GENERAL CERTIFICATE OF SECONDARY EDUCATION
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EXAMINERS' REPORTS

MATHEMATICS
(3 Tier)

SUMMER 2007

Statistical Information

GCSE

The Examiners' Report may refer in general terms to statistical outcomes. Statistical information on candidates' performances in all examination components (whether internally or externally assessed) is provided when results are issued. As well as the marks achieved by individual candidates, the following information can be obtained from these printouts:

For each component: the maximum mark, aggregation factor, mean mark and standard deviation of marks obtained by *all* candidates entered for the examination.

For the subject or option: the total entry and the lowest mark needed for the award of each grade.

Annual Statistical Report

Other information on a centre basis is provided when results are issued. The annual *Statistical Report* (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

MATHEMATICS
(3 Tier)

General Certificate of Secondary Education 2007

Chief Examiner: Mr. D.A. Timbrell

FOUNDATION TIER

The majority of the candidates entered for this examination found that the first half of both papers allowed them to demonstrate their knowledge of mathematics in a meaningful way. However, most candidates found the second half of the papers extremely challenging.

Candidates at all levels of ability continue to find questions involving algebra very demanding. Questions involving money continue to be well answered, but there is considerable room for improvement in the way that the majority of candidates handle simple arithmetical calculations. The majority of candidates experience great difficulty with questions involving simple fractions.

A large number of candidates appeared to have sat the examination without access to suitable geometrical instruments; as a result these candidates lost a considerable number of marks.

Paper 1

Q.1 Most candidates made good attempts at answering all sections of this question. The sections, which caused some difficulty, were,

(a) (ii) the word difference continues to cause difficulty,

(b) (ii) many gave the smallest four-digit number rather than the smallest odd number,

(c) There were a large number of incorrect answers. Many candidates did not know what was required and those who realised that they needed to divide 120 by 5 were often unable to obtain the correct answer.

Q.2 Many candidates did not have access to geometrical instruments and consequently lost several marks on this question.

(a) Often not attempted or drawn freehand.
Many drew circles of radius 3.

(b) Very disappointing. Many candidates were unable to measure the length of the line; those who did sometimes gave the answer to the nearest centimetre. A large number of candidates were unable to measure the size of the angles.

(c) The line through Q parallel to RS was often correct but most candidates experienced great difficulty in drawing the perpendicular line through P, this line was often drawn parallel to the edge of the examination paper.

Q.3 Well answered.

Q.4 (a) Well answered by many candidates.

(b) While there were many correct answers this proved to be more difficult than (a). One fairly frequent answer was 75÷25 = 3.

Q.5 (a) Well answered.

(b) Well answered.

(c) Many correct answers but a large number of candidates thought that $^{12}/_{36}$ = ¼.

(d) A surprisingly large number of candidates failed to write 0.6 as 60%. A popular incorrect answer was 6%.

Many wrote ½ 0.6 and 54% in ascending order rather than descending order.

Q.6 Both sections were well answered.

Q.7 (a) Well answered. Most candidates replaced 207 by 200 or 210 and 5.1 by 5 and many then explained that the resulting product was greater than 105.57.

(b) Most candidates found this question difficult. Some realised that they needed to divide 42 by 6, sometimes obtaining the answer 7, but then often failed to multiply 7 by 5.

(c) Well answered. Most realised that they needed to multiply 16 by 6 and many obtained the correct answer.

(d) Fairly well answered. While many realised that they needed to divide 120 by 8, many were unable to obtain the answer 15.

Q.8 All sections were well answered.

Q.9 Candidates from some centres were more successful with this question than candidates from other centres. Many candidates were able to give the answer of ¼ for (a) but few obtained the required answer to (b).

Q.10 Fairly well answered. Many candidates were able to obtain the correct answer. Others realised that they needed to measure the length of RS and AB but were then unable to use the information given to obtain the actual length of AB.

Q.11 Section (c) was often correct but incorrect answers were frequently given for both (a) and (b).

Q.12 All three sections caused difficulty.

(i) Many of the candidates who obtained 27 and 8 were unable to multiply correctly to give the required answer.

A frequent answer was 9 × 6 = 54.

(ii) There were many incorrect answers, a frequent answer was 9.42.

(iii) Very badly answered. Most candidates are unable to manipulate simple fractions.

Q.13 (a) Well answered.

