OCR
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GCSE

Mathematics C

General Certificate of Secondary Education **J517**

Reports on the Units

June 2010

J517/R/10

Oxford Cambridge and RSA Examinations

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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.

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GCSE Mathematics C (J517)

REPORTS ON THE UNITS

Chief Examiner's Report

General Comments

This has been an interesting summer for the assessment of J517. The new GCSE specifications for teaching from September 2010 (see below) have already impacted on J517 – for instance we have had fewer Year 9 candidates than usual taking this specification. More centres appear to be entering candidates strategically, switching candidates who have not done well on past modules to the linear J512 to 'start afresh', whilst retaining candidates with positive module results on the J517 assessment. Also, in spite of the trend for lower numbers overall, the number of candidates for modules 9 and 10 has actually increased. The net result of all the changes has been an increase in the quality of the candidature for J517, with an increased proportion of Higher Tier candidates aggregating this summer in comparison to last year. Pleasingly, there has been a considerable increase in the percentages of candidates gaining grades A and C.

Centres are reminded that they can analyse their results using Active Results at www.ocr.org.uk/interchange/active_results - teachers who have been using this have commented on how useful they find it.

In the reports on the separate papers, a recurring theme as usual is the problem where candidates do not show working, therefore gaining no marks at all when the answer is wrong, instead of possibly being eligible for some method marks. This will be of particular concern in the next specifications too, where there is more of an emphasis on process skills, so centres are encouraged to do all they can to help their candidates to know that their partial attempts are of value.

Centres should note that January 2012 is the last aggregation for current specifications. Candidates who have not obtained the required grades by then would need 'start again' in June 2012 by taking papers from one of the new specifications, without being able to carry forward module marks. There is not any extra national curriculum content in the new specifications, but with the new assessment objectives and functional elements there are differences in approach, so that problem-solving skills for such candidates would need to be enhanced between January and June.

The new specifications may be downloaded from www.ocr.org.uk/2010 . The new GCSE criteria mean that each paper in the new specifications must assess every grade from G to C or from D to A*, so that the present very successful graduated assessment has had to be adapted. Both of OCR's specifications are possible successors. The new Mathematics B (J567) specification already contains references to the current graduated assessment; whilst mappings to and from graduated to the new Mathematics A (J562) are also on the website, to assist teachers in preparing for the changes.

B271: Module Test M1

General Comments

The majority of candidates made a real effort to show what they could achieve. Performance on Section A was broadly similar this year and last, but there was a disparity between the Section Bs, with achievement this year being less good than in June 2009. The cause of this difference was the multi-step problem solving parts of Q.8 and Q.10. These were found challenging by all but the highest-scoring candidates. As a result, overall performance on Section A was better than on Section B, by a margin of about 4 marks.

The overall standard of presentation was generally satisfactory: both number work and handwriting were usually readable. However, over-writing should be discouraged as marks were possibly lost through lack of clarity and the resulting ambiguity. A prime example of this was in Q.7, where altered Bs and Ds were sometimes illegible.

Candidates completed the paper within the time allowed. In terms of omissions, Q.8(d)(i), Q.4(b), Q.8(d)(ii), Q.9(b)(ii) and Q.3(b) were the worst with omission rates of round about one tenth or more. With the possible exception of Q.10, where a large number of candidates experienced difficulty translating the problem, there were no obvious instances of candidates misinterpreting the rubric. Careless reading of the scale in Q.8(b) was apparent in a number of instances.

In common with previous years there appeared to be some candidates without access to calculators. There were candidates who failed to write down working and as a consequence no doubt failed to gain any of the available method marks. Examples of this were Q.8(a) and Q.10, where lack of any hard evidence, apart from the wrong answer, meant that it was not possible to award partial credit.

Areas of content that proved particularly challenging included: estimating area by counting squares (Q.1 (e)(i)); selecting numbers odd or even numbers with a certain divisibility (Q.3); multi-step arithmetic problems (Q.8(a) and Q.10).

Areas of content which were addressed well were: extracting and interpreting data presented in tables and charts (Q.1(a), Q.1(f), Q.10(a)); finding unknown numbers presented as basic “equations” (Q.2).

Comments on Individual Questions

Section A

1 **(a)(i)** & **(ii)** A good start to the paper, well answered by almost all candidates.

(b) Well answered, with a relative few who confused thousands and hundreds and even fewer who merely wrote the names of the digits. Poor spelling, if the meaning was obvious, was not penalised

(c) Three quarters of candidates gained some credit. The use of rulers was not always obvious, however for this question questions were marked on the basis of intent – so hand drawn lines were condoned whenever possible.

(d) Candidates often find conversion of metric units problematic, and this relatively easy example proved no exception. 0.2, 0.02 and 2 were common wrong responses.

(e)(i) Not very well done, with almost 1 in 10 candidates omitting this part question. Most realised that counting of the squares was required but tended to be inaccurate in this, usually by counting only full squares. 20 was a relatively common response.

(ii) Common errors were missing arrowheads or arrowheads in the wrong direction.

(f) Found accessible by most candidates. Most errors arose from not reading the key and interpreting each barrel as representing 1 million gallons rather than 10.

(g)(i) & **(ii)** Found difficult. The wide range of wrong responses suggested a widespread misunderstanding of time in this type of context.

2 **(a)** Very well answered.

(b) Not quite as well as well answered as part (a). A common wrong answer was 8, possibly due to misreading the question as 10 − 2.

(c) Well answered by over three quarters of candidates. A common incorrect answer was 4 (perhaps from 6 − 2).

3 **(a)** & **(b)** In both parts of this question there was confusion over odd and even. Both parts had omission rates of about one in ten.

4 **(a)** This context-free question was correctly answered by slightly less than three quarters of candidates. Answers such as 26, 29 and 27 were observed, indicative of errors in 'adding on' in order to perform the multiplication. However there were other answers, such as 34 or 18, which were perhaps evidence of guessing.

(b) Poorly answered. This question was found challenging by over half the candidates.

(c) Answered better than either parts (a) or (b).

5 **(a)** Reasonably well answered with "likely" a common error.

(b) Quite well answered, with about the same success rate as part (a), but with "evens" a commonly seen wrong response.

(c) The best answered part of the three: over three quarters were successful.

Section B

6 Most gained credit here but with 2/6 a common wrong answer.

7 Fairly well answered, with many candidates showing a systematic approach to their listing. There were occasional difficulties distinguishing between some candidates' Bs and Ds.

8 **(a)** This was one of the least well answered questions. Interpretation of the requirements appeared problematic. A common wrong approach was to base the answers on £72 ÷ 12 = £6, ignoring the £15 already saved. Common incorrect responses were £12 and £15. Although partial credit was available, it was sometimes difficult to find unequivocal evidence on which to award it.

(b) This was a poorly answered question with 67 and 72 as common errors.

(c) Credit was awarded for the correct "number" and for the correct units – candidates tended not to gain the latter. A noticeable proportion of candidates gave the perimeter of the square token.

(d)(i) Not well answered. Lack of equipment may have had an effect; the part question was omitted by one in five candidates. Unfortunately answers in centimetres were not uncommon.

(ii) Fairly well answered. A common wrong choice was the hexagon.

9 **(a)** Candidates tended to gain full credit or no credit. Over half of the candidates were successful.

(b)(i) Reasonably well answered, but instances of the transposition of coordinates were not uncommon, as was the case in (a). However some partial credit was available for those who consistently transposed throughout the whole of question 9.

(ii) Candidates that were successful with part (i) were usually successful here. There were, in common with previous sessions, answers of the form "I followed the pattern".

10 **(a)(i)** A well answered question by the full range of candidates.

(ii) A common wrong answer was 25, the total weight of the stamps.

(b) By far the most challenging part question on the paper. Many candidates found interpreting the question difficult. Overall three quarters of candidates failed to gain any credit.

(c) Although about one in ten gained full credit, almost two thirds of candidates failed to gain any credit. It was found very challenging by the majority of candidates and omitted by almost one in ten. The lack of any systematic approach was very apparent.

B272: Module Test M2

General Comments

There was, as usual, a wide range of achievement on this paper with the spread of marks indicating that the paper tested all abilities at this level. It appeared that some candidates did not have a calculator for Section B. There also seemed to be a lack of rulers used on the drawing and angle questions.

Many candidates still do not show working and several marks were lost on both sections due to this.

The questions on identifying fractions of shapes were tackled well by candidates. The questions on converting between fractions, decimals and percentages and reading from mileage charts were the weakest topics.

Comments on Individual Questions

Section A

1 **(a)(i)** This question was well done by most candidates, demonstrating their competence in adding simple numbers.

(ii) In contrast to the above, the subtraction of 7.5 from 30 proved difficult for almost all candidates. A range of answers was seen depending on the operation used. 7.5 and 30 were often added, giving 10.5 as a result of misalignment of the digits. Attempts were rarely made to convert kg to grams, and most of those who did made errors with the decimal point. There were very few correct answers seen, however several candidates scored 1 mark for the figures 225.

(b) A small number of candidates were successful with the addition of these figures but most made errors in one or other of the columns of figures.

(c)(i) Very well done.

(ii) Many candidates made errors in either reading the scale on the bar or subtracting 55 from 80, and commonly gave Carbohydrate as 35%. Others did not give a clear explanation.

(iii) Although there were a few correct answers most seemed unaware of how to form a fraction from a percentage or, in some cases, what a fraction is. Attempts seen included $\frac{1}{25}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{1}{25}$, $\frac{50}{100}$, $\frac{25}{2}$, and 2.5.

(iv) Reasonably well done, but few showed any written methods in order to arrive at an answer. Answers of 80, 125, 150, 250 and 450 were seen.

(d) Simple multiplication seemed to be beyond most candidates. Almost always, 6 × 14 was arranged as a string of 14 sixes and attempts to add them had varying degrees of success. Several candidates added 14 and 6 giving the answer 20.

(e)(i) Many candidates demonstrated that they knew the median occurred at the middle of a string of numbers, however they had not understood that the numbers needed to be arranged in numerical order first. Consequently many answers of 4 or 12 were seen.

(ii) The correct answer of 4 was the most common, but other answers showed that there was confusion with the other measures of central tendency.

(f)(i) Answers indicated that many had not understood the question and appeared confused by the directions. Even so, South was the most common answer for the first statement, but most answers for the second statement were attempts to give the compass direction of Pippy relative to Max.

(ii) Well answered.

2 **(a)(i)** Well answered, but with a number of 60° seen from using the wrong scale.

(ii) Uncertainty about the name and the spelling of the angle were evident and often the answer space was left blank.

(b) There were reasonable attempts at drawing the correct angle. Some responses lost the mark where an angle was drawn in the middle of the given line but not indicated, giving a choice of two.

(c) Again candidates had difficulty with naming the correct angles and spellings were taxing to read. Acute was mostly seen for the first part but the second answer was often given as obtuse. Also seen were right angle and 'left angle'.

3 **(a)(i)** Usually well answered.

(ii) Usually well answered, although some candidates wrote 'add 3' or just '3'.

(b) This question tested a spread of abilities. Many candidates gave clear explanations for finding the rule for the next number in the sequence. Some candidates, although knowing the next number, had difficulty in describing the rule and there were also many candidates who did not see the connection between the numbers in the sequence.

Section B

4 **(a)** This was a good starter to the section, with only a small number of candidates having difficulty forming the appropriate fractions.

1/3 was sometimes given for the first shape and the occasional integer answer of the number of shaded sections was seen.

The second shape was the one that caused most problems, with answers of 3/8 and 5/6 seen.

It was pleasing to see some cancelling of 3/6 to 1/2 for the third shape, although not asked for.

A few gave answers of 1/3, 5/3, 3/3; the shaded portion was the numerator and the un-shaded portion the denominator.

(b) There were very few correct answers to this part question. The most frequent answers were 0.34 or 3.4. Other answers included 0.12, 0.25 and 0.3. This shows a lack of understanding of the structure of decimals.

5 Candidates scored well on this question, but most shapes were drawn freehand with some having difficulty drawing a straight diagonal line. Marks were lost through inaccuracies with the length of the base line, many of them stopping short of the correct position.

6 Every shape was misnamed to greater or lesser degree. The most consistent errors in naming the common shapes were cube instead of cuboid, and triangular-based prism in place of pyramid.

7 **(a), (b)** & **(c)** It was obvious that candidates saw the scale divided into 4 so that commonly (4) Apple was given as arrow S (the fourth position) and (2) Orange as arrow R (the second position). Blackcurrant was generally positioned at P. Several candidates answered with words such as impossible etc. These responses scored 0 marks.

