (a) and negative values in part (b).

21 It was only the better candidates who managed to cope with this question, and they invariably produced clear, concise answers. Others managed to get part way but after the substitution of $x – 3$ for y they failed to evaluate $(x – 3)^2$ correctly. Many did not give up on the question and found a correct pair of values through trial and error.

J512/04 Paper 4 (Higher Tier)

General Comments

Overall the standard was variable with a significant number of very poor papers and a significant number of very good papers. There was evidence that many candidates had been well prepared - achieving high scores, displaying an excellent knowledge of the topics and showing full and accurate working throughout. Equally there was evidence that some candidates appeared to have been inappropriately entered for the higher tier and/or inappropriately entered early for GCSE. There was no evidence that candidates were short of time on this paper.

Presentation of work was, on the whole, very good with clear working shown although answers requiring reasons or an explanation of the mathematics were less well answered.

Comments on Individual Questions

1 Part (a) was very well done. Occasional errors included denominator divided by numerator and brackets not used round numerator and denominator when putting it into the calculator.
Part (b) was generally well done. Some candidates appeared to enter numbers into the calculator without using brackets.

2 In part (a) the majority of candidates scored full marks. There was evidence of multiplying by 10 and very occasionally 5 × ¾ = 15/20.
In part (b) several candidates did not always appreciate that the figures given were for 2 children so 6 was a common answer. A number of candidates rounded prematurely and doubled 6, not their full answer, to give 12, not 13.

3 In part (a) many candidates drew a correct table, although some did not understand what was required and had 2 columns. Where candidates had drawn a correct two-way table, 14 (as either a number or tally marks) was in the correct position.
In part (b) some candidates thought that it ought to be about cars and some were distracted by the 1-2, but in general most candidates realised there was no answer for 3 and either redefined all the answer choices or rewrote the final one as 3 or more.

4 In part (a) almost all candidates gave the correct angle, but not a correct reason. Candidates do not always appear to appreciate the difference between a reason for an answer and a method to find the answer.
Part (b) was generally correct, but a surprising number of candidates were not aware of the angle sum in a quadrilateral.

5 Almost all candidates scored at least one mark in this question. A significant number did not use the 21 weeks that the boxes had been bought for, relying only on the numbers in the question rather than answering the actual question asked. For those candidates that did use 21 weeks a range of correct methods were seen.

6 Part (a) was generally answered correctly with a few candidates starting with $n = 0$. Candidates appeared to find part (b) less difficult with relatively few showing any method.

7 Part (a) was quite well answered although several candidates missed one part of the description and some described rotation as turn. A number of candidates described a mix of transformations (usually not completely correct) rather than the single transformation asked for. In part (b) a significant number reflected in the *y*-axis and not the *x*-axis.

8 In part (a) better candidates scored full marks; weaker candidates either scored no marks for 100/6 or one mark for 342 but then went on to divide by 6. The awarding of two marks was not as common as candidates sometimes made a mistake with one of the products.
In part (b) although many gave an adequate reason it would be good to see candidates being encouraged to use more precise mathematical language.

9 The majority of candidates gained full marks in this question.

10 There were some good attempts at this question. Good candidates sometimes lost one mark due to the accuracy; when asked for an appropriate degree of accuracy candidates need to be encouraged to write their final answer to the same number of significant figures as those in the question. Several candidates lost marks through not reading the question carefully and finding the whole surface area. Part marks were awarded regularly as candidates usually gave sufficient working instead of just writing down answers. When no marks were awarded it was often for working out the volume of the cylinder.

11 In part (a) it was encouraging to see that many candidates understood the word 'integer'. A number of candidates scored full marks with a few candidates giving the values 8, 12, 16, 20 instead. A more common error was for candidates to work out 20 – 7 and then divide this answer by 4.
There was a mixed response to part (b) with about the same number of candidates scoring full marks or scoring 1 mark for two correct lines drawn. Drawing the line $x + y = 7$ caused problems for some candidates. Where candidates could draw the lines they invariably were able to apply the inequalities to shade the correct side of the line.

12 Many candidates were able to make an attempt at this question using Pythagoras. Unfortunately they were not always precise enough in their conclusion. The most common answer seen found the square root of 198.9 as 14.1 and then just said the triangle was not right angled without any explanation nor reference to the third side given. Candidates using the cosine rule to find the largest angle or using the trigonometry ratios to find one of the smaller angles in two or more ways were generally successful, although some candidates then did not explain that the largest angle could not be 90. Candidates who used the same trigonometry ratio to find each of the smaller angles were not successful as their method did not involve all three sides given. A few candidates thought 14.1 was near enough to 14.4 and very weak candidates thought it was right-angled and the sides did not matter.

13 Candidates who attempted this question generally gave the correct answer for angle *y* but very often did not earn the mark for stating a valid reason. Many gave a partial answer such as '*y* is double angle B' or 'top angle at B is half of angle at O' or 'two times angle at circumference'. The standard reason of 'angle at the centre is two times angle at the circumference' was the most straightforward way of earning the mark.
Candidates found it more difficult to find the size of *z*. It was quite common to see an answer of 86 and occasionally 43, often with a reason that 'opposite angles of a quadrilateral are equal'. Another misunderstanding was that opposite angles of all quadrilaterals add up to 180 which led to an answer of 94, presumably from using quadrilateral OADC.