(b) Many candidates subtracted 108 from 180 obtaining 72 but a large number were then unable to use the properties of an isosceles triangle to find the value of y.
A frequently seen incorrect answer was, 180 – 108 = 72 y = 72/2 = 36.

Q.14 Most candidates knew what was required but some of the diagrams were badly drawn. A number of candidates used 2 or 4 as a scale factor rather than 3.

Q.15 Both sections were well answered. A number of candidates lost marks once again because of the use of 'in', 'out of' or ':'. The only acceptable forms for the probability are a fraction, a decimal or a percentage.

Q.16 Very badly answered, there were very few correct answers to any of the sections.

Q.17 A few candidates were able to find the correct answer for (a), but (b) proved too difficult for most.

Q.18 Many candidates attempted this question, and a large number realised that an estimate was $\frac{40 \times 600}{80}$. Few were then able to obtain 300.

Q.19 Both sections were very badly answered. Very few candidates were able to remove the brackets correctly in (a). The few who did remove the brackets correctly were usually unable to collect terms correctly.
Very few candidates were able to factorise the expression in (b).

Q.20 (a) Well answered.

(b) Few candidates were able to correctly name the type of correlation.

Q.21 Many candidates did not attempt this question. Those who made an attempt showed little understanding of the required method.

Q.22 A small number of candidates obtained £27 and some then obtained the correct selling price.

Paper 2

Q.1 (a) Well answered.
A number of candidates did not appear to have a calculator available for use in the examination.
A number of candidates inappropriately rounded their answers either to the nearest 10p or in some cases to the nearest pound, resulting in the loss of all of the marks for this question.

(b) Well answered.

Q.2 (a) Well answered.

(b) Most candidates used metric units for (i) and (ii) but the answer to (iii) was often given as miles.

Q.3 Other than the usual arithmetic errors all sections of this question were well answered.

Q.4 Well answered. Most of the candidates used a suitable uniform scale for the frequency. Those using a scale of 2cm to represent either 4 or 10 pets usually completed the diagram correctly. Candidates using a scale of 2cm to represent 5 pets often misread the scale and plotted one or more incorrect bars.

Q.5 All parts were well answered.

Q.6 (a) Many candidates were unable to mark a radius or a chord on the appropriate diagram.

(b) Pentagon and parallelogram were popular incorrect answers.

(c) Fairly well answered. However, many candidates simply drew a diagram of a cube rather than the net of a cube.

(d) Well answered.

Q.7 Well answered but a substantial number of candidates reversed one or more of the coordinates.

Q.8 (a) All sections were well answered.

(b) (i) and (ii) were well answered but the brackets were usually omitted from the answers to part (iii).

(c) Fairly well answered but a frequent incorrect answer was 43 + 6 = 49.

(d) Very few correct answers. Most candidates did not attempt this question.

Q.9 All sections of this question were well answered.

Q.10 (a) Well answered**,** but a fairly large number of candidates gave the answer 8 for the number of screws left over.

(b) Fairly well answered. Many candidates calculated 4 × (25.55 + 5.75) rather than 25.55 + 4 × 5.75.

(c) Few candidates used a calculator to evaluate either 0.7 × 24,500 or 7 × 24,500 / 100 preferring to attempt to find 10% of 24,500, 1% of 24,500, 4% of 24,500 and then adding their answers for 10 % and 4%. Many using this method found 10% and then simply guessed the answer for 4%.

(d) (i) 8.2 was a popular incorrect answer.

(ii) Fairly well answered.

(e) Both parts were badly answered with decimal points being inserted in a variety of points. In section (ii) many candidates used multiple decimal points.

Q.11 (a) Fairly well answered. Many candidates having obtained £1.65 did not continue with the remainder of the calculations.

(b) Few candidates used a calculator to evaluate 0.38 × 56, most attempted to write down 10% of 56, followed by 1% and the 8%. Many made errors in the arithmetic and some having found 10% guessed a value for 8%.

Q.12 A small number of candidates were able to find the correct probability in (a), but very few were able to obtain the correct answer for (b). A popular answer to part (b) was 110.

Q.13 (a) A substantial number of candidates gave the answer as 42 + 25 + 20 but there appeared to be an increase, when compared to 2006, in the number who evaluated the volume correctly.

(b) Few candidates were able to attempt this section and very few obtained the required answer.

Q.14 Fairly well answered. Many candidates gave a completely correct answer.