8 Many candidates had difficulty in understanding what the question was asking. Answers ranged from 'Fish Supper,' 'Meat Pie' etc to £3.80 and the cost of different numbers of meals. There were, however, numerous correct answers.

9 **(a)** Yellowknife was mainly given as the answer, with the occasional −15 (which was allowed). −4 or Murmansk was also seen which shows poor understanding of negative numbers.

(b) The warmest and coldest values often appeared in the working thus candidates gained 1 mark, but only a few candidates correctly found the difference in temperature. 12 was the most common answer, obtained from subtracting 15 from 27.

10 **(a)** This was very poorly done. It was difficult to determine what candidates did to obtain their answers as there were so many inconsistencies. They clearly had little experience in reading this kind of chart. 98 was a common answer suggesting a possible diagonal reading of the chart.

(b) Few candidates gave the correct answer or identified 213 and 256.

(c) Poorly done; some identified 118, but failed to divide by 2.

11 **(a)** There were a number of correct answers but many attempts showed that candidates had difficulties in multiplying 40 by 1.6 and often wrongly positioned the decimal point.

(b) Many candidates failed to realise that the 72 was kilometres not miles and multiplied rather than divided, thus 115.2 was a very common answer.

B273: Module Test M3

General Comments

The performance of candidates on this module was disappointing, with few candidates gaining more than 30 marks and many scoring 10 or below. Many candidates may have had a more positive experience if entered for a lower module. Candidates had sufficient time to complete the paper, although there were a number of questions that a high proportion of candidates did not attempt, suggesting that they may not have been fully prepared for all of the module criteria.

As is often the case, problems with language skills in reading, understanding the requirements of a question and the ability to express ideas in written answers were evident. Manipulation of decimals was found to be a particular problem for many candidates. Some candidates did not have a ruler, which caused problems with Q.6 and Q.9 in particular.

Comments on Individual Questions

Section A

1 (a) This was answered surprisingly badly, with only the higher-scoring candidates getting the correct answer. Many candidates multiplied by 100, and answers of 12·8, 1 r 28 and 1 were also common. Some candidates subtracted 100 to get 28.

(b) This was answered reasonably well, with a strategy of repeated addition being common. Incorrect answers of 6·12 from a misunderstanding of decimal place value were often seen, and some candidates omitted the decimal point.

(c) Division was found much more difficult than multiplication, and those who could divide, often omitted the decimal point in the answer. Answers such as 1 r 1·5 were seen, where candidates did not know how to deal with the decimal.

(d) Answers of 15 and 30 were common, with little working seen. A method mark was sometimes awarded for 6 seen, but 180 was rare.

2 (a) Most candidates were correct here, though some counted the cubes incorrectly. A significant minority misinterpreted the question and filled in the gaps with words such as centimetre or solid.

(b) Many candidates attempted a view of the solid here, rather than a 3-D picture, but there was a large number of side views rather than the required plan. Those who drew the correct plan view usually got the shading correct.

3 (a) Most candidates gave a fraction with the correct denominator of 16, but 7/16 was a common error. Decimal and percentage equivalents were not seen, perhaps due to the difficulty of the fraction, although there were still a number of answers in the wrong form such as ‘1 out of 16’ or 1:16, which did not score. The very weakest responses used probability words, such as unlikely.

(b) Few candidates identified either the square numbers or indicated how many of them there were. Those who did score usually gave a more general answer, or identified that there were 'only 3' in the 5 times table. Some misinterpreted what a square number was, by explaining that it could be multiplied by itself. Candidates who said 'no' or who gave a correct statement but no comparison did not score.

4 **(a)** This was well answered, with candidates either giving the expected 10:45 or the special case answer of 10:28, from using the timetable given in the next part.

(b) Many candidates gained some credit in this question, although few scored all 3 marks. The most common error was to read the timetable incorrectly by going diagonally from one train to the previous one, or to move along the timetable horizontally.

5 Candidates could often score 1 mark here for attempting to calculate 10 lots of £6·20, although answers to this were often incorrect due to problems with dealing with the decimal, with similar problems to those seen in 1Q.(b) from use of repeated addition. Working out was rarely seen in attempts to find 20% and very few candidates could work this out correctly, although a few candidates did manage to follow through with their 20% and gain the third method mark for adding the two values together. Candidates may have scored more on this question if working had been less haphazard.

6 **(a)** The higher-scoring candidates could answer this question well, where they showed the correct calculation using 12 cm and reaching 240 m. Some errors in calculation were seen, leading to the loss of a mark. Weaker responses often gave vague statements such as 'it is too short' or 'he hasn't calculated right' which did not score although some scored a mark for stating that the length was 12 cm.

(b) Most candidates drew a 10 by 6 rectangle here, having failed to relate this question to the previous part. Many diagrams were not ruled and a significant number drew the rectangle in the space below the question rather than on the scale diagram, although these were still marked. The higher-scoring candidates for the paper generally scored at least one mark here.

7 **(a)** Many of the lower-scoring candidates omitted both Q.7(a) and (b), indicating that they had not met, or were not confident with, algebraic formulae. Answers of 83 and 11 were common here, with only the higher-scoring candidates getting the correct answer.

(b) Even fewer candidates could answer this part, with the notation for division clearly not being understood by most. Common errors were 65/2 and 5·5. However some candidates did score the method mark for 30 seen.

Section B

8 **(a)** Candidates generally chose the correct type of unit for each part, and the majority were correct with hours. Metres and grams were seen as alternatives for kilometres and kilograms in some cases, perhaps indicating that candidates were not attempting to estimate whether the quantities given were reasonable.

(b) Many candidates appeared to guess here, with common answers of 1/2, 2/5 or 25/100 from those giving fractions and various other answers such as 2·5 or 25 being far more common than the correct answer.

(c) As is usual with conversion questions, candidates knew that the conversion factor was a power of ten, but few used the correct one and answers of 150 and 15 were common.

9 **(a)(i)** The performance on this question was disappointingly poor, with even the higher-scoring candidates struggling to provide their own axes. Deciding which set of values to use on which axis caused much confusion, probably because both sets of data were numbers. Common errors for the vertical axis were numbering in the gaps, or a non-linear scale. Few candidates could number the horizontal axis correctly, with numbers not being centred on the bars. The heights of bars generally followed through from the candidate's scales but the bar for 0 books was sometimes omitted. A small number of candidates drew 12 bars, a set for the number of books and a set for the frequencies. Many diagrams were not ruled.

(ii) A very small minority of candidates gave the correct answer here, with 7 being the most common answer, using the frequency rather than the number of books.

(b) Higher-scoring candidates gained at least some of the marks here, although marks were lost due to computational errors. Some candidates found the total, so scored a method mark. Some went on to divide by 8 rather than 10, from not including the zeros in the list. As is common in questions on averages, many candidates attempted to find the median, mode or range rather than the mean.

10 **(a)** This was the best-answered question on the paper, with almost all candidates getting the correct answer.

(b) This was another question where candidates failed to understand algebraic notation, and answers of 20, from 4 + 20 = 24, were common.

(c) Again candidates did well here, although 7 was common, from rearranging as 12 – 5 rather than 12 + 5.

11 **(a)** Candidates who had a calculator and could use the correct button had no problem here, but too many did it without a calculator and attempted to evaluate 1·6 + 1·6, not always getting to 3·2.

(b) Many candidates scored at least 1 mark here, for showing either 6·8 or 1·5 in their working. There were many answers of 19·48 or 14·23 with no working, showing a lack of awareness of the correct order of operations.

12 **(a)** Lower-scoring candidates struggled to deal with the difficult word formula. A significant number of the higher-scoring candidates worked out what to do, although some failed to score both marks as they gave an answer in pence rather than pounds. Some working out was seen in this question, and a number of candidates scored for showing a correct multiplication. Answers of 170 or 70 were common from candidates who just added some or all of the numbers seen in the question.

(b)(i) & **(ii)** The scales on the axes were found challenging here, with many candidates attempting to read off at the correct point on the graph, but being unable to interpret the value on the axis, with answers of 5·4 common in (i). The horizontal scale was found easier to interpret, and there were more correct answers seen in (ii).

13 This was reasonably well answered, with the most common error being answers of B and E, where candidates had just compared the lengths of the bases of the triangles and not the heights as well.

B274: Module Test M4

General Comments

Candidates seemed to have been entered at a level appropriate to their ability. There were very few completely blank or mostly correct papers. Most candidates seemed to have had adequate time to complete the paper.

There was little or no working seen in a lot of scripts and this sometimes prevented the awarding of method marks for the longer questions. Many candidates did not seem to use a calculator for Section B and this prevented them gaining some marks. The other main weaknesses were poor ability with number, as witnessed in Q.6(a), confusion between the terms factor and multiple in Q.1, and interpreting graphs in Q.8 in Section B.

Comments on Individual Questions

Section A

1 **(a)** This was usually correct though occasionally two answers were given.

(b) This was reasonably well done though many candidates did put the answer of 72, which would appear to be a misunderstanding of the terms multiple and factor.

(c) This caused many of the candidates to falter: they often gave the answer of 9, probably showing confusion between prime numbers and square numbers.

2 **(a)** A significant number used the length of the decimal as an indication of its magnitude and wrote 0·57, 0.075, 0.507 as the answer. Candidates who added the extra 0 to make 0.570 usually got the question correct.

(b) 57/100 was seldom found, with the vast majority of answers having 5 as a numerator and 7 as a denominator or an answer of 1/57. A few candidates wrote down 57% as a result of not reading the question carefully.

(c) Only a quarter of candidates correctly identified 40%. The rest tended to ensure they used the digits 2 and 5 so 25% was a very common incorrect answer.

3 **(a)** This proved a huge challenge for the majority of candidates with very few scoring both marks. Some did score for a correct reflection in a vertical line but many simply had no idea. The most common error was to reflect triangle A in the *x*-axis, scoring no marks in the process.

(b)(i) A few candidates did reverse the coordinates but on the whole R was plotted successfully.

(ii) Many did not seem to know what a parallelogram is, with a lot of candidates producing a trapezium. Quite a number of candidates plotted their S at either (2, 1) or (4, 1), being one square out horizontally.

(iii) Many correct or follow through marks were awarded here, with a few reversed coordinates seen.

4 **(a)** This proved a challenging question and few fully correct answers were seen. A lot of candidates wanted to put a numerical answer, often choosing their own number of oranges and finding the corresponding cost.

(b) As in (a), most candidates sought to have a numerical answer with little regard or understanding of the word formula. Often extra embellishments of *r* for red or *g* for green pens were seen.

5 **(a)** Explanations were often incoherent or incomplete but many did manage to find a correct answer here – usually expressing a '1/6 idea' either as a fraction or in words. Wrong answers usually tried to say there were not only 2 sides to the dice.

(b) Few candidates seemed to realise that a probability should be expressed as a fraction, decimal or percentage. Most incorrect answers tried to use the 50-50 idea from (a) or said there were 3 even numbers on a dice so it should be 3 out of 6.

6 **(a)(i)** Most candidates did choose the correct operation but few managed to carry it out correctly. Some got mixed up with pounds and pence. Few attempted the traditional method, with the grid method as the preferred option. In this method, candidates clearly knew how to use it, but many made arithmetical errors in one or two boxes such as 30 × 20 which was written as 60. A significant few recorded 36 as 3 and 6 rather than 30 and 6.

The Napier's Bones / Gelosia method was also commonly seen and most using it did so correctly, but again with arithmetical errors in one or two squares. However, the large majority of candidates did have a systematic approach to the calculation even if they made numerical errors. A few candidates attempted multiple additions and this nearly always ended in failure. Some candidates correctly found the £72 but then struggled to subtract 36p, presumably finding the difference in units difficult to handle.

(ii) The majority of candidates did attempt the correct operation though multiplying, subtracting and adding were also seen. Some wrote down the division the wrong way round. Some candidates did try the 'Bus Shelter' method but often they did not know what to do once they had arrived at the 1 for the tens digit. Some correct answers were seen with no working out at all.

(b)(i) All of Q.6(b) was well answered with this part nearly always correct.

(ii) Again nearly always correct with some candidates qualifying their answer with the year 2008.

(iii) Most candidates again scored well on this part with few errors seen.

(iv) A lot of fully correct answers were seen with several scoring 1 mark for either the 270 or the 130. A few candidates scored a special case mark for carrying out the correct procedure based on 2008 rather than 2009.

Section B

7 (a) There were a lot of fully correct answers seen here. Those who did make one slip, normally in the last term, were awarded one mark. Those who did not appear to have use of a calculator appeared to make the most errors. Sadly some candidates thought you had to add 5 rather than multiply by 5 (usually achieving 2, 7, 12, and 17) so again reading the question is an important skill.