14 There was a mixed response to this question as candidates either did not attempt it or were unable to find the lengths of the sides of the squares. Several candidates found the '40' squares, but stopped at 20.25. Candidates who used an algebraic approach to obtain $3x$ and $5x$ were not always able to accurately complete it. The mistakes included $5x \times 8x = 40x$ and $5x \times 8x = 13x$. The first mistake usually led to 3 marks for the answer of 20.25 or full marks when they 'recovered' the x^2 (generally without saying so). Other errors included finding the perimeter of the shape or incorrectly finding the area of the individual squares or just dividing 810 by 5. There were several methods involving trial and improvement that generally scored full marks and no instances of a correct answer without method. Candidates who did not understand the question either left it blank or seemed to keep halving 810 till reaching a number they were happy with. There were however a significant number of solutions presented with clear correct mathematics shown.

15 Most candidates scored full marks in part (a). If there was an incorrect plot it was usually (30, 36) plotted at (30, 26).
Candidates found part (b) more difficult with many giving French as the answer. The typical incorrect answer was obtained by using a mark of 40 on the horizontal axis and using the graphs to give readings of 108 for the French exam and 60 for the German exam leading to an answer of French by 48 marks. Few candidates realised that the median for German was given in the table and this could have been used in place of reading from the graph.

16 Responses to this fairly straightforward algebra question were disappointing with many candidates not showing any evidence of understanding the principle of factorisation. It was quite common to see all, or nearly all, of the parts omitted. In part (a), (i) was either omitted or answered correctly; (ii) was frequently omitted with some candidates only partially factorising the expression either with a common factor of 2 or *x*; (iii) saw a mixed response with only a minority of candidates appreciating that the factorisation could be achieved using the 'difference of two squares'.
Candidates had the most difficulty with part (b) with few correct answers seen. Common errors included attempts to 'cancel' just one of the *x*'s in the numerator with an *x* in the denominator or an incorrect attempt to 'simplify' the numerator.

17 Part (a) was generally answered correctly.
There was a more mixed response to part (b) with more correct answers as 1000 rather than 10^3. Incorrect responses were generally 3 or 0.001 or 10^{-3}. Incorrect answers almost never seemed to follow a correct method.

18 Only about half the candidates seemed to know that a trig ratio was needed in part (a). Those that did generally scored full marks.
Fewer candidates were able to use the cosine rule successfully in part (b) although able candidates tended to gain full marks.

19 Candidates found part (a) challenging with many commenting in general terms about trend rather than focussing on why a two-point average was appropriate. In part (b) it was common to see the next moving average predicted and not used to work out the next estimate. Where two answers were given they often appeared in the reverse order with no calculation.

20 This question was usually very nicely done, with candidates showing the value of x being used, giving the value of 7 to this power, and then stating too big or two small. Many checked the value at 1.695 to conclude that the answer had to be 1.69 and not 1.7. Fewer candidates than in the past gave the answer to more than the required number of decimal places. A significant minority took the expression 7^x to mean $7x$.

21 Part (a) was generally correct from more able candidates with others using factors, but giving answers of $9\sqrt{5}$ or $5\sqrt{3}$.
Part (b) was answered better than part (a), although there were many more decimal answers given.

22 In part (a) very few correct answers were seen. It is not understood by the majority of candidates that parallel lines of equal length have the same vector. Better candidates did gain marks in part (a) with part (ii) answered better than part (i).
Part (b) was answered well by high scoring candidates and some others scored one mark for using 1/3 or 2/3 following through their answer in part (a)(ii).

23 In part (a) several candidates thought $(x - y)^2 = x^2 - y^2$ and tried to reason from this. Many candidates only gave numerical examples. A number of candidates said that square numbers were positive or stressed that a negative squared is positive, but relatively few gave a complete explanation.
In part (b) very few candidates gained the mark, many choosing to give numerical examples.

Grade Thresholds

General Certificate of Secondary Education
Mathematics A (J512)
January 2010 Examination Series

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
1	100			66	55	44	33	22
2	100			67	56	46	36	26
3	100	66	49	32	18			
4	100	56	39	23	14			

Specification Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	200				133	111	90	69	48
Percentage in Grade					40.9	21.6	13.7	10.2	7.3
Cumulative Percentage in Grade					40.9	62.5	76.2	86.4	93.7

The total entry for the examination was 16286.

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	200	156	122	88	55	32	20		
Percentage in Grade		8.3	15.4	25.3	30.2	15.0	4.1		
Cumulative Percentage in Grade		8.3	23.7	49.0	79.2	94.2	98.3		

The total entry for the examination was 3462.

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	1.5	2.7	4.4	39.1	20.4	12.0	8.4	6.0
Cumulative Percentage in Grade	1.5	4.2	8.6	47.7	68.1	80.1	88.5	94.5

The total entry for the examination was 19748.

Statistics are correct at the time of publication.

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