Q.15 (a) Fairly well answered. A frequently seen incorrect answer was 10a + 10b.

(b) Many candidates obtained one mark but only a small number gave a completely correct answer.

Q.16 Very few candidates were able to obtain the required answer.

Q.17 This question was well answered by candidates from certain centres. However, the majority of the candidates from the remaining centres found the question difficult.

Q.18 Most candidates found this question difficult. Few demonstrated any real understanding of the correct method. Many of the candidates who did find the correct number of units used and multiplied by 9.45 often failed to convert the pence into pounds and ended up with bills running into thousands of pounds.

Q.19 Most candidates were unable to use the appropriate formula for the circumference and area of a circle. Both sections of this question were very badly answered.

Q.20 The majority of the candidates who attempted this question did not use an appropriate scale for the rainfall, almost all using $40 < x < 50$ etc. on the rainfall axis. Many candidates did obtain 1 or 2 marks for correctly drawing the bars.

MATHEMATICS
(3 Tier)

General Certificate of Secondary Education 2007

Chief Examiner: Mr. R.W. Brice

INTERMEDIATE TIER

General Comments

Candidates appeared to have had sufficient time to attempt all the questions in the time allowed. On the whole, candidates continue to give an adequate and clear account of their work so that full credit can be given to those who get incorrect answers but have used a correct method.

More work needs to done in basic number to raise their confidence and improve their accuracy of calculating without the use of a calculator.

Candidates have a good level of competence in solving linear equations. Candidates continue to have difficulty in converting words into algebra (as in question 6). They do not make proper use of brackets which often leads to incorrect algebraic expressions.

Candidates continue to have difficulty in manipulating the fractions that arise in their work.

Comments on individual questions :

Q.1 (a) (i) Well answered with the majority of the candidates selecting the correct number of 37.

(ii) 36 was very often seen perhaps confusing cube number with a square number.

(b) (i) The majority of the candidates managed to reach 27 and/or 8, but far too many failed to reach the final result of 216.

(ii) Well answered.

(iii) The correct answer of 0·09 was far more in evidence this year, but there were a significant number of 0·9 also offered.

(iv) More candidates gave the correct solution than in previous years, but far too many answers showed that candidates are not confident in handling fractions.

Q.2 Both parts very well answered.

Q.3 Very well answered. Many candidates drew an enlargement to a scale factor of 2

Q.4 Although well answered by the majority of candidates a number of them offered 5/15 and 10/15 as their answers. It is pleasing to note that incorrect notation such as 7 in 15 or 7 out of 15 or 7:15 is very rarely seen.

Q.5 Candidates were confident in converting 0.58 to a percentage or 65% to a decimal, but it was the 3/5 that proved difficult to many candidates.

Q.6 Still poorly done by the majority of candidates. The common error was to move through the question by simply extending the previous expression. So we had answers such as 2x, 2x+11, 10x+11 for parts (a), (b) and (c). Only a few gained full marks in part (d) as most did not have a bracket to clear. Many candidates persist in turning their expressions into equations.

Q.7 Most candidates found the length of GH correctly and used it to give the perimeter as 80. Although the shape had been suitably partitioned on the diagram and area was known to be 'length × breadth' many failed to chose the correct values to use in their calculation. Most common error was to use 18 × 10 rather than 18 × 7 for the upper part of the shape. Candidates should realise that the instruction to 'clearly state the units' means that marks will be lost if this is not done.

Q.8 Again this year the vast majority of candidates gained the method mark, but then failed to make the subsequent calculation. Although a high percentage of candidates changed the calculation to $\frac{40 \times 600}{80}$ it was extremely rare to see the calculation reduced to $\frac{600}{2}$ and so to 300. Most would attempt to get $\frac{24000}{80}$ and then evaluate it incorrectly.

Q.9 (a) Most candidates gave the correct expansion.

(b) Not well answered by the weaker candidates.

Q.10 Well answered by most candidates. Far less of the common errors associated with this type of question were seen as compared to previous examinations. Some candidates joined their plotted points. Usually their line of best fit was fit for purpose and passed through the ‘mean score’ point in the majority of cases. Also their line was used accurately to estimate the fuel consumption of the car.

Q.11 Very few managed to write down the correct equation. A number thought that '..an equation that x satisfies' means that it has to be x = 'something', so x = 63 + 4x–10 + 2x+48 was often seen.