(b) Most candidates answered this correctly in terms of the 30 stars but often their explanation lacked clarity or was incomplete. Those who drew a diagram to support their argument were usually rewarded.

8 (a)(i) This was mostly correct with 95 and 97 also seen. The most common errors were 98 closely followed by 93 both from misreading the scale of the graph.

(ii) Most candidates did not score here as they often opted for 'one hour' rather than looking for better accuracy. Some candidates also opted for 1.15 hours, failing to turn the 15 minutes into decimal hours. Some candidates gave Colin and Jean an enormous lunch time – up to 100 hours was seen.

(iii) This was not well answered as most candidates simply stated it was the fastest section, thus repeating the question, without reference to the steepness of the sections. Some thought BC was uphill, which made it the fastest section. Others thought the fact that line BC was the longest meant it was the fastest section.

(b) The correct answer for the speed was given quite often, with or without working. The common error was to do 126 × 3 = 378 mph: an unreasonably fast speed.

(c) Most candidates knew they had to add and then divide with many going on to collect 3 marks for a fully correct answer. Some got only as far as the adding to 39 and then did not know what to do. The SC2 mark was awarded a few times for candidates who failed to press = when they had their total before dividing by 6. A few candidates tried to find the median.

(d) This was rarely answered correctly and the conversion appeared not to be well known to candidates. Common errors of 4, 4000 or 20 were seen.

(e) Generally well attempted with candidates gaining at least 1 mark for 560: the idea of £80 per day for 7 days was generally understood. A common error was to do 1050 – 80 = 970. The correct answer was also seen with no working suggesting that calculators were used but nothing recorded. There were a few candidates who did 7 × 1050 = £7350, resulting in a very expensive break!

9 There was the usual confusion about area and perimeter here with a wrong answer of 19.8 often seen with or without units. Those who did know they had to multiply usually got the 22.4 but then often failed to include any units, and rarely the correct one. Again lots of answers without working were seen here at the risk of losing marks.

10 (a) A lot of correct answers were given here – some with the method shown but a lot of answers with no method shown. The common error was to subtract from 360 rather than 180°.

(b) Many candidates did get this right though the method mark was rarely awarded as many candidates showed no working out. A few candidates thought it had to be 77° as it looked the same as the other one, despite being not to scale.

11 Candidates who knew how to do trial and improvement generally scored well here with many full marks seen. Some were unsure whether 19, 24 or 456 was their final answer showing some confusion despite a good method being seen in the table. Others failed to "add 5", simply filling in their table with any numbers, sometimes managing to reach a product close to 456. Some candidates did get 2 marks for 2 correct trials without reaching 19. This was one of the most successful questions on the paper.

B275: Module Test M5

General Comments

Many candidates appeared unprepared for this paper. In Section A, questions that required fairly standard responses such as Q.1(a), Q.2(b) and Q.5(b)(ii) and (iii) were not well answered. In Section B, many failed to show the clear steps of working required to gain part marks on questions such as Q.8(b), Q.10(b) and Q.12(b)(ii). Questions that required some interpretation, such as Q.3 and Q.5(b)(i) left candidates struggling for a sensible response.

General suggestions for improvement include avoiding writing over wrong numbers, which can leave examiners in doubt about intended figures. Candidates should be advised to cross out any work which is to be replaced to make their intention clear. Working should be organised well and written down even when a calculator is used. Candidates should also read the question carefully and make sure they know what to do before answering it.

Specific areas that could be improved include: completing questions requiring drawing with a pencil and a ruler; rounding to 1 significant figure, including for estimations; writing down the measurements taken from scale diagrams (to gain partial credit if the subsequent conversion is wrong); considering the meaning of data in tables; and considering the meaning of statistical measures and not just the mechanics of calculating them. The latter two points will become particularly important for candidates for the new specifications, who will be assessed for quality of written communication and interpreting problems.

Comments on Individual Questions

Section A

1 **(a)** Many candidates were not able to round to 1 significant figure and gave the answer 190.

(b) Some good answers of 200 × 300 = 60 000 (or 190 × 300 = 57 000) were seen. Some candidates wrote 200 × 300 but were unable to evaluate this, stating answers such as 500 or 6000. However, the vast majority wrote 194 × 307 and attempted to evaluate this. In most cases the answer was wrong by a very large factor. A significant minority intended to add, subtract or divide the two figures and so scored no marks.

2 **(a)(i)** Many good answers using 3 and 4 were seen. Some candidates introduced numbers of their own but, where this happened, most fractions were not equivalent.

(ii) Few candidates knew that 20% = 1/5. In many cases, the response given was 1/20 or 1/2.

(b) Some very good applications of 'numeracy' methods were seen. However it was disappointing to see many candidates who could not work out 10% of £15 and then double this to obtain 20%. £30 was a common wrong answer, from 2 × £15 or 20 × 15. Some candidates showed good working, found the increase of £3 and added this to £15 to obtain £18. They were not penalised. However, some candidates simply wrote £18 without working and scored 1 mark only.

3 **(a)** Some candidates gave the correct answer of 20 but many gave the answer 6, presumably from counting the number of rows in the table, or 69, from adding the numbers of words on each line.

(b) Most candidates did not understand that the number of words on a line was being measured and not the frequency. Hence the common responses were either, '6 is not the mode, 2 is,' or 'The mode is the most common number and 6 only appears once.'

(c) Some sensible comparisons were seen inferring that Deepika may have had smaller writing or more words on a line and that Vipin's number of words on a line was more varied than Deepika's. Some candidates repeated the modes and ranges and made no comparisons. Some repeated that they used the same sized paper. Some said that Deepika had 'made it easier to understand' by using an easier table. A significant minority made no attempt to compare the writing and very few candidates made any reference to the range indicating 'consistency'.

4 **(a)(i)** Many good answers were seen. A frequent error was $a - b$.

(ii) Many good answers were seen, though $b + b + b + b - a$ was common. A common error was to write $b^4 - a$, which was awarded 1 mark for $-a$. Other candidates gained 1 mark for $4b$.

(b) Many candidates correctly answered 15 but a common error was 33, from adding the values. Some candidates wrote 24 − 9 but were unable to correctly evaluate this calculation.

5 **(a)** This was usually done well. Some candidates showed arcs. Many 'adjusted' their rulers so that the required triangle was formed. Some candidates drew one line of 8 cm and appeared to hope that the second line would also be 8 cm. A significant minority clearly did not have a ruler. Pen drawings were also common and this could cause problems when intended lines were changed.

(b)(i) Many candidates knew what was required but found framing a suitable response difficult. Some good answers referring to the symmetry of the shape or the sizes of its angles were seen. Common errors such as 'Two triangles don't make a square,' 'It's tilted over,' and 'She is not wrong,' were seen often. A strange misunderstanding of 'side' was also evident: many candidates said this could not be a square because it had five sides, mistaking the diagonal for a side.

(ii) Spellings of 'rhombus' were varied but rewarded if unambiguous. Common errors were equilateral quadrilateral, square, and parallelogram. Curiously, some said the shape was a rhombus in part (i) but then called it something else here. Kite, parallelogram and diamond were popular names.

(iii) 2 was often seen but 4 was a common wrong answer.

6 **(a)** The table was usually correct although an error that was often seen in weaker responses was to include impossible repeats such as AA, HH and SS.

(b) 1/6 was often seen but 2/12 was an error that revealed misunderstanding what was required. Most candidates used fraction notation but some candidates used 'in' or 'out of' and were penalised once. Few used ratio but these received no marks.

(c) This was less well answered and many fractions with denominators of 12 or 18 were seen.

Section B

7 **(a)** Generally answered well. A very common error was −2, 0, 2. Other common errors were −4, 0, 4 and −2, 0, 4 and 1, 0, 2. Candidates found the coefficient of 1/2 difficult to deal with.

(b) Many that scored in (a) usually drew the correct line although a few dropped a mark by failing to join up their points. There was a significant amount of inaccurate plotting of (4, 0). Many gained a follow through mark by plotting their wrong values in (a) although some candidates plotted points off the grid, not realising that they must have made a mistake.

8 **(a)** Even with working shown, most candidates struggled with this question. 8, 0.8 and 8/10 were all seen as common wrong answers.

(b) Far better answered than (a) with 2 marks often awarded. Quite a number of candidates used function machines successfully and a few were awarded 2 for embedded answers. Some candidates lost the second mark by showing a complete solution in their working but spoiling it by choosing 12 as the answer.

9 Many candidates found using a ruler accurately in this question presented them with a problem. Quite a lot of candidates gained a mark for 2.3 to 3.2 being seen either on the diagram or in the workspace but many stopped at this, not seeming to know what to do with their numbers. Some multiplied these lengths, with 7.5 being a very common answer, often with no other figures or working seen. Quite a number of responses gave 8, again, often with no working or measurements. Others converted correctly to metres but some then found the perimeter.

10 **(a)** Mostly correctly answered. Dockyard was seen a few times.

(b) This question was very poorly answered. Many students did not know how to find 21% using a calculator and the jumbled working, often involving 50% and 25% let a lot of candidates down. Many wanted to find 63% instead of 21%. There was some confusion between degrees and percentages with methods such as 21/360 × 800 000 seen.

11 **(a)** This question was done well by many candidates but a significant minority did not attempt it. Errors included: joining the 2 ends with a single line; extending top and bottom lines by 2 gaps then completing the shape to give rotation symmetry order 2; and adding 2 lines meeting at a point. Some felt they had to draw a 3-D shape on the isometric paper.

(b) This part was not often correct though nearly always attempted. A very common error was 90; 61 from measuring (slightly inaccurately) was also common. Other errors were 59, 80 and 300.

12 **(a)(i)** This question was fairly well answered. The most common error was 15 (from 5 × 3). Other errors were 625 (a multiplication too far) as well as 25 (a multiplication short). There seemed to be evidence from this question and 10(b) that many candidates did not have access to a calculator.

(ii) Many gained only one mark, giving their answer as 3.1 or 3.1(….). These were far more common than 3.2. Other common errors were: 3, misunderstanding decimal places; 5, from halving rather than square rooting; 1.0, from dividing by 10; and 100, from squaring. Again, a possible lack of a calculator may have lead to some of these errors.

(b)(i) This was poorly answered. Many candidates scored in (a)(i) but then got this wrong. Some errors seen were 6, 25, 60 and 150. Some candidates measured the drawing and multiplied the three lengths.

(ii) This question also had a low success rate, with candidates seeming not to know what to do. The correct answer of 55 was very rarely seen. Very few part marks were awarded for 6, 5 and 6 or 180 from finding the cuboid's volume. More marks were given for the alternative method of adding layers. The special case mark for 50 was very common as was the independent mark for 25. Sometimes 50 was supported with working such as 25 × 2 or 25 + 25 for a second mark. The independent mark for 30 or the special case mark for 60 were awarded less often. Other common answers, usually with no working, were 2, 2.5, 5, 6 and 10, often written with units in centimetres. Frequently the answer appeared with no working and so it was impossible to determine whether it related to their given answer in part (b)(i).

13 **(a)(i)** By far the most common answer was 4335 from subtracting instead of adding. Some responses just stated 4421 or 86.

(ii) Generally answered well. The most common error was 16 − 2 = 14. Other errors seen were −14, −16 or 58.

(b) Many got the idea it was either 4/6 or 6/4 and many went on to cancel correctly, so 1 or 2 marks were often awarded. 2(m) and 10 were common whole number answers. Other errors were 4/10 and 6/10.

B276: Module Test M6

General Comments

Overall the difficulty of the paper seemed appropriate. There was, however, a wide range of achievement with some candidates gaining very high marks and some gaining very low marks. Many candidates did make an effort to show their working and the trend here is improving.

In Section A the overall success seemed to relate to whether the candidates could successfully manipulate equations, but overall they could and most candidates did better on this section. Section B of the paper produced a wide range of results; some candidates scored high marks but there were also many inappropriately entered candidates scoring less than 5 and sometimes 0. It was evident that many candidates did not have the use of a calculator and this section required one for many questions.

Candidates generated problems for themselves by completing diagrams in pen so that they had difficult making corrections. Poor handwriting made it difficult for markers to ensure that the resultant explanations were given due credit and poor figures, especially 2, 4 and 7 also made work difficult to read. Candidates also need to ensure that decimal points are clear and obvious.

The presentation of processes was frequently haphazard and non-sequential. There were also very many cases where no working out was shown at all, although the answers given suggested that only slight slips had been made and method marks might well have been earned had the working been shown.

Comments on Individual Questions

Section A

1 **(a)** Many gained full marks with this simple reflection. Candidates appeared to have rulers and pencils. However some reflected it in the *y*-axis.

