

Additional Mathematics (Pilot)

General Certificate of Secondary Education **J915**

Examiners' Reports

June 2011

J915/R/11

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

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

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Chief Examiner Report

There was a pleasing increase in the proportion of candidates gaining 90 marks and over in this series. Unfortunately this was matched by the proportion gaining 10 marks or fewer. The latter must have had a very negative experience in this examination.

In recent sessions candidates have often failed to give answers to probability questions in acceptable forms. In this session it was pleasing to note that candidates generally did give such answers in acceptable forms, usually as fractions or decimals.

Candidates should be encouraged to write a few words to explain their jumble of numbers in calculations as it is sometimes very difficult for examiners to decide what candidates are attempting to do. The fact that a very large or a very small value affects the mean value but not the median was tested on this paper, and few candidates appreciated that on this occasion the median was the better representative of the data. Discussion about contexts and measures should go hand in hand in statistics.

As always, premature approximation led to inaccuracies in final answers in calculations. Candidates should leave the full values in their calculators and use these in later working to be sure of gaining accuracy marks.

Presentation of work is gradually improving in the longer questions but a few words of explanation would help examiners enormously.

J915/01 Additional Mathematics Paper 1

General Comments

This paper produced an unusually wide spread of marks with large increases in both the proportion of candidates scoring more than 90 marks and the proportion scoring fewer than 10. As previously, most candidates were able to start each question, earning the first 2 or 3 marks. Weaker candidates then moved on to the early parts of the next question. Two of the eight questions were very clearly algebra questions; the weakest candidates often omitted them. Pleasingly, probabilities were rarely written as ratios. Most candidates showed their calculations, which often earned marks even when the final answer was wrong. Many candidates need to improve the presentation of their written work so that it forms a coherent argument that can be understood by others.

Comments on Individual Questions

- 1 In part (a)(i) almost all candidates scored the 1 mark. In part (a)(ii), despite the given example in the table, many candidates did not appreciate that the "58" registration was used until February 2009 resulting in "December 2008" being a very common wrong answer. Many candidates in part (a)(iii) correctly answered "3 years and 9 months" but there were also many who scored 1 mark for either the 3 or the 9. Some of these also earned a method mark by writing as part of their work "1st September 2007", the first date on which the "57" registration was used. In part (b) there were many correct answers but 13 and 22 were common wrong answers. In part (c)(i) many candidates gave the median correctly, but a few lost the mark by giving the registration rather than the age. Some forgot that the data needed to be arranged in order of size and others had difficulty doing that. Many candidates in part (c)(ii) were able to find the mean. Those who showed their working clearly were usually the most successful. There were problems with converting between months and years. Many picked up marks for finding 28 years and 34 months and most earned a method mark for dividing by 5. Some candidates thought the table with two columns of numbers was a familiar frequency table and multiplied the years by the months. Some just added all the figures and divided by 10 which earned no marks even though this gave the required answer but from an incorrect method. In part (c)(iii) the median (1 year 3 months) was the better representative here as it was within $1\frac{1}{2}$ years of four of the five ages whereas the mean (6.2 years) exceeded four of those ages by nearly $3\frac{1}{2}$ years. Most candidates thought the mean was the best representation because it was "the average" and the median was "just the middle number". Candidates did not appreciate that one large value affects the mean, especially when there are only 5 values, but does not affect the median.
- 2 In part (a)(i) the vast majority of candidates answered the question correctly. Some misinterpreted the table and others carelessly omitted the decimal point. Most candidates answered part (a)(ii) correctly. A few earned partial credit for working with figures from the wrong part of the table. There was some evidence of careless arithmetic. Some candidates were completely successful with the algebra question in part (a)(ii) but many were not comfortable with discussing the purchase of w prints. Some produced numerous calculations involving 15 and 22 having failed to understand the question. Those who recognised that the saving per print was 7 pence earned a mark. Candidates who attempted part (b) usually scored at least 2 marks for raising some amount by $17\frac{1}{2}\%$ and 20% . Calculations were often either laboured ($10\% = \dots$, $5\% = \dots$, $2\frac{1}{2}\% = \dots$) or difficult to follow or both. Even some strong candidates failed to earn the final mark as their explanation was often inadequate. Weaker candidates often wrote " $2.5\% \approx 2.13\%$ " or omitted the question.