Although 360 did appear frequently, it rarely formed part of an equation. For example, candidates who did find the expression for the sum of the four angles to be 7x+101 failed to link it to make the equation 7x+101=360.

Many found the solution of 37 by arithmetical means, even dividing by 7, without any reference to algebra. In questions like this one, where the candidate is asked to write down an equation that x satisfies, only 2 marks are awarded for the 37.

Q.12 (a) It was pleasing to see a variation in methods for finding 45%. Most used 10% = 6, 40% = 24, 5% = 3, others found 50% = 30 and subtracted 5% = 3, and fewer used the (60×45)/100 method. It was disappointing that a few candidates, having found the £27, failed to give the selling price of £87.

(b) Most candidates knew that they were required to evaluate 'distance/time'. The vast majority of them, however, could not deal with the time correctly in hours. Many wrote 180/135 and failed to convert to m.p.h.

Q.13 (a) Well answered.

(b) Very poorly answered. Candidates did not know what is meant by 'highest common factor'. Most gave their answer as 5 perhaps because this was the 'highest' of the two common factors of 3 and 5.

Q.14 An incorrect value in part (a) did not appear to upset the candidates and they proceeded to gain very good marks for the rest of the question. Candidates were very successful in drawing the line y=3. Few candidates lost the mark for the drawing of the curve because they joined adjacent points by means of line segments.

Q.15 (a) Candidates found it difficult to appreciate that the reflection could overlap the original diagram.

(b) Well answered. The use of tracing paper has made rotation questions much more accessible.

Q.16 Most candidates drew the correct arc centre Y. Few drew the bisector of angle ZXY, with several of them drawing a line parallel to XY through the mid point of XZ instead.

Q.17 Not fully explained - 'they must add up to 360' - is not enough. Candidates are expected to explain that 360 ÷ 80 is not a whole number. A polygon was often thought to be a pentagon.

Q.18 Well answered on the whole. Candidates are now confident in the method of solving simultaneous equations, but their ability to manipulate the algebra involved was often not up to the task.

Q.19 Pleasing to note that the ‘greatest value’ is now answered correctly by far more candidates than was seen in the past. The second part of the problem is still poorly answered. Candidates on the whole do not focus on the crucial sizes, but rather apply their arithmetic to all the values they have written on the page, leaving either no final answer or a selection of answers. The explanation should clearly show that 60 × ‘least length’ is greater than ‘longest path’. A very common error was to think that the path was 30.0m long and not $29.05 \leq$ path length ≤ 30.05. Many candidates failed to convert from cm to m correctly.

Q.20 Those candidates who confined themselves to three dimensions usually gave a correct answer. Many seem to think that when travelling from Cardiff to Mold you experience hundreds of dimensions!

Q.21 (a) An improvement on answers seen to similar questions set previously. Poor arithmetic however showed that some candidates had not really understood the concept of showing that the corresponding sides were in the same ratio. An answer often seen was 21/14 = 1·7, 18/12 = 1·6, 12/8 = 1·4 so they are in the same ratio!

(b) Very few correct solutions seen.

Q.22 (a) Having arrived at $-2n > -11$ most candidates then wrote $2n > 11$ giving a final answer of $n > 5{\cdot}5$. This meant that there was no follow through answer available in part (ii), although 6 was often offered.

(b) Well answered. Surprisingly it was the 4×3 = 12 that was most often left undone or given as 7.

(c) Once the bracket had been cleared only the more able candidates proceeded with the question.

Q.23 (a) Having to draw the second pair of branches did not cause any problems although a few simply drew a single two branch fork.

(b) Many candidates added the two probabilities rather than multiplied them.

Paper 2

General Comments

Candidates appeared to have had sufficient time to attempt all the questions in the time allowed. On the whole, candidates continue to give an adequate and clear account of their work so that some credit can be given to those who get incorrect answers but have used a correct method.

Candidates did seem to be using their calculators appropriately in question 1(b) and were very successful in finding 38% of £56. However, they need more experience in answering unstructured questions such as 9 and 16. They also need to be more accurate in combining pence and pounds.

Candidates were able to use Pythagoras' Theorem correctly and use trigonometric ratios appropriately.

Comments on individual questions :

Q.1 (a) Well done, although writing 0.66p as their final answer often lost a mark.

(b) Well done.

Q.2 (a) Many misunderstood 'more than 22 sweets' giving the answer for '22 or more sweets' so that 36/50 was a common wrong answer. Other frequently seen wrong answers were 2/5 and 3/5.