(b) Many candidates got one mark for the correct rotation with wrong centre - relatively few achieved full marks. The quality of drawings was generally good.

2 **(a)** This was not answered well. The need to divide 7 by 8 was understood by some, but most were unable to do this division.

(b) About half of the candidates answered this very well, although some did not attempt to simplify their fraction. The weaker responses often started by converting the two fractions to a common denominator of 20 but when multiplying did not multiply the two 20's, giving 20 as the denominator.

3 **(a)** This was found to be difficult and a common approach was to do $^{-}12 + 2 = {}^{-}14$.

(b) A great variety of different wrong answers were given for this question. Many could not cube the 2 and just multiplied it by 3 to get 6 so ending with 11 as the answer, or they did 2 × 2 = 4 then 4 × 4 × 4 and so on. Some candidates attempted to multiply by 2 too many times.

4 **(a)** This was usually well answered but some gave $\frac{1}{5}$ and others $\frac{2}{5}$.

(b) A very common error seen was to sum incorrectly to 0·49, achieved by 45 + 3 + 1 to 49; the answer would then be 0·51. Many clearly knew the method but they could not carry out the arithmetical processes correctly.

5 **(a)** A slight majority were in favour of Colin with correct reasoning, i.e. BODMAS / BIDMAS calling for multiplication first. A few worked through the arithmetic to arrive at correct answer i.e. 3 × 2 = 6, 6 + 4 = 10. Very rarely, candidates would justify their answer by explaining why Anwar was wrong. However some agreed with Anwar and explained so.

(b) Many gained full marks for this calculation and appeared to be happy tackling the bracket first. However although almost all found 8 from 14 − 6, the 3^2 was often 6 (= 3 × 2) or 27 (= 3 × 3 × 3).

6 **(a)** Many candidates set out their working very well and gained full marks. Lower-scoring candidates found this equation difficult because they could not deal with −3, or they divided 30 by 4 incorrectly. Trial and improvement was not attempted well. A common error was to do 27 − 3 = 24, giving $4x = 24$ and hence 24 ÷ 4 = 6.

(b) Only the higher-scoring candidates could achieve the fully correct rearranged equation. Although it was straightforward, lower-scoring candidates caused themselves problems because they did not set out their working properly or they tried to use a flow diagram. Some separated the two halves and added instead of subtracting, so $8x$ and 36 were seen.

7 Some candidates appeared to be well prepared for this question and the working was concise and correct. Most candidates knew they had to divide by 6, and usually got 2 marks, but many failed to get the final subtraction correct, often taking away from 48 rather than 40. Some divided 48 by 5 so created problems for themselves and others simply subtracted 48 − 25 = 23.

Section B

8 This was answered fairly well. Candidates were more able to use their ruler than their protractor, so if they gained 1 mark, it was usually for the length of the line rather than the measurement of the angle. It seemed likely that candidates had not measured the angle, but had tried to copy the given diagram, despite the 'Not to scale' sign. The angles that were incorrect were in the main 55 - 65°.

9 **(a)** Many answered this correctly, but there was a general weakness in using mathematical language. Some could see a relationship but failed to describe a trend and others failed to see what the question was asking, giving answers such as 'science marks are higher'.

(b) Most candidates were able to draw a line in-between the points given. A few lines were unruled and some attempted to join the dots.

(c) This was usually correctly answered within the tolerance given.

10 **(a)(i)** The most common error was to forget the stem and to give the answer as 7.

(ii) This part was generally answered well. Here the most common error was to write 2 − 45 or 45 − 2 and not work it out.

(b) The most common error was to choose 7C on the basis of a higher range. Many candidates attempted to perform some calculation on the figures or to see if the mean and range were close.

11 **(a)** This question was badly answered with a relatively small proportion of correct answers. The most common response was a few crosses on the grid. Some candidates plotted the points correctly, but failed to join them up. Others did not draw the line long enough as some pupils ignored the point at $x = 0$. A common response was to mark a cross at (2, 2); another erroneous response was to draw the line $y = 4$.

(b) Most students who had drawn a line were able to follow through to this answer. A number calculated the answer from the equation. Some calculated 12 by substituting $x = 5$ into the expression.

12 **(a)** Most candidates achieved 1 mark for this if they wrote down any correct partial working. However rounding their answer to 2 decimal places was less well done. The most common error was to take 39·69 then to divide by 15·8 and then add 9·7.

(b) The most popular wrong answer was 5 hours 40 minutes; however some candidates did 5.4 × 60 = 3 hours 24 minutes. Centres and candidates should be aware that the 'degrees, minutes and seconds' button on a scientific calculator
[° ' "] can be used to do these conversions simply.

13 **(a)** There were a small number of completely correct answers here. Those who calculated the correct area often omitted the units or got them wrong. The most common wrong answer was 102.92 from forgetting to divide by 2. Some added the lengths. There were also some calculations involving Pythagoras' theorem.

(b) There was some confusion of area and circumference formulae, with lots of random squaring and halving. However some candidates achieved the correct answer.

14 **(a)** As expected, some continued beyond the correct answer to get an answer of $12x$, and others attempted to solve the 'equation' to find a numerical value for x. Some multiplied the first term but not the second and gave $4x + 2$, or $4x + 6$.

(b) This was less well done than part (a). A very common answer was $21x$. Those who did factorise often gave an answer of $6(x + 2{\cdot}5)$.

15 **(a)** This was very disappointing. Some gained the mark for 360 ÷ 6 but then could not continue, or gave 120 as the answer. There were quite a lot of 45's and 90's seen.

(b) Many gained the mark for the reason of equal sides. Poor use of language hampered candidates in explanations regarding angles, and they usually said that the angles were equal, which is not sufficient.

B277: Module Test M7

General Comments

The paper overall proved to be appropriate for the majority of candidates. There was a wide range of ability demonstrated, with some candidates scoring full marks and others struggling with the content for this module, and attempting only a few of the questions.

Work was generally well presented but there was a wide variety in the amount of working shown. On multi-mark questions, candidates should ensure that appropriate working is shown in order to gain part marks and in some cases full marks.

Topics where candidates were more successful included percentage reduction; mid-point of a line; describing correlation; ratio; solving equations with brackets and calculating an estimate of the mean. The topics which were frequently badly answered included: reciprocals and evaluating problems with indices; angle calculations and circles; inequalities; volume of a cylinder; using Pythagoras' theorem and calculating average speed.

All candidates had time to complete the two sections of the paper.

Comments on Individual Questions

Section A

1 **(a)(i)** & **(ii)** The majority found this question challenging and although in part (i) many were able to calculate the square root of 49 correctly, fewer were able to calculate 4^3. A common error was an answer of 5 from 12 – 7 but there were many other incorrect values for 4^3 used. In part (ii), some were well prepared and sensibly used rules of indices correctly to arrive at 5^2 but often did not then complete the evaluation to 25. Many others tried longer calculations involving long multiplication and division and often made arithmetic errors. A common error was to give an answer of 12 from $\frac{20 \times 15}{25}$.

(b) This was poorly answered; most did not understand the term reciprocal. Common errors included 64, 4, 0.8, −8 and 8/1. Some attempted factor trees. About 15% of the candidates omitted this question.

2 Most candidates made an attempt at this question and although some had a reasonable idea, they were often unable to explain their reasoning clearly. Answers such as 'the answer should be smaller' in the first part or 'dividing by a decimal is the same as multiplying' in the second part were examples of this. The higher-scoring candidates referred in the first part to the fact that multiplying by a number less than one should reduce the outcome and were more precise in their explanations. There were several incorrect comments concerning multiplying or dividing by 0, less than 0 or a negative value. Some used approximations of the values to explain the problem and this was acceptable, provided the rounded values used were shown and a correct conclusion was made relating to the outcome.

3 This was attempted reasonably well. The more successful candidates attempted to find 10% of 140 first before doubling this and then subtracting from 140. A few made an error at this stage and did not score because they did not explain how to find 10% of 140. Some found 10% but then made errors in doubling this e.g. 10% = 14 then 2 × 14 = 24. Some left answers as 28 and did not subtract from 140. Other candidates attempted multiplication methods such as 0.2 × 140 or 0.8 × 140 and although this scored method marks, arithmetic errors often cost the final mark. A few had little idea of how to find 20% of 140 and attempted, for example, to divide 140 by 20.

4 High-scoring candidates had little difficulty with this question and gave the answer (1, 3) with the minimum of working. Others preferred to draw a grid and sketch the problem but this often led to inaccuracy. Many were successful in obtaining one of the ordinates. Very few candidates showed the method of finding the mean of the x and y co-ordinates. Common errors included (2, 6), (2, 4), (1, 2.5) often from a sketch or what appeared to be random working.

5 **(a)** Very well answered. Almost all used the word positive, although there were many spelling errors. A few chose to describe the relationship between diameter and height and not the correlation.

(b) There were many good answers referring to this tree not fitting the trend shown on the graph or having a height to tall for its diameter. Some used the terms 'outlier' or 'anomalous result'. There were other vague responses such as 'It is too tall to be an oak' (no link to the diameter for this tree) or 'the taller the tree, the larger the diameter' (no link to why this tree is not an oak).

6 **(a)** A number made errors in the evaluation of $t = 2$ and $t = 4$ in the formula $h = 5t^2$. Common errors for $t = 2$ were 25, 100 and 35 and for $t = 4$ were 75, 200, 400 and 85.

(b) Most candidates scored 1 mark for plotting the points correctly although a significant number did not plot the point (0, 0). However many did not attempt to join the points. Some drew ruled lines between the points rather than a curve and others incorrectly attempted a line of best fit.

(c) This was often correctly answered either from a curve or from estimating between points. Common errors included using an incorrect line to read the estimation.

7 Answers to this question were varied. Some showed clear working and obtained the answer 65° with all steps shown. Others obtained 65° but did not show any working or reasoning as required. Weaker responses showed evidence of not understanding three letter angle notation (though ∠CDA was marked on the question paper to aid candidates) and attempted to draw a triangle from C to D to A before looking for the 3 angles of that triangle. There was also a tendency to use one-letter descriptions of angles in working which led to confusion. Some considered ∠CDA as alternate to ∠OCD and gave the answer 25°. Most candidates were able to mark 25° for ∠CDO or 90° for ∠ADO or ∠BDO on the diagram for which they gained credit.

8 **(a)** A full range of answers was seen to this question. Many obtained the value 4 but often without the correct inequality and answers of $x = 4$ were common. Some listed integer values on the answer line e.g. 4, 3, 2, 1, 0 without ever solving the inequality. Others made errors in collecting the numbers giving $3x \leq 8$ and they were not able to make further progress.

(b) Candidates answering part (a) correctly were often successful and a follow through mark was available provided an inequality was given in part (a). Examiners expected the correct notation to be used i.e. a dot or circle on the value 4 with an arrowed line to the left. In this instance there was no penalty for those who showed an open, unshaded circle. A number of candidates did not use the correct notation; others did not interpret the inequality correctly and drew an arrowed line to the right.

Section B

9 There were many correct answers to the ratio question. The most common error was to divide by 8 rather than 9 to obtain the red paint. A few tried to build a ratio where the parts made 31.5 but were not in the ratio 1 : 8. Some other candidates gave reversed answers.

10 (a) Many candidates were successful in expanding the brackets and then obtaining the correct answer. The usual approach was to expand the brackets first before collecting numbers on the right hand side. Some made errors in expanding the brackets with $20x - 7 = 50$ and $9x - 35 = 50$ sometimes seen. Candidates making these errors often went on to solve their equation successfully for which they were given credit. Some made errors in collecting the numeric terms $20x = 15$ was often seen. Some used trial and improvement, often successfully, to obtain the answer 4.25 – this approach was rewarded only when the correct answer was obtained.

(b) Many candidates were successful with this part as well. Some favoured the table approach to the expansion, others simply showed the 4 terms. The most common error was to give the product of 2 and 5 as 7 rather than 10 and some candidates gave answers of $x^2 + 10$, not considering the inside and outside products of the terms in the brackets. Many candidates obtained $x^2 + 2x + 5x + 10$ but then went on to simplify incorrectly. On this occasion they were not penalised as the question did not ask for simplification, but this type of error was common and it would be penalised on a higher module.

(c) This part was less well done. Candidates that added 5 to both sides of the formula as their first step invariably went on to give a correct answer. Some did not divide the expression $y + 5$ by 3 but showed $y + 5/3$ which was ambiguous. Some candidates simply swapped the x and y in the formula.