- 3** This was an undisguised algebra question and the weakest candidates often ignored the whole question. Most candidates answered parts (a)(i) and (ii) correctly. The common wrong answers were 28 and 10 respectively. In part (a)(iii) very few candidates recognised that the quadratic equation was already factorised and therefore easy to solve. Most started by multiplying out the brackets and then tried to factorise or use the formula, often making mistakes. Some did realise and corrected their error. Some earned 1 mark for $c = 5$ found by trial and improvement but very few scored both marks from this method. Stronger candidates could answer part (b) correctly. Weaker candidates often had an 8 in the working from 2^3 but could not progress. There were a number of successful attempts at trial and improvement though the question was frequently left blank. In part (c) most candidates did not recognise that completing the square could have been helpful. A few did complete the question correctly. Unexpectedly, one or two knew enough calculus to complete the question via differentiation. Others used trial and improvement but were not successful if they restricted e to being an integer.
- 4** In part (a)(i) most candidates earned the 2 marks though a small number misread the scale. Most candidates scored at least 1 mark in part (a)(ii). There are numerous possible correct statements about this data set and most candidates wrote a correct description of the way the productivity varied but sometimes it was in slightly incorrect English. Some only earned 1 mark because they included a false statement. Some candidates did not indicate which day of the week they were considering. Part (b)(i) was answered well but a few candidates gave the answer as a fraction. Parts (b)(ii) and (iii) were also answered correctly by most candidates. Weaker candidates frequently added instead of multiplying in part (b)(iii) and some then divided by 2 to avoid having a probability greater than 1. In part (b)(iv) there were a pleasing number of fully correct answers. Those that answered the previous part correctly generally scored full marks here. Many of the candidates who drew tree diagrams made errors on the tree or did not know how to continue.
- 5** In part (a) the vast majority of candidates answered both parts correctly. Over 50% of the candidates also answered part (b) correctly, though a few only scored 1 mark because they added the base and/or the top. Very few candidates scored well in part (c)(i) as most did not recognise that they could apply Pythagoras' Theorem to find the height of a triangle such as TEF. Some did use Pythagoras' Theorem to find other lengths which were sometimes useful but calculations often suffered from early rounding. Although fully correct answers were rare in part (c)(ii) candidates were more successful here as they recognised that a mixture of Pythagoras' Theorem and trigonometry was needed. Again, early approximation often stopped candidates from earning full marks.
- 6** Most candidates answered part (a) correctly though some faulty arithmetic was seen. In part (b)(i) most identified that the x -coordinate should be 0 but few obtained the 4. The common incorrect solution was (0, 3). Similarly in part (b)(ii) the vast majority obtained the y -coordinate to be 0 but $(-1, 0)$ was a very common wrong answer. Very few candidates were able to attempt part (b)(iii) where a common incorrect answer was $y = -5x + 4$. In part (c) there were only a few candidates who attempted to form simultaneous equations to answer this question. It was generally answered by trial and improvement. Mistakes were made in substituting $x = -4$ but some earned a mark for the other equation. Candidates were often unable to substitute for x and y to create equations in a and b . A few earned 2 marks for finding the gradient of PQ and if they continued by using $y = mx + c$ they earned another mark. In part (d) there were some good answers but many reached $1 = k \times 4$ and then wrote $k = 4$. Those who chose to substitute $x = -4$, $y = 4$ made more mistakes than those who used $x = 2$, $y = 1$. Many candidates did not use the coordinates of P and Q but instead just rearranged $y = kx^2$.

- 7 Part (a)(i) was answered very well. Only a few candidates gave multiples of 20 instead of factors and a few omitted one or two factors. Again candidates gave mostly correct answers in part (a)(ii). A few omitted one of the factors. Those who repeated the factor 7 were not penalised. Approximately 30% of candidates answered part (b) correctly and completely. The common error was to omit $+sn - sn$. A few candidates lost the mark by writing $+n^2$. Part (c)(i) was very rarely incorrect and candidates generally explained part (c)(ii) well, writing 'It is not a whole number' or 'It is a decimal'. In part (d)(i) nearly 50% of the candidates scored 3 marks but many only completed row 3 and others left it blank. Some did not appreciate that the second column required the use of n^2 . There was no penalty for going beyond row 5 or failing to complete the values of $s - n$ and $s + n$ in row 5. Very few candidates made the link between part (d)(ii) and the previous part even though many had the answers 31 and 41 in the table. Most started to work it out from the beginning and were generally unsuccessful. Common incorrect answers were 1×1271 and 31, 41, the latter being unacceptable as the question asked candidates to express 1271 as the product of two prime numbers.
- 8 As expected, part (a) was answered correctly by the vast majority of candidates. In part (b) most candidates earned some marks but many drew the fully open door in part (i) incorrectly: it was often shown to the right of A, fully inside the garage. In parts (b)(ii) to (iv) most candidates had a reasonable idea of what the question was asking them to do but many did not draw the positions of the door within the required tolerance. Many candidates indicated that as P moved down in 40 cm steps U moved horizontally in 40 cm steps. In part (v) candidates nearly always drew the vertical door correctly. Surprisingly in part (c) only approximately 50% of the candidates drew the translation correctly. The others did not move the car far enough or moved R further than they moved S or omitted the question. In part (d) candidates found locus a difficult concept and there were few attempts at this question. Those who had drawn the doors on the first grid but decided to draw the locus on the second grid made it difficult for themselves and for the examiners. In part (e)(i) many candidates left the answer space blank. Wrong answers included virtually every point on the diagram. Parts (e)(ii) and (iii) were also frequently omitted but many who attempted them earned the marks.

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