Probabilities were written in the correct form in almost all cases.

(b) Many knew that they needed to calculate $\sum fx$ but a significant number wrongly calculated $\sum x$ giving 110 as a common incorrect answer.

Q.3 Candidates continue not to use brackets. Most candidates gained one mark for n + 7 × 3.

Q.4 (a) Very well answered with the majority of candidates correctly calculating the volume of the cuboid.

(b) This proved much more difficult. Many did not realise that the height of the water could be found by dividing its volume by the area of the base of the tank. A small minority divided the original volume of water (21000) by the new volume (8400) and found that proportion (2.5) of the height of the whole tank. A significant number found 12cm rather than the 8cm.

Q.5 Generally well done.

Q.6 (a) Many answered this correctly with a full simplification of 4a – 6b. Some continue to write it as 4a + – 6b.

(b) Generally well done.

(c) Some difficulty was experienced in substituting clearly into the expression. Many wrote a correct embedded solution and then deduced incorrectly that w = 6.

Q.7 The calculation was quite well done, but many could not correct their answer to 3 significant figures.

Q.8 (a) Not well done. Some found the bearing of Porthcawl from Swansea rather than the other way round.

(b) Quite well answered overall. Many candidates continue not to draw the bearing lines to intersect at a point.

Q.9 Very many found it difficult to negotiate their way through the electricity bill to reach the final answer correctly. Many could calculate the difference between the two readings to find the number of units used and to multiply that by 9.45 to find the cost in pence, but they failed to divide this answer by 100 to change the amount to pounds before they added it to the standing charge of £13.04. A significant number of candidates divided by the 9.45.

Candidates were confident in calculating the V.A.T., but several failed to give the final answer with a £ sign and to express it correct to 2 decimal places.

Q.10 Generally well done except many lost the final mark by forgetting to give their answers 'to an appropriate degree of accuracy'. This was interpreted as either corrected to one decimal place or to the nearest whole number.

Q.11 (a) Many labelled the rainfall axis with the inequalities given in the table rather than marking it with single values at regular intervals. There are still far too many students who confuse frequency polygons with grouped frequency diagrams.

(b) There were still many candidates who did not find the mid-points of the intervals given in the question and who were therefore unable to find $\sum fx \div 90$. A frequent error was to divide whatever total was found by 6 rather than by 90.

Q.12 (a) This caused some difficulty. Many evaluated $(2n)^2 – 3$.

(b) Quite well answered. A common error was an answer of 4 + n rather than the correct 4n.

Q.13 A common mistake was to divide £660 by 10 showing a basic misunderstanding of the problem being asked.

Q.14 (a) A common error, having arrived at $4x = 2$ was to give $x=2$ rather than $x = ½$.

(b) This caused great difficulty, particularly in dealing with the denominator of 3. Very few were able to achieve $11 + 4x = 21$ or its equivalent. However, they were able to continue to find some value for x from their wrong equation.

Q.15 The more capable candidates used Pythagoras' Theorem correctly, subtracting AD^2 from AC^2.

As usual, a common error was to find $32^2 + 16^2$.

Q.16 Calculating 1.5% proved difficult for many. Relatively few candidates could cope with adding 1.5% and subtracting 3% twice in the appropriate order to obtain the correct answer.

Q.17 Many could find the volume of the rod but could not use it to find the density because they had forgotten the correct formula. A common incorrect answer was 111. 9 coming from volume divided by mass.

Q.18 This type of 'reverse VAT' question still causes problems. Very many candidates subtracted 5% of £99.75 from itself rather than by dividing £99.75 by 1.05 which would have given the original amount.

Q.19 Many could earn the first two marks but could not continue and failed to test the relevant intermediate value. Difficulty was encountered in this particular question when values of the function occurred in standard form on the calculator. Several did not transfer their answer on the calculator correctly to their working on the script.

Q.20 (a) Many found this difficult though the graph was given in the question.

(b) There were more correct answers to part (b) than to part (a). However 235 was a frequent incorrect answer.

Q.21 Most candidates have difficulty with basic standard form questions. Incorrect notation such as 7^{12} rather than 7×10^{12} were frequently seen.

Q.22 (a) Multiplying –4 by +7 often resulted in the answer +28. Candidates also had difficulty in correctly combining the x terms.

(b) Partial factorisation was done, particularly of the common factor 3.