11 (a) Many candidates were well prepared for the estimated mean and showed clear working using the mid-interval values of each class to multiply with the frequencies to find an estimated total before dividing by 100. Some obtained the estimated total 6470 but then divided by 5 (the number of rows on the table) or 325 (the sum of the mid-interval values). A few showed the complete correct method but then gave an answer of 647 from $6470 \div 100$. Others made errors in the mid-interval values and used either the upper or lower values of the intervals. For lower-scoring candidates, the sum of the frequencies (or mid-interval values) divided by 5 was the most common error seen.

(b) Many correctly obtained the value 34 as the number of athletes weighing over 70 kg. Fewer were able to give this as a probability. Common errors included answers of 34, 34/66, 25/100, 2/5, (from the intervals on the table) or answers in the form of odds or ratio.

12 **(a)** This was a challenging question for most candidates. Many appeared to be unaware of the method for finding the volume of a prism and this was further compounded by a weak knowledge of the formula for finding the area of a circle. Those who recognised the involvement of π in finding the area of the circle often confused the area and circumference formulae. Some used the correct formula for area of a circle but substituted the diameter instead of the radius into the formula. Most using a method involving π did try to multiply their area by the height of the cylinder, 1.2, for which they were given some credit. The weaker responses often showed $1.2 \times 0.5 = 0.6$, and the other common incorrect answer was 1.884 from $\pi \times 0.5 \times 1.2$. Some of the higher-scoring candidates who understood the method rounded the area of the circle prematurely to 0.2 before multiplying by 1.2 to find the volume. It is advisable to retain full calculator accuracy until the final answer.

(b) Many candidates did not make use of Pythagoras' theorem to find the length of the diagonal shown in the drawing. There were many worded explanations that involved areas or combinations of figures using 0.5 and 1.2, e.g. 0.5 + 1.2 = 1.7, and these were invalid. Those who used Pythagoras' theorem usually had little difficulty in showing that the length of the diagonal was 1.3 and using this to justify why the rod would not fit. An occasional error for those using Pythagoras' theorem was to arrive at 1.69 by adding the squares of the lengths but then not square root and then explain that the rod fits.

13 This question produced a wide range of answers. Many candidates understood that the speed was calculated by dividing the distance by the time, but most were unable to convert the time of 3 hours and 45 minutes to 3.75 hours. An answer of 12.2 from $42.195 \div 3.45$ was quite common. Some worked in minutes and used 225 minutes but then the majority did not convert back to hours giving answers such as 0.187 km/h. Lower-scoring candidates often divided the time in minutes by the distance to give an incorrect answer of 5.33.

B278: Module Test M8

General Comments

The full range of marks was achieved on this paper, with candidates finding Section A easier than Section B. Topics confidently done by many candidates included working with fractions, probability, moving averages and drawing a cumulative frequency graph.

Although there were many strong candidates, it was sad to see some candidates being entered for M8 who found virtually everything being tested beyond them.

Comments on Individual Questions

Section A

1 **(a)** Most students attempted to use a common denominator in adding the fractions, but many made mistakes either with converting the original fractions to an improper fraction or in forgetting to add 2. Failure to simplify the final answer was common (eg $3\frac{3}{18}$ or $\frac{19}{6}$). Possibly more candidates dealt with the whole number and fractional parts separately rather than using top-heavy fractions. Most tended to use denominators of 12 or 18 rather than 6.

(b) In multiplying the mixed numbers, most candidates managed to write $\frac{5}{4} \times \frac{16}{3}$. Whilst many then correctly obtained $\frac{80}{12}$, some candidates needlessly converted to a common denominator of 12 and then often continued with the error $\frac{15}{12} \times \frac{64}{12} = \frac{960}{12}$ or attempted addition, obtaining $\frac{79}{12}$ despite writing the × symbol. The weakest responses dealt with the whole numbers and fractions separately, resulting in $5\frac{1}{12}$. A few candidates turned one the fractions upside down as if attempting a division problem. Many candidates left their answers in an unsimplified form.

2 **(a)** Candidates often drew 'rays' from (0, 3) and produced an acceptably accurate enlargement, although some did not use the scale factor correctly. A common error was to use (3, 0) as the centre, whilst others producing a correctly sized triangle from an incorrect centre often had the right angle at (0, 3) or used the origin as the centre.

(b) Fully correct answers were very rare. Many gained the mark for centre (0, 3) but almost all candidates gave the scale factor as 2·5 or −2·5.

3 **(a)** High-scoring candidates for the paper generally gained this mark. A few gave $4{\cdot}2 \div 10^3$. Common incorrect answers were $4{\cdot}2 \times 10^4$, $4{\cdot}2 \times 10^{-4}$ and $4{\cdot}2 \times 10^3$.

(b) Again high-scoring candidates often gained both marks here. Some failed to use standard form in their answer and left it as 90 000. Virtually all candidates appeared to attempt to convert the given standard form numbers into full ordinary form, perform the addition and then re-convert their answer, rather than have the confidence or ability to convert $8{\cdot}4 \times 10^4$ into 84×10^3. Many were unable to convert $8{\cdot}4 \times 10^4$ into ordinary form correctly and consequently obtained final answers starting with the digits 846… or 144…. A few thought they needed to multiply and gave answers starting with digits 504.

4 **(a)(i)** In solving the equation in part (i), most candidates successfully expanded the bracket. The collecting of terms was less successful with many obtaining ± 5 rather than 7. The final step from $ax = b$ sometimes led to $x = {}^{a}/_{b}$, perhaps because the candidates were insecure about having a non-integer solution. For instance, those who correctly obtained $5x = 7$ were not always able to complete the last step correctly, with the answer 1·2 being a common error. Follow through method marks rewarded those who had the right idea but made errors.

(ii) In solving the inequality in part (ii), many obtained one mark for obtaining 3·5 but often the inequality symbol had been replaced with equality. From the given $3x - 7 > x$, the candidates who gathered x terms on the left side (where there are most) were more successful. Some weak responses used a form of trial and improvement, with very limited success because of the non-integer critical value.

(b) A pleasing number of candidates achieved full marks or at least suggested factors of $(x \pm 1)(x \pm 4)$. The most common responses worth no marks were $(x \pm 5)(x \pm 1)$ and $x(x - 5) + 4$.

5 **(a)** This was generally answered well. Most incorrect answers were B, showing a lack of knowledge that the coefficient of x is the gradient and not the intercept.

(b) This was much less successfully answered. Answers of 'D and E', and 'B and E' were particularly common, again showing a lack of knowledge about the general characteristics of $y = mx + c$.

6 **(a)** The tree diagram was completed very well, even by lower-scoring candidates. The most common error was to put shopping instead of cinema or reverse the comments. Some worked out $(1 - 0{\cdot}1)$ as opposed to $(1 - 0{\cdot}3)$ or gave 0·6 as the probabilities.

(b) Most candidates identified the correct branches and knew that they needed to multiply the probabilities, but sadly $0{\cdot}1 \times 0{\cdot}7 = 0{\cdot}7$ was seen very frequently, and consequently those who failed to show their working often scored 0. Those who changed it to $\frac{1}{10} \times \frac{7}{10}$ had more success.

Section B

7 **(a)** This question was done well by only the highest-scoring candidates, with the majority not recognising the 'reverse percentage' nature of the question. The most common attempt was to multiply 75560 by 1·35, but multiplication by 0·65 was also common. Other attempts included multiplying by 1·65 and dividing by 0·35.

(b) This part was done much better with most candidates recognising the 'compound interest' situation. A few compounded for 4 years; others did simple interest; others still reduced instead of increased; and a small number multiplied by 1·4. The arithmetic was generally done accurately, some going the direct route by finding $75560 \times 1{\cdot}04^3$, others by finding the value after successive years, although many had the number of geese to several decimal places!. It was sad to see a few floundering with 'non-calculator methods' in a paper where calculators are required.

8 This question was done well on the whole, with many gaining both marks, though some candidates chose the wrong values from the table. A few candidates seemed to be well versed in finding moving averages for groups of four values (perhaps confusing this calculation with quarterly moving averages); a significant minority seemed to have no idea about what to do.

9 The majority of candidates failed to solve the simultaneous equations completely correctly. Although most seemed to understand that they needed to equate the coefficients of either x or y in order to eliminate one of them, they failed to do this accurately. A few candidates used $2 \times 0 = 2$, or $3 \times 0 = 3$. The combining of the equations to achieve the elimination was done particularly poorly with most errors stemming from the signs. The presence of the 0 on one side of the second equation made it difficult to be sure of candidates' intentions and as a consequence the marking scheme treated them generously, although marks for accuracy were lost all too often. However, most candidates did make some sort of algebraic attempt, with only a very few candidates trying to reach the answers purely by numerical methods – probably because the solutions were not integers.

10 **(a)** This was answered very well by many but some had no idea at all what to do and involved the 1·7 and 18·5 together in calculations with no reference to trigonometry. Some quoted 'SOH CAH TOA' but opted either for sin or cos, or even did nothing further.

There was an alarming amount of poor calculator use, with $\tan 34 \times 18{\cdot}5$ leading to 57·28... etc. Many calculator models need $\tan(34) \times 18.5$ etc (or $18.5 \tan 34$) and so candidates should be encouraged to be really familiar with their own model before entering an examination, and also to estimate before picking up the calculator. A significant number forgot to add on the height of Hassan's eyes above the ground.

(b) The drawing of the cumulative frequency graph was usually done well. A few candidates plotted the points at the mid-interval values rather than at the end of the range or drew a bar chart. The points were usually successfully joined by a curve or by line segments.

Finding the median was not done well and many of the problems were caused by the candidates' failure to read from the scales correctly. As a consequence, answers in the range from 13 to 14 were very common. Another common answer was 62.

Poor reading from the graph also affected the last part. Readings at 19 and 16·5 seemed to be more common than at 18. Not many knew what to do with their number of trees at 10 m and 18 m. Of those who subtracted correctly few went on to involve the 90 trees and calculate the percentage correctly.

11 There were some candidates who tried to base an argument on lengths, others who considered the angles, but very few used both. So full marks on this question were very rarely given. A large number of candidates were unable to come up with any valid reasons, with many simply talking about enlargement, equal angles, or rotation without being specific. In considering the lengths, many arrived at the scale factor as being 1·5 (or very occasionally as 2/3), though not all of them used both relevant pairs of lengths; some showed no working at all. A few candidates showed that the ratio of the adjacent sides was the same for both triangles. When dealing with angles, many candidates made imprecise statements, for example saying all the angles are the same or that the opposite angles are the same. Their answers lacked enough precision to gain the marks. Some thought the lines were parallel and talked about alternate or corresponding angles.

B279: Module Test M9

General Comments

A full range of marks was seen on this paper. Some candidates appeared to have been inappropriately entered for the module, as they were clearly not familiar with basic algebraic manipulation or the use of trigonometry, for example, which are topics developed from earlier modules. The probability and bounds questions were well answered.

Questions which asked candidates to show that a statement was true, or to explain or justify a solution, were not generally well answered. Candidates need to consider the evidence that they need to supply and then provide concise mathematical explanations. Similarly, candidates found describing a difference between two distributions difficult and tended to rely on comparing just one group. Candidates appeared well equipped, and demonstrated competent calculator use in Section B, although some failed to use a ruler for the histogram..

Comments on Individual Questions

Section A

1 **(a)** Almost all candidates completed the tree diagram correctly. Some changed the decimals into fractions.

(b) Most candidates identified the two correct products but there were many errors in dealing with the decimals. Those who changed to fractions in (a) made fewer errors than those working with decimals. A common error was to evaluate 0.4 × 0.7 as 2.8, and similarly with 0.6 × 0.3 leading to an answer of 4.6. Other incorrect calculations included 0.4 × 0.7 = 0.21 and 0.4 × 0.7 = 0.028. Weaker responses tended to consider only one of the possible pairs or, having identified the correct pairs, added the two probabilities for each pair or, on occasion, multiplied all 4 probabilities together. Some candidates did not appear to realise that their answer had to be less than 1.

2 **(a)** A range of responses was seen to this question. Many candidates reached 25 $\times \frac{1}{25}$ but this did not always lead to the answer 1. Common errors were 625, 1/625 and 25/625 . Lower-scoring candidates often interpreted 5^{-2} as −25 or −1/25. Other candidates used addition of indices but 2 + ¯2 = 0 was often followed by 5 or 25 or 25^0 as the answer.

(b) About a quarter of candidates gained full marks. A further third of the candidates reached 5^4 or 625 but were unable to deal with the fractional index. Some failed to complete the evaluation and gave the answer as 5^2 or $\sqrt{625}$. Some lower scoring candidates cancelled the 5s and so reached 1^4 or interpreted 5^9 as 5 × 9 and reached 45/25.