Q.23 This proved to be too difficult for the vast majority of candidates. They were unable to clear fractions successfully.

Q.24 Well answered by those who had been taught the necessary trigonometric skills. Very many candidates showed that they had no knowledge of the trigonometric ratios and merely manipulated angles with no reference to trigonometry.

MATHEMATICS
(3 Tier)

General Certificate of Secondary Education 2007

Chief Examiner: Ms. L. Mason

HIGHER TIER

Specific comments about individual questions are as follows:

Paper 1

Q.1 Although not requested, the majority of candidates correctly expressed their answer using index notation. A common incorrect response for the HCF in part (b) was 5, with many candidates not relating the 3^2 or 3 x 3 to the factor of 3 given for 105.

Q.2 This question was generally well answered, with a curve drawn correctly and the straight line y = 3 drawn and used correctly.

Q.3 Both parts were generally well answered. If there was an error, it was with the reflection of the vertex at (3, 2). There was evidence that tracing paper was used correctly, particularly for the rotation.

Q.4 Generally this question was fairly well answered. Very occasionally the angle bisector was drawn from the wrong vertex of the triangle. In general it would seem that candidates have the correct equipment in order to answer the question.

Q.5 Explanations tended to be vague, or simply a repeat of the question that it was not possible, as if stating the obvious. It is important for candidates to realise the need to fully explain and reason their responses in this type of question. There also seemed to be a little confusion as to whether it is interior or exterior angle sum that is 360^0.

Q.6 The majority of candidates have a sound strategy for solving simultaneous equations. Where errors occur it is usually due to numerical rather than algebraic difficulties.

Q.7 The first part of the question was well answered, with very few incorrect responses. The difficulty in part (b) seemed to be with the length of the path accuracy and bounds, and then with the calculation of 60 multiplied by 50.5 without the aid of a calculator.

Q.8 This question was generally well answered. However, a common error was to give an incorrect answer of 6 for the number of dimensions for the perimeter of a hexagon.

Q.9 Candidates need to realise that a full explanation is required to clarify that all the corresponding sides are in the same ratio, and that working with either one or two pairs of sides is insufficient as an explanation in part (a).

Many candidates had a sound strategy for finding XY in part (b), but did not have the arithmetic skills in order to do so accurately.

Q.10 A number of candidates were out of their depth of understanding when handling negative term division or multiplication for inequalities in part (a). There were only a few candidates who treated part (a) as an equation ignoring and replacing inequalities with equal signs.

Part (b) was well answered. A few candidates concentrated on adding indices and consequently also added four and three instead of multiplying the coefficients.

Part (c) was well answered, with the majority of candidates expanding the brackets to begin, rather than alternative approach of dividing by five.

Q.11 This question was well answered. A few candidates drew only two branches in part (a) instead of two pairs of two branches.

Q.12 Many candidates were able to gain marks from drawing at least two of the lines correctly. However, many candidates answered this question completely correctly, with correct lines and the correct region clearly indicated.

Q.13 Although many candidates started by collecting terms in f, then factorising and dividing, others correctly manipulated the formula given but with no apparent aim to gather f terms together.

Q.14 A common incorrect response was $50\sqrt{9}$. Obviously candidates were thinking of factors and squares but did not have sufficient understanding in order to handle the notation correctly.

Q.15 Although a number of candidates gave an incorrect response in part (a), many of these candidates realised that the answer in part (b) should be half their response to part (a) correctly stating that the angle subtended at the circumference is half that subtended at the centre. A common incorrect response in part (a) was 58^0.

Q.16 The majority of candidates were able to attempt to translate the information given in the question into mathematical notation. The final part of the question was the most demanding in manipulating an expression involving a fraction.

Q.17 The majority of candidates knew how to find the number of trees measured by finding the area. A surprising error was in the consistent misread of the heights of the rectangles, incorrectly as 14, 17, 10 and 12.

Part (b) was not well answered. A number of candidates were not able to interpret the question.

Q.18 This question was relatively well answered. A number of candidates do not realise in part (b) that “blue, yellow” as well as “yellow, blue”, and “blue, red” as well as “red, blue” needs to be considered.

Q.19 Part (a) was generally quite well answered, that is by candidates showing good knowledge and understanding at this stage of the examination paper. Part (b) caused some thinking problems, with a number of candidates floundering for a problem solving strategy. It was not the algebra skills that caused the problem, rather the application.