3 **(a)** The majority of candidates ignored 'the square' and so C = 20r was a common wrong answer. Those who started correctly with $C \propto 20r^2$ often kept the proportion sign throughout. A significant number were unable to evaluate 80 ÷ 16. Those who found k = 5 often did not substitute to reach $C = 5r^2$.

(b) Those who scored at least 1 mark in part (a) usually got 245 for (b). The most common answer was 140 from direct proportion.

4 Just over a quarter of candidates gained full marks for this question but most others gained at least one mark. Those who failed to score generally started by subtracting one area from the other. Candidates did not lay out their solutions clearly and it was often difficult to see the method used to reach the answer. A significant number reached 20 and then converted to 5%. The alternative method, which found 3 million as a proportion of 60 million in stages, also led to 5% in most cases though errors in zeros often gave 0.5% or even 50%. Many candidates divided the area of Australia by the world area or vice versa. With the first method errors tended to arise in the division and with the second candidates failed to proceed beyond 20. Many elected to work with ordinary numbers, rather than staying with standard form, and this often led to inaccuracies in the number of zeroes attached.

5 **(a)** Almost all candidates scored at least one mark but some then made errors in signs and/or arithmetic and/or omitting the 'squared'. Candidates using the grid method appeared more likely to give the correct $6x^2$ and -2 rather than the errors of $6x$ and -1.

(b)(i) Only the very highest-scoring candidates knew that all they needed to do was to equate their quadratic from (a) to 33. Many tried to solve the equation at this stage.

(ii) Just over half of the candidates scored in this part but comparatively few found the correct factors of $(2x - 5)$ and $(3x + 7)$. The most popular variation seemed to be $(6x + 1)(x - 35)$. Those who got the correct factors often forgot the $2x$ and $3x$ when solving so gave answers of 5 and -7.

(iii) Less than a quarter of candidates scored in this part. Many candidates had no values of x from part (ii) to use and so did not score. Those who had two values often substituted inconsistently and regardless of sign. Some made no use of their factorisation, so gave answers of 11 and 3.

6 **(a)** Almost half of candidates scored full marks for this part and a further third gained 1 mark for describing the intercept. Many failed to score the second mark despite recognising that the gradient should be 4, because they did not evaluate it by quoting 8 and 2. 'One along and 4 up' was a common incomplete response. Only a small proportion used the alternative method of substituting the coordinates of the two points into the equation.

(b) About a quarter of candidates knew that the product of the gradients should be -1 and so reached a correct equation. However it was sometimes impossible to judge whether the x was in the numerator or the denominator. A surprising error was the omission of the x in the final equation. A significant proportion of candidates gained 1 mark for $-4x + 3$ or $\frac{1}{4}x + 3$.

Section B

7 About a quarter of the candidates gained full marks with clear, well presented, correct solutions. A further third gained part marks for correct steps in their solution. The common problem was the failure to cope with the fraction. Many realised that they needed to multiply by 5. Some made errors in multiplying only the LHS. Others multiplied the RHS by 5 but omitted to multiply one or other of the terms. Having made that error, such responses reached $(2 - 2)m$ and sometimes gave this as m. Weaker responses simply transferred the 7 or the $2m$ from the RHS to the LHS. Marks were also lost by candidates who finished with $8m = 3p + 35$ or failed to simplify $10 - 2$. A significant number of lower-scoring candidates ended up with a formula involving m on both sides.

8 The majority of candidates gained full marks. Most used the correct upper bounds with few incidences of 4.249 etc, though some did use 4.24. Some found the volume using the given measurements then tried to find the upper bound of their answer and some added rather than multiplied the upper bounds.

9 **(a)** Just over half of the candidates gained full marks. Calculator work was good with only a few calculating $49 \times \sin 6.4$ and there was very little sign of 'grad' or 'rad' settings being used. The most common error was $6.4 \times \cos 49$. Some failed to recognise the need to use trigonometry in this question, sometimes using Pythagoras' theorem involving the 6.4 and 2.8.

(b) A similar proportion of candidates scored full marks in this part and a significant number scored part marks, following through their answer to (a). In general candidates were able to cope with using inverse tangent.

10 Most gained the mark for $x = 146°$ and about a half gained the related mark for geometric reasoning. Other candidates did generally realise that 2×73 alone was insufficient but many did still fail to give the circle theorem, tending to write that the angle at A is double the angle at the centre. Others lost the mark for the use of edge instead of circumference, for the use of origin for centre or for quoting 'the arrow theorem'. A few gave the value of x as 214° so did not appreciate that they were looking for the obtuse angle.

Over a half of candidates scored for $y = 34°$ but reasoning was weaker in this part. Various methods were possible but the most successful was when candidates used the 90° angles and sum of the angles of a quadrilateral to reach the 34°. The majority stated that the angles at B and D were 90° but did not always fully justify their statement. Some quoted 'opposite angles of a cyclic quadrilateral add up to 180°' without justifying the cyclic quadrilateral. Those using the isosceles triangles generally did not score full marks because they did not identify the equal sides. A few examples of the use of the alternate segment theorem were seen.
The most common incorrect answers were $y = 73°$ with the explanation that $\angle BAD = \angle BED$, $y = 107°$ with $\angle BAD + \angle BED = 180°$ or obtuse $\angle BCD$ is double $\angle BED$.

Overall, few candidates set out their working clearly. Many wrote rambling essays rather making concise mathematical statements.

11 **(a)** About half scored full marks for the histogram and a further quarter just made one or two slips with the frequency density. Almost all candidates attempted a histogram, although some lower-scoring candidates were unable to calculate frequency density.

(b)(i) The majority of candidates scored at least one mark but some did not show the individual frequencies. Errors often occurred in the fourth and last classes usually after mistakes in reading the scales rather than wrong methods. Some weak responses just added the heights of the columns.

(ii) The majority of candidates did not score because they commented on one interval only, usually 25 – 40 but sometimes other intervals. Some found both total populations but saying more people lived in Haringey did not 'compare the distributions'.

12 Only a fifth of candidates gained full marks. The most common answer was 800. Most candidates appreciated that a scale factor was involved but many appeared not to realise that they had to apply the volume factor to find the capacity. Some used the square of the scale factor. Only the higher-scoring students used 1.6^3 and a few of those did not gain the final mark because they multiplied it by 32 not 500. Some worked out 1.6^3 but rounded it before multiplying by 500.

B280: Module Test M10

General Comments

Examiners felt that the general standard l of the questions on both sections was appropriate. There was no evidence to suggest that candidates had insufficient time to complete the paper with the majority attempting all questions. In general, candidates were more successful in Section A.

Q.9 (trigonometry), Q.10 (equation) and Q.11 (volume) proved a step too far for many of the candidates. Overall there was a wide range of achievement on this paper with roughly equal numbers gaining low marks as gaining high marks. Some poor presentation, particularly in questions involving equations, led to the loss of marks for some candidates. Numerical work involving fractions was surprisingly poor.

Comments on Individual Questions

Section A

1 **(a)** This was very well answered with the majority getting full marks, often without showing any working. For the rest it was clear they had been taught the method but could not apply it with accuracy, often multiplying by 10 or 1000 rather than 100. Common errors included $100x = 73$ leading to $x = 73/100$.

(b) Over half of candidates were awarded both marks. Of the rest, most managed the root, much fewer the reciprocal. So 6 and −6 were common. Some got $\sqrt{36}$ in their answer but didn't evaluate it. To some $36^{\frac{1}{2}}$ means $36 \times ½$ and so 18 was often seen.

(c) Although some good answers were seen, candidates generally achieved less success on this part of the question. Some used the multiplication square whilst others multiplied straight from the brackets. Common errors included $2 \times \sqrt{5} = \sqrt{10}$ and $-2 \times -2 = -4$. Roughly one third of candidates scored no marks.

2 **(a)** Many candidates realised that the first bar represented 28 students but were unable to correctly find the frequency density. So answers like $28 \div 40 = 0.7$, $28 \div 2 = 14$, 28 and others were seen quite often. Over 80% of candidates failed to achieve this mark, with many having no idea of what to do.

(b) The vast majority of candidates suggested Year 11 but only half could justify their answer with an explanation. Incorrect responses tended to refer to a time of 50 seconds, or values on one side, rather than to the times surrounding 50. Some referred to a higher frequency density without any reference to times at all. Many thought the group 50-55 was actually 50 and referred only to that group, often saying that there were 37 in Year 11 with 50 seconds. A significant number of candidates referred to range and a few to average.

3 **(a)** This was more often right than wrong. Occasionally **a** – **b** was seen, occasionally just **AB** and sometimes a Pythagorean root involving **a** and **b**.

(b) Less success was achieved in this part. All too often the idea of dividing by 4 was there but no brackets were given, leading to ¼ **b** – **a**. Another common error was to give an answer but not in terms of **a** and **b**.

(c) Roughly one in three candidates achieved both marks. About the same number earned one mark for identifying a correct route such as **a** + *their* (b). Many were confused with vector notation, for example, often mixing AB with **a** and **b** or giving answers such as **a** + ¼**ab**.

4 **(a)** Roughly half of all candidates scored full marks with many showing minimal or incorrect working. Consequently it was rare to award 2 marks in cases where the constant term was incorrect. The figure 4 featured in the majority of brackets with the most common error being to use 8 or even retain the x to give $(x - 4x)^2 - 6$. There was a variety of constant terms such as 10, 16, 26 etc.

(b) Those candidates who had (a) correct often achieved this mark with others earning the follow through mark. However some could not apply the work in (a) to answering (b). Some failed to connect (b) to part (a) and started again, usually with little success.

5 About one in four candidates could eliminate a variable (almost always y), collect the terms, factorise the quadratic and obtain correct solutions. For the rest a variety of errors lost the marks. The first mark was almost always earned, with only the lowest-scoring candidates failing to do so. Many errors were seen when rearranging terms with negative signs. Collecting terms and obtaining a positive x^2 term usually led to successful factorisation, but obtaining a negative x^2 term often led to errors with the signs in the brackets. Lower-scoring candidates did not realise that terms need to be collected on one side and it was common to see attempts at finding the square root of each side.

6 About 50% of candidates obtained a fully correct solution, some with the use of a tree diagram whilst others just listed the appropriate outcomes and carried out the necessary calculations. For the rest a variety of errors were seen. Many experienced problems with the multiplication of two fractions and $\frac{6}{10} \times \frac{5}{9} = \frac{35}{90}$, $\frac{3}{10} \times \frac{2}{9} = \frac{5}{90}$ and $\frac{1}{10} \times \frac{0}{9} = \frac{1}{90}$ were very common errors. Some made heavy weather of multiplication by rewriting the fractions with common denominators first. This frequently led to errors. Another common error involved picking the counters with replacement. Several candidates reduced the number of counters in the bag by two and so calculations such as $\frac{6}{10} \times \frac{4}{8}$ were also seen.

Section B

7 **(a)(i)** This was almost always correct. A common error was an answer of 18·7.

(ii) Most candidates were awarded at least one mark. The plotting of the points was good, though some candidates made one or more errors by taking the vertical scale as 1 small square for 1 gram rather than 2 grams. Most candidates attempted to draw a smooth curve through their points (joining the points with straight line segments was counted as an error) but the quality of the curves produced was often poor. There were some excellent graphs, of exemplary smoothness, drawn with a sharp pencil, and passing precisely through the plotted points; but there were also some very poor attempts where the 'curve' was a very thick line or was not at all smooth or missed some of the points by some margin.

(b) Roughly 75% of candidates were able to read from the graph correctly. For the rest it was common to see a misinterpretation of the horizontal scale leading to answers such as 5·6 and 7.

8 **(a)** Many correct descriptions were seen. Some candidates wrote about the number of fish rather than their weight, but most said there was a decrease and then an increase. There were some very brief answers such as 'decreased then increased' and also more descriptive ones indicating the gradual decline in the weight of fish followed by a significant decrease and then a rapid increase although not to the original weight. A few candidates only mentioned the decrease in weight and some explained that 'the moving averages show what happens to the weight of fish'. A small number described the graph of the annual data.

(b) Less than 20% of candidates managed to earn both marks but the vast majority failed to gain any marks at all. Many answers used the four correct weights, adding them and then dividing by 5 to give 735.8 and many added in 976, divided by 5 and gained the answer of 931. There was a lot of dividing various groups of numbers by 3 or 4. Sometimes the correct method was used but either a moving average outside the range was chosen or no moving average was equated at all.

9 **(a)** Any candidate who recognised the need to use the sine rule usually went on to gain all three marks. For the rest of the candidates the majority were awarded no marks. Some lost the final mark by prematurely rounding off the values in the calculations too early which led to an answer outside of the acceptable range.

(b) Fewer candidates knew what to do in this part and was clearly reflected in the marks awarded. Over half of the candidates earned no marks. However, many found it straightforward, and those who knew the formula usually carried out the required calculation correctly. A few candidates used a wrong side or a wrong angle, or even worked in the wrong triangle, in this part.

10 Less than 10% of candidates earned all seven marks. Most candidates were able to gain at least 1 mark for $3(2x - 1) + 4(x + 2)$. Some were able to clear the denominator, but their algebraic manipulation frequently included errors and led to the loss of further marks in obtaining a quadratic equation. Many created a linear equation from their manipulation thus losing the subsequent marks for solving. Those who gained no marks usually started the work by adding 3 and 4 and using 7 as the numerator.

There were some excellent solutions, but it is important to write down full working so that marks can be awarded for methods after errors in the manipulation. Most candidates seemed to have rounded from their calculator to the page without writing more decimal places and so could not be awarded the special case mark which was available for this rounding.

11 This proved a difficult question for many with less than 10% of candidates earning all four marks. Some gained part marks for a correct method involving errors but over 70% earned no marks at all. Only a very small proportion could even attempt an appropriate method for calculating the required volume. Many made no attempt at the question at all, and most of those who did make an attempt were unable to carry out any calculation that was relevant to the volume asked for.
The first problem appeared to be in identifying what sort of shape the planter was. Most candidates appeared to have ignore the first diagram (which showed the actual shape) but instead to have concentrated entirely on the second diagram (whose only purpose really was to show the depth of the planter clearly and also the depth of the 'completed' pyramid). Many concentrated on the second diagram and calculated volumes of cones or worked with prisms. Others simply calculated the total surface area.

For those candidates who had started out on a completely misconceived method, it was often quite difficult to make out exactly what they were trying to calculate at any given moment. Many candidates, in this sort of question, set out their work very poorly, with little more than a series of multiplications, divisions, additions and subtractions seen.

12 Again, many disappointing responses were seen. A lot thought all they had to do was read an approximate answer from the sketch, so 135 and 315 appeared often. Quite a few had the idea but got the wrong quadrants. Several answers involving $180 - 1{\cdot}5$ and $360 - 1{\cdot}5$ were seen.

B281: Terminal Paper (Foundation Tier)

General Comments

This paper seemed to differentiate well and the marks scored ranged from 0 to 99 out of 100. High-scoring candidates were challenged by some questions but those with lower overall marks had sufficient accessible material. In section A, lower-scoring candidates often gained many of their marks on Q.4. In section B, the topics with which candidates were least familiar were bearings and the volume of a prism.

Some very unrealistic answers were given (e.g. the price of a loaf of bread or hourly rate of pay). Most candidates attempted most of the paper, and had sufficient time to complete it.

Comments on Individual Questions

Section A

1 **(a)** This question on basic number work was generally very well answered, with the main problem in part (i) being spelling, although candidates were not penalised for this. Only very few introduced millions or hundreds. The rounding in part (ii) was done much better than it often is.

(b) Most candidates subtracted correctly; the common error was 68 instead of 58.

2 **(a)** Again this was very well done on the whole, although there was a minority who did not understand the terms multiple, factor etc. As expected, identifying the prime number in part (iv) caused the most problems, with almost as many opting for 9 as did the correct 11.

(b) Those who knew what a square number was generally gave a reasonable explanation or a clear numerical demonstration. However those who gave 9 as a prime often gave an attempted definition of a prime. Also common was 'it's a number times by itself' or 'you can times it by itself' or '9 × 9 = 81'.

3 **(a)** Calculating ½ of £9 was often correct, but some lost a mark for giving 4·5 rather than 4·50. Other errors were 3·50 or 5·50.

(b) Working out 1/5 of £60 was found more difficult. Some unfortunately gave £48, the sale price, instead of what was asked. Also fairly common were answers such as 55 (from subtracting 5) and 30.

(c) Expressing 30% as a decimal produced a variety of answers, including 0·03 and 3·0 or sometimes 30/100.

(d) Writing 12% as a fraction in its simplest terms was not very well done. 1/12 was common and also some decimals were seen. 1/12 was often 'simplified' to 1/6 or 1/3. Those who got 12/100 often cancelled it correctly to 3/25 although some did not attempt to cancel.

4 **(a)** The mode in part (i) was usually correct, although occasionally 12 was seen or rugby/football (the 'median'). Drawing the bar chart in part (ii) was very well done, with the most common errors being failing to number the axis or, from fewer, getting the first square of the scale wrong and fewer still numbering the gaps. Most plotted all heights correctly, most had equal width bars, except for those who drew them 3 squares wide and then usually had a final bar of width 2.

(b) Most interpreted the pie chart correctly in the first part, although not all candidates had a good strategy for finding ¼ of 60 or realised what they had to do in part (ii). Common errors here were 60 ÷ 5 = 12, as there were 5 sectors, or answers of 25 or 90 or 20.

5 **(a)** Many solved this multiplication problem correctly. Some scored a method mark for a correct method seen with errors, generally adding four lots of 35, rather than multiplying by 4, and often leading to 130 or 150 instead of 140.

(b) Various errors were seen here, including only adding one lot of 1·4 (leading to answer 3·7) and adding 2·8 and 2·3 and getting 4·11, showing a lack of understanding of place value.

(c) This was generally answered correctly, although there was a disappointing number who thought that 35 ÷ 5 was 6 - those who showed working for this scored a mark, but many simply wrote the answer thus did not get the available method mark if the answer was wrong. Some candidates worked out 35 × 5 = 175, seemingly not considering whether this answer was sensible.

(d) Many candidates gained at least one mark. The allocation of marks in the mark scheme helped those who calculated the length correctly (and showed it) but then went on to work out the perimeter or area. Some gained the method mark for measuring the length as 9 to 9·4 cm, but left it at that or sometimes doubled it. There were some candidates who lost the second mark as they could not divide e.g. 9·4 by 2 – often gaining answers such as 4·2.

6 **(a)** Completing the table was possibly done better here than in the past, but it was still common to see candidates make up their own patterns for y, usually -3, -1 or 0, 5.

(b) Many gained a follow through mark for plotting their points (if they fitted on the axes) and more candidates seemed to join the line than in the past – possibly due to part (c). Some did leave this blank.

(c) Weaker responses were of the type 'there is no 12 or 9 on the axes', although better ones did attempt to substitute into the equation and often got to 19. A few failed to score because they obtained an incorrect value for y. Some felt that it was wrong because the pattern went up in 4s, following on from the table.

7 **(a)** Candidates must be made aware that 'give a reason' does not mean 'show your calculations' but more 'state the geometrical facts you have used'. However there were more good reasons given than there have been in the past. There were many correct answers for the angle, with few arithmetic errors. Insufficient reasons commonly given were 'it adds up to 360/180' and just 'they are opposite' and not stating equal. The most common correct reason was 'angles round a point/in a circle add to 360'.

(b) The reason mark was given more frequently here, as 'angles in a triangle = 180' was often seen, with 'isosceles' appearing occasionally, and the angle was often correct, with very few errors in calculation. Wrong reasons included mention of parallel and equilateral (sometimes after calculating correctly). Weaker responses appeared to guess/measure the angle or gave 130 (subtracting from 180) or 40 (subtracting from 90).

8 **(a)** High-scoring candidates for the paper did well here, although some thought they needed to use laws of indices and gave an answer of 10^5. As usual it was common to see $2^3 = 6$, $5^2 = 10$ leading to a final answer of 60, although more calculated 2^3 correctly than 5^2 and answers of 80 were not uncommon. Some added 8 and 25, leading to the answer 33.

(b) There were many errors here with adding the fractions, with 1/2 or −1/2 being common answers, whilst some candidates did not attempt this question. Some knew that they needed common denominators, but then left the numerators, ending up with 4/35 – 3/35 = 1/35. However the high-scoring candidates often had no problems and obtained the correct answer.

9 This was beyond most candidates. Some could deal with the brackets and scored M1 for $6x - 8$; however it was common then to see $4x = 7$, as they could not deal with the negative. Many of those who did reach $4x = 9$ could not give an acceptable final answer, with eg $x = 2{\cdot}2$ being quite common.

10 **(a)** Surprisingly few candidates were correct, with even the high-scoring candidates usually reflecting in the y-axis rather than the line $y = 0$ in this common question with Higher.

(b) The rotation was done much better, with many scoring at least 1 mark, usually from the correct orientation, with fewer rotating clockwise.

11 **(a)** Many did not understand what was required in 'showing', though the mark scheme rewarded those who had the right idea eg by writing 18/48. Weaker responses gave answers such as 'unlikely' and some omitted this part. Many showed a fraction of 18/30 and 'showed' that it cancelled to 3/8 or even 30/18 and removed digits to get 3/8.

(b) Many errors were seen here because the majority of candidates did not realise that they could use the 3/8 and instead chose to try to calculate 400/48 and then work from there, generally leading to errors. Repeated addition of 48s was seen frequently, sometimes leading to an answer of 8 boxes, scoring the M1. Some guessed, saying it was about half faulty, then gave answers such as 180 or built up combinations of 18s and 30s to try to get 400. It was pleasing to see some attempts here from candidates who had omitted part (a).

Section B

12 **(a)** The pattern was usually neatly drawn and correct.

(b) The table was usually correct and often continued on for the next part.

(c) Most got the mark for 29. The explanation varied, with some just giving a general description, and some not specifying direction. Very few used the *n*th term expression but those who did were usually correct. The most common error was to omit the 'each time' aspect of the 'add 4' explanation.

13 **(a)** This was fairly well answered but 580 was quite common, for subtracting 420 from 1000, not 1500. Evidence of the conversion from kg to g was frequently not evident, so few scored a method mark if their answer was wrong.

(b) Notation of time varied, but most gained at least 1 mark in this time calculation.

(c) Many candidates tried to divide 400 by 88 instead of 88(00) by 400, hence getting 4, 4.5 etc.

14 **(a)** Very few showed any working here, but most used the formula correctly.

(b) Some omitted the final zero here. Again, not many candidates showed any working and fewer had the right idea of how to proceed here than in part (a), as expected.

(c) There was a distinct lack of working here for the majority who got this part correct. Some used trial and improvement to find their answer. Some subtracted the 30 first.

15 **(a)** Often, very little evidence was seen of how to calculate the mean. Sometimes the total was shown, but often there was only the answer on the answer line. Some candidates confused the mean and median.

(b) A lack of understanding of how the stem and leaf diagram worked hampered many candidates here in all parts. However, this was generally well done by higher scoring candidates. 107, the total of the leaves, was a popular misconception. The total of all the values was very occasionally found as was the maximum value of 48. Attempts to find the median were made in the last part, but answers of 24, 25 or 4.5 were usually given. Numbers on the diagram were crossed off, but did not always seem to lead to anything fruitful.

(c) The great majority of candidates got full marks here, especially in the first part. Very few used 11, 12 or 13 or repeated lines of the table and most used the numerical probability correctly.

16 **(a)** Many candidates were able to identify the line and rotation symmetry here. Those not gaining full marks often scored 1 mark.

(b) This part was a challenging one for many and some candidates over-complicated their diagram, finding it difficult to end up with 1 line of symmetry. Many scored the rotation mark, possibly by default; fewer scored the reflection mark. A number ended with a shape that had 2 reflection lines and rotational symmetry of order 2.

17 The boat often appeared on the land. Very few candidates scored well here. Some appeared to have no access to a protractor and tried to answer this bearings question with just a ruler. Those who drew lines from P and Q in the correct direction usually gained all 3 marks, but these were rare. More common was to put a dot at the end of a protractor, particularly for the bearing from P, and then not know what to do.

18 (a) The orientation of the net was usually correct, but the dimensions of the rectangles and triangles was variable. Some confusion seemed to exist between nets and plan views of the shape.

(b) Finding the volume of the prism was generally poorly answered. In particular, candidates struggled with the area of the cross-section. Units, if given, were usually correct, but were often omitted.

19 (a) Few gained both marks in this question on collecting terms and simplifying. More obtained the mark for $7a$ than for $-5c$.

(b) Most of the higher-scoring candidates multiplied the bracket out successfully, although many others had no idea what to do. As expected, the common error was to write $5x - 4$ as the answer, forgetting to multiply the 4 by the 5.

(c) Factorising was not done well. There was a lack of understanding what the question was asking, and many omitted this part, or guessed a random value for x.

(d) Very few candidates gained marks here in this rearrangement of a formula. Many had no idea how to proceed, for instance simply swapping x and y.

20 (a) There were good attempts to simplify the ratio. Many spoiled it by continuing on or did not find the simplest form.