Q.20 Part (a) was well answered, a number of candidates did not attempt part (b). A number of candidates did establish that a horizontal line was required but had little idea of how to establish what line.

Q.21 Candidates with good algebraic skills found this question relatively straight forward. A few candidates incorrectly attempted to treat the fractions as an equation.

Q.22 Although many candidates were able to establish correctly that part (a) is always odd and that part (b) is always even not all were able to explain why this is true. There were more correct explanations for part (a) than for part (b).

Q.23 Part (a) was well answered, with a number of candidates leaving part (b) blank. The most common strategy in part (b) is to attempt to use values, there is some confusion with the square of x in this method. Candidates using the graph and knowledge of equations of straight lines generally give the correct responses.

Q.24 Many candidates gave an incorrect response of 80 x 48 or 3840. There appears to be difficulty in the understanding of ratios of similar solids for area and volume. Many candidates have no knowledge beyond the ratio of corresponding lengths. This question proved to be quite searching in terms of knowledge, understanding and application.

Paper 2

Q.1 This question was generally well answered, with candidates using the mid points correctly. Where there were errors it was generally in dividing by 6 rather than 90.

Q.2 This question was generally well answered, although a small number of candidates misinterpreted the question and started incorrectly, by dividing by 10.

Q.3 Many candidates answered this question correctly. Others made one error in their algebraic understanding or manipulation.

Q.4 This question was very well answered, with very few incorrect responses.

Q.5 Although many candidates answered this question correctly others found it more demanding making a variety of errors. Errors included incorrect rounding or truncation leading to being a few pence out in the final answer, subtracting 1.5% rather than adding, and adding 3% rather than subtracting.

Q.6 This question was often answered correctly, with candidates changing units and deciding on the appropriate calculations. The vast majority of candidates started correctly by finding the volume.

Q.7 Candidates either could work from an inclusive V.A.T. value at 105% or they incorrectly worked with 5% of the amount given.

Q.8 This question was generally well answered, with many candidates being awarded marks. However, a number of candidates missed out on the final two marks as they did not verify their response by checking to three decimal places as confirmation.

Q.9 Many correct answers were seen, candidates correctly interpreted part (b).

Q.10 This question was generally well answered, with few cases of incorrect notation. A small number of candidates are unclear whether indices are negative or positive. A number of candidates gave their answer in part (b) as 0.58×10^{-11}, which is not in standard form.

Q.11 This question was generally well answered, although some candidates made errors in collecting like terms in part (a).

Q.12 Many candidates cleared fractions correctly and efficiently; others did not really understand the balance nature of an equation. Mixed responses to this question.

Q.13 This question was generally well answered with candidates selecting and applying appropriate trigonometric ratios to solve the multistage problem.

Q.14 Candidates tend to find vector questions demanding, particularly when negative direction is to be considered. This question did involve a change of direction, many candidates were not able to write out an unsimplified form for **KL**. In recent years a number of candidates have answered in response to a part of a question that a geometric relationship is that lines are parallel, even when early parts of the question have been omitted or incorrect. The relationship here required the explanation that the points lie on the same straight line, thus being collinear, so spurious answers were not rewarded.

Q.15 The majority of candidates answered part (a) correctly, with a vertical translation, although not all candidates indicated the point of intersection on the y-axis. The majority of candidates realised that part (b) required a horizontal translation, but they did not always know in which direction, left or right.

Q.16 This question was not well answered. More candidates answered part (a) correctly than any other part. A common incorrect response in part (b) was x^6. Candidates were often able to manipulate a pair of indices in part (c), but found working with halves demanding.

Q.17 Mixed responses in this question. It is clear that many candidates have no or little experience of working with trinomials with a coefficient of x^2 other than one. Other candidates find the algebra requirement straight forward. Some errors are made with signs in finding the two solutions.

Q.18 This question was generally well answered, with few candidates without a strategy to solve the problem.

Q.19 Many candidates find forming algebraic expressions or equations very demanding, with many not knowing how to start to answer the question. As a result part (a) was not well answered. In part (b) a number of candidates make errors with the substitution, in particular for the value of c and with the denominator, not always treating it as a common denominator.

Q.20 Of the candidates answering this question, a number did not indicate any values on the vertical y-axis. In part (b) a number of candidates incorrectly gave positive values as well as the correct negative values.

Q.21 Although printed in bold twice in the question a number of candidates still treated this incorrectly as a "find the radius of a sphere" question. There was much confusion about the formula for the volume of a sphere, with many strange incorrect variations of the formula. Many candidates found this question difficult.

Q.22 The demand in the question for candidates tended to be the application of the cosine rule to find an angle. Many candidates were unable to rearrange the cosine rule correctly in part (a). It was surprising how many candidates gave the units for the area in part (b) incorrectly as cm^3, although many answered correctly, this was a surprising incorrect use of units.

Q.23 A number of candidates did not attempt part (a). Part (b) was generally well answered, with many candidates having a clear strategy.

Q.24 Part (a) was not well answered. Tangents were rarely seen, more often candidates read values from a point on the graph and divided these. There seems to be a lack of understanding of how a speed/time graph can be interpreted to find acceleration. Although in part (b) many candidates knew that the area was required, many made errors with formulae and calculations.

MATHEMATICS
(3 Tier)

General Certificate of Secondary Education 2007

Chief Moderator: Linda Mason

Coursework

As in previous years centres have generally selected appropriate tasks, allowing access to the full range of marks in each assessment strand. However, where there is good practice in allowing the mid ability candidate access to a task or investigation originally aimed at the Higher Tier candidate, there is also some evidence of Higher Tier candidates accessing original Intermediate Tier problems. When this happens, it can be difficult to extend a task that is not substantial or complex in its nature to progress beyond 6 marks in an assessment area without very creative development. Progress to 7 marks in an assessment area does imply that there is a need to develop complexity.

Centres generally complete all summative documentation correctly, and the main coursework cover sheets are signed by the candidates. Although there was still a need this year to return a small number of cover sheets to request candidate signatures for validation that the work is that of the candidate.

The marking of coursework usually shows that Performance Indicators and the General Assessment Criteria are applied consistently. However, where there are differences between centre and moderation judgements, we generally find that the centre marking has been a little generous, or had a slightly lower expectation than the moderator. Rarely do we find evidence of under marking. In AO4, Handling Data tasks, a number of centres do not appreciate the need to meet **all** the bullet points within a minimum requirement list in order to be able to award that mark.

The annotation on the cover sheets helps considerably in agreeing judgements and marks given. This aids the moderation process, as the moderator is able to understand the centre interpretation of aspects of the work and the assessment criteria. Some annotation is seen on the work, this again is helpful in highlighting key developments or explanations.

Specific task comments remain similar to previous reports, when the same issues are seen repeatedly, these are commented upon in individual centre reports from moderators to aid teaching and learning as well as marking for the following year. There is an issue of guidance given to candidates, this often presents a greater problem for the more able candidate in not accessing the highest marks in each assessment area due to lack of individual creativity within investigating and thinking about implications.

AO1 Using and Applying Mathematics

In the Isoperimetric Quotients investigation, quite a number of candidates should not be awarded the highest marks in the strands, in contradiction to the centre based marking. This relates to the need to develop the task, in tackling an investigation that considers many options in a natural progression, for example

- Consider the change in the IQ from types of non regular to a regular polygon?
- How can this be described?
- Does this development continue?
- Why dismiss non regular polygons?
- How does looking at regular polygon alone aid the investigation?
- How can the concept of compactness be seen to develop?
- Is there any consideration of a limit?

In Gradient Functions many candidates appear to complete separate mini tasks rather than develop an investigation that is based on improvements of methods towards greater accuracy. The fundamental process of moving from chords to tangents is key to understanding the idea behind the algebraic method. This often does not come through in the work of many candidates, yet some centres incorrectly accredit very high marks for work not demonstrating this understanding.

AO4 Handling Data

The importance of minimum requirement bullet points is fundamental to the assessment of Handling Data projects. All statements need to be met in order to award the mark linked with the minimum requirements.

The complexity of the problem is a consideration in the progress towards awarding higher marks. The task needs to be substantial and not a non-linked collection of simple problems, this does impact on the first and third assessment areas in particular.

In the second assessment area it is always worth reminding candidates of the need to interpret all data collection tables, calculations and diagrams, otherwise these aspects cannot be credited within the project. Equally a reminder is needed for the need to evaluate a strategy for the third assessment area. Without evaluation of a strategy only 3 or 4 marks can be awarded in the third strand. It is worth noting that this entails an evaluation of a strategy rather than a simple evaluation of any results or findings, it requires more depth than a conclusion of results.

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