(b) The most common error was to calculate 42000/20 = 2100. Few divided by 12 or 48 and even fewer then multiplied by 5 or 20.

21 Many candidates made no attempt to calculate anything, and just 'guessed' one of the burgers. Many added or multiplied the two weights together, or divided the weight by the carbohydrate number. Few found the correct percentages.

B282: Terminal Paper (Higher Tier)

General Comments

Candidates demonstrated a full range of attainment on this paper and some extremely good responses were seen to challenging questions. It was pleasing to note that there seemed to be fewer inappropriately entered candidates.

In general question facility reduced as the paper progressed. Exceptions included errors in basic arithmetic within the area question, reflecting in $y = 0$ and the use of bearings. All examiners commented that the standard of algebraic manipulation continues to improve.

It was however disappointing to note that candidates continue to have difficulty when giving reasons for a choice. Even the highest-scoring candidates appeared to be unfamiliar with constructing an equation given two intersecting graphs. At a lower level, candidates found it difficult to explain the interior angle of a polygon - too frequently just combining the information given in the question.

Candidates appeared to be appropriately equipped and most demonstrated good calculator skills. Presentation varied with some candidates using the working space for very rough jottings with no attempt to set out the work in sequence. Some candidates appeared to be a little rushed at the end of section B, possibly as a result of using inefficient methods earlier in the paper.

Comments on Individual Questions

Section A

1 The vast majority of candidates answered this question correctly, with answers almost always in their lowest terms. Almost all the candidates knew in principle how to subtract fractions, though there were occasional arithmetical errors in calculating a correct common denominator or in calculating one of the numerators, or even in subtracting two correct numerators. It was quite unusual to see evidence of a totally wrong method in this question, although very occasionally a completely wrong answer such as $\frac{1}{2}\left(=\frac{4-3}{7-5}\right)$ was seen, indicating a misconception.

2 **(a)** This question was very well answered but a few made numerical errors or gave other sequences with a difference of 5. Candidates who attempted to use the general formula for arithmetic progressions often had alternative sequences with a common difference of 5. Another common wrong answer was 3, 13, 63 (multiplying previous term by 5 then subtracting 2).

(b) This part was well answered. Common wrong answers included: $n + 4$ (an attempt at a term to term rule), $4n$, $4n - 1$, $4n - 3$ ($4n$ correct) $7n + 4$ (using first term 7 and common difference 4) and $3n + 4$ (values switched round).

3 The majority of candidates scored full marks for this question. There were the usual sign errors in collecting the like terms on either side of the equation but candidates were able to demonstrate their understanding by attempting further steps correctly, for which they were given credit. Weaker responses often reached $3n = 2$ having added the 7 on to the −5, but this was often followed by $n = 3/2$. A few having arrived at $3x = -12$ then went on to give an answer of −3 or 4.

4 **(a)** Many candidates scored full marks in this question. The common error was to use 100m = 1km (1.2km became 120m). Almost all candidates understood that they needed to divide the length of 1.2km by the length of the pool. Many tried to find the number of lengths by working in multiples of 25m and those showing a formal division often had difficulty with the position of the decimal point or 1200/25 became 40.8.

4 **(b)(i)** About half the candidates correctly found the area. Some, having shown a correct substitution, then failed to multiply 25 by 1.5 correctly with 38.5 being a common error. Others, having recognised the need to use the trapezium formula, were unable to identify the parallel sides and recorded ½ (25 + 25) × 2 or ½ (25 + 1) × 2. Some candidates split the trapezium into a rectangle and a triangle but many having used 25 by 2 for the rectangle then added on the triangle area rather than subtracting.

(ii) Some candidates realised they just had to multiply their answer to part (i) by 10 and 1000, and gained full marks. However many started again, ignoring the area of the cross-section, and multiplied 25 × 10 × 1 × 2 or calculated surface areas. Those who had a dimensionally correct volume were generally able to earn a mark for correct multiplication by 1000.

(c) Just over a third of candidates earned full marks for this part whilst nearly a fifth did not attempt the question. Successful candidates used a range of methods: drawing diagrams and working up to the 1440 by adding 180s each time, then division by 10; using the formula 180(n − 2) to reach the 1440, then division by 10; starting from the 144 to find the exterior angle of 36, then comparing this with 360/10 and starting from 360/10 then 180 – 36 to give the required 144.
Some just stated sum of angles is 1440° and then 1440/10 = 144 and failed to score.

5 **(a)** A minority of candidates used the correct mirror line for this reflection. Many confused the line $y = 0$ with the y–axis and reflected in the y–axis.

(b) Far more candidates were successful in this part, with the only common errors being either to use an incorrect centre of rotation for the 90° anticlockwise rotation or to attempt a 90° clockwise rotation. Few failed to score.

(c) The majority of candidates scored at least one mark and many identified the line correctly. Some ignored ‘single’ and gave reflection then translation or other combined transformations.

6 **(a)** The table was completed correctly by most candidates but a common error was to give the values of y as −4 or 2 where $x = -1$.

(b) Candidates were able to plot their points accurately although fewer obtained both marks for a correct curve. Some drew linear sections on the graphs, while others did not recognise that the minimum value of the curve should be below −2, drawing a ‘flat’ bottom section of the curve.

(c) Most candidates attempted this part. About one third scored 2 marks and a further third scored 1 mark, generally for giving only the positive value. A few attempted to solve $y = 0$ rather than $y = 1$.

7 **(a)** Most candidates realised they had to use 18/48 and were able to cancel it down, or showed in a convincing way that 3/8 of 48 is 18. Others split 3/8 into 3 and 8 and multiplied both values by 6 to give the 18 and 48. Some wrongly used 18/30 and attempted to simplify this to 3/8.

(b) Those candidates who used 3/8 of 400 usually achieved a correct answer but those who worked with 18/48 often had problems with 400 ÷ 48, and didn't know how to deal with the 16 mugs 'left over' after using 8 × 18 = 384.

(c) Just over a half of candidates recognised the need to multiply the fractions but some made arithmetic errors, such as 4/800, or attempted to find a common denominator even when the multiplication had been written down.
A common error was to add 1/100 to 3/8 or equivalent.

8 **(a)** Almost all candidates demonstrated that they understood factorisation and most recognised the need for two brackets with ± 2 and ± 7. About a quarter of candidates, having factorised, failed to proceed to record the correct solutions, often just recording the factors on the answer line.

(b) About a half of candidates scored full marks on this question. Most realised that they needed to multiply to equate the coefficients of x or y but some, having equated y, then subtracted or having equated x then added. Some of those who used the correct operation then made arithmetical errors. Very few candidates used the substitution method and there was little evidence of trial and improvement.

9 Most candidates failed to score in this question. Many did not appreciate what was required and wrote about the parallelogram and the triangles. Some identified correctly equal pairs of sides or angles but failed to include correct justifications or to correctly identify angles. For example 'AB = DC as they are parallel' or 'angle at B = angle at D' rather than $\angle ABD = \angle BDC$ with the justification of alternate angles. Some candidates made claims such as AE = CD or FD = EB, sometimes with spurious justifications. A typical answer was 'they both have right angles, all of the other angles and sides are the same, so congruent'. Some candidates who appreciated the type of response required often pursued the RHS condition.

10 **(a)(i)** The majority of candidates gained this mark. Some thought the answer was 7 or 0.

(ii) For many candidates only parts of the index notation were understood. Some interpreted the cube root correctly and obtained 5 in their working. Others interpreted the square correctly to give 25. Fewer interpreted the negative index, however, and answers of 25, −25, −5 were fairly common. Some rewrote the expression in a different and correct form but did not carry out any calculations.

(b) Less than half of the candidates scored in this part. Many of these reached 423/999 as their answer but failed to simplify this to 141/333 or 47/111. Very few showed a method starting with 1000r = 432.(4…..). The most common wrong answers involved trying to use 100r and errors like 423/1000 or 423/99.

Section B

11 A full range of responses was seen. Over a third gained full marks but there were some poor attempts with candidates confusing bearings with loci, so lots of construction marks were seen on the diagram. Some candidates did mark off a correct bearing (more often from P than from Q), but then ignored it and labelled the place where 3 circles from P and Q overlapped instead. Some had 2 correct lines where they were not extended to cross - but with a line or, in a few cases, a boat drawn horizontally to span the gap.

12 The vast majority of candidates scored 2 marks for this question. Very few candidates were unable to round or misapplied the order of operations.

13 (a) Almost all responses were correct. Errors included $5x - 4$ and $5x - 9$ and a small number of candidates continued and solved the equation $5x - 20 = 0$.

(b) This part was also very well done, but there were a few more errors than in part (a). A common mistake was to try to factorise into two brackets with $(x + 1.5)(x + 1.5)$, $(x + 1)(x + 2)$ and $(x + 1)(x + 3)$ seen.

(c) Most candidates were able to complete this rearrangement. Common errors were $(y - 2)/5$ and $y/5 + 2$.

14 About a half of candidates scored full marks, correctly working out the percentages and making the correct choice. Some used the alternative method of finding the weight per gram of carbohydrate (5.8, 5.9 and 4.6), but then it was more common to see the incorrect choice of 'cheese burger' made. Erroneous attempts included adding the total weight to the carbohydrate to gain a new total, or dividing 100 by the total weight.

15 (a) Almost all candidates were able to simplify the ratio.

(b) Most candidates answered this correctly. Errors were more likely to occur when candidates used the original ratio instead of the simplified version. A small number divided 42 000 by 5.

16 About three quarters of candidates gained full marks. Some added rather than subtracted the squares but scored 1 mark if they then attempted the square root. Some attempted trigonometry but they rarely completed this successfully. Overall very few candidates were unable to tackle this question.

17 (a) Only about a quarter of the candidates scored the mark for this part. Most failed to make comments that related to the context of the question. Common amongst the wrong reasons were: comments on the range of results, 'to avoid groups with zero frequency', 'ease of use' and 'it would be more accurate'.

(b) Nearly half of the candidates scored full marks. Of those who did not, it was fairly common to see the correct mid-points identified. A substantial number of candidates used the class widths rather than the mid-points to work out the total distance covered by all employees. Having reached a total some divided by 4 and others by their total frequency, which was not necessarily 50.

(c) About a half of the candidates made a reasonable attempt at the histogram, either fully correct or with a slip in the frequency density for one interval, usually 20 to 40. About a sixth of the candidates did not attempt this part and a few others produced lines or curves.

18 **(a)** About a half scored full marks. Some others scored 2 marks for an answer outside the range, having rounded $\sin 72$ prematurely, before multiplying by 40, or for using a calculator not set in degree mode. Weaker responses sometimes gave $72 \sin 40$, $\sin^{-1}(72/40)$ or $40 \cos 72$.

(b) Unfortunately the vast majority of candidates assumed the triangle was right-angled and/or the line 'x + 15' was straight. These candidates were able to gain a 'special case' mark if they correctly applied 'right-angled' trigonometry. Those who realised the triangle was not right-angled generally recognised the need to use the cosine rule and substituted correctly. However many failed to score full marks because they made the error $1825 - 1200 \cos 58 = 625 \cos 58$.

19 **(a)** About two thirds gained full marks. Most of the others failed to score as they simply subtracted one area from the other.

(b) The majority answered this correctly, generally from multiplying by 0.88^2. Some candidates calculated 12% but failed to subtract before re-calculating 12% again. A few candidates added two 12s then used 24% or multiplied by 0.76.

(c) About a quarter of candidates answered this correctly, generally through using $\times 0.88^n$. Those candidates using successive multiplications tended to lose track of where they were. Some reached 22 years but then added on to 2007 rather than 2005. Some gained a mark for reaching 2009 with the supporting 3.1×10^6.

20 **(a)** The majority calculated the last moving average correctly but some mis-plotted, generally at the end of the grid, or failed to plot at all.

(b)(i) The majority of candidates made a sensible prediction of the next moving average.

(ii) About a quarter of candidates omitted this part and a quarter answered correctly. Common errors generally involved adding three or four figures and then dividing by 3 or 4. The most common was to add the last 4 moving averages and then divide by 4.

21 **(a)** Few candidates recognised that they needed to substitute either $x = 0$ or $y = 0$ in the circle equation. Those who usually gave the correct coordinates of A but often the y-coordinate of B was a positive value. Many guessed point A as (3, 0) or (4, 0).

(b)(i) Only a small minority demonstrated understanding of this part. Those who did were then generally successful in substituting and expanding the quadratic. Others made attempts to factorise and solve the quadratic.

(ii) Very few correct answers were seen and there were a great number of non-attempts. Those who did use the quadratic formula sometimes only scored one mark for substituting, whilst others who did find $x = -4.1$ did not then substitute in $y = x + 2$ to find the y-coordinate.

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