WJEC
CBAC

GCSE EXAMINERS' REPORTS

MATHEMATICS
(2 TIER)

SUMMER 2009

Statistical Information

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

General Certificate of Secondary Education 2009

Chief Examiner: R.W. Brice

Foundation Tier - Paper 1

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.

Candidates are confident in presenting and interpreting bar charts (question 3) and scatter diagrams (question 14).

Whereas candidates can identify parallel lines they have difficulty with perpendicularity. More effort is needed in algebra (questions 11 and 17).

Comments on individual questions :

Q.1 (a) (i) Very well answered. A frequent error was 8024.

(a) (ii) Well answered. Many answers were mathematically equivalent, but not used in practice, for example, forty six hundred thousand.

(b) Well answered.

(c) (i) Very well answered.

(c) (ii) Not as well answered as (i) with 8800 a frequent incorrect answer.

(d) Quite well answered, but a frequent wrong answer was 100 or 'hundred'.

(e) Fairly well answered for 1 mark. Many candidates gave 3 and 5 but left out 15. Most common non-factor given was 10.

(f) The correct strategy was usually applied. Many used the 'repeated addition' method leading to arithmetical errors.

Q.2 (a) Quite well answered.

(b) Well answered, but ¾ was often given as 0·34, 3·4 or 0·25. There were also many errors in putting them in ascending order.

Q.3 A very well answered question with candidates drawing well-labelled bar charts. Part (b) caused most difficulty with 10 rather than '2' being a common error.

Q.4 (a) Well answered.

(b) Poorly answered with AB or BE being frequently seen incorrect answers. Candidates at the lower grades have great difficulty with perpendicularity.

(c) Far better answered than part (b).

(d) Candidates have difficulty with the 3 letter notation for angles. Many incorrect answers of approximately 21º and 32º were seen in (i) and 70º in part (ii).

(e) Fairly well answered, but 'reflex angle' was a popular incorrect answer.

Q.5 (a) Many drew vertical and horizontal lines in addition to the correct lines of symmetry.

(b) Well answered.

Q.6 The 'Counting squares' method was usually used with a great deal of success. Far too many candidates did not give any units or gave incorrect ones such as cm.

Q.7 Well answered although a number of candidates also drew Pattern 5.
Most common errors in parts (b) and (c) were to add a constant 4 or 5 each time.

Q.8 (a) Embedded answers were frequently seen.

(b) An answer of $8a + a$ was often seen.

(c) Well answered, but surprisingly many left their answer as 15+8.

Q.9 (a) Fairly well answered with fewer place value errors than in previous years. Candidates who use the 'non traditional' methods sometimes set the problem out correctly but are not sure on how to 'collect' their numbers. Those who used the Napier's rods method often did not collect the answer correctly.

(b) Part (b) was not well answered. Often they found 48÷8 = 6, but did not proceed further.

(c) Quite well answered.

Q.10 (a) (i) The cube number 64 was given by most.

(a) (ii) 61 and 67 were identified as prime numbers, but several candidates also included 63.

(b) (i) Not very well answered. Many wrote $2^3 \times 5^2 = 6 \times 10 = 60$ and others $8 + 25 = 33$.

(b) (ii) Quite well answered, but 3·37 was a common error.

Q.11 (a) Fairly well answered, but $6x$ was a very common incorrect answer.

(b) Well answered.

(c) Mainly correct, but a number of $2b$ and $2 - b$ seen.

(d) $9r$ was often seen, but the term in t proved difficult.

Q.12 (a) Very well answered.

(b) (i) Generally well answered.

(b) (ii) Very well answered.

(c) A common incorrect answer was 8/16 perhaps because they misread the question as 'less than 8'.

Q.13 (a) Not well answered with many not realising that an isosceles triangle was involved.

(b) Less well answered than part (a). Many made y equal to 43º, by making the angle in the triangle 94º and using the straight line property.

Q.14 (a) Very well answered.

(b) Weaker candidates gave a description rather than using the word 'positive'.

(c) Well answered.

(d) The answer was often not found using their line of best fit, but was an estimate in the acceptable range.

(e) Candidates found it difficult to explain clearly why they were correctly saying 'No'.

Q.15 (a) Most candidates scored well in this part, but 460g of mixed summer fruits caused the most difficulty.

(b) This part proved much more difficult for most candidates. A large number of them gave 5·5 litres as 550ml.

Q.16 (a) The vast majority of candidates scored at least 1 mark.

(b) Many wrong reasons given, mainly 'sides have to be equal'. Those who had the correct idea found it difficult to explain their reason clearly. Very, very rarely was $3 + 5 < 10$ seen.

(c) Very well answered by the better candidates.

Q.17 A very disappointing performance on a straightforward question on algebra. Apart from the expansion of the brackets in (b) and (c) little correct work was seen.

Foundation Tier - 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 full credit can be given to those who get incorrect answers but have used a correct method.

Candidates were confident in handling basic arithmetic early on in the paper, but their efforts in handling the electricity bill in question 16 was disappointing.

The data handling questions (12, 14 and 17) were answered very well overall.

There is a need to offer more experience at explanations as exemplified by questions 19 and 20.

Comments on individual questions

Q.1 (a) Very well answered though the cost of 8 flower pots was often given as £36 rather than £3.60. £85.03 was a frequent wrong answer for the total.

(b) Fairly well answered, but many wrong answers showed that some candidates did not understand what was being asked.

Q.2 Very few candidates gained all four marks. The area of the floor of a classroom was particularly poorly done. Imperial units were often given. Very many did not give square units and some of those who did, wrote down cm^2.

Q.3 (a) Very well answered overall, but many confused hexagon (C) with the pentagon (A).

(b) Very well answered.

Q.4 (a) Substituting numbers into the formula was well done, but some used their calculator incorrectly and evaluated $4 \times (21 + 15) = 144$ rather than $4 \times 21 + 15 = 99$.

(b) Many candidates struggled with this part of the question. A common incorrect answer was £230 / 10 = £23.

Q.5 (a) (b) Fairly well done.

Many candidates who knew the method for finding the mean and median confused them and gave the median in part (a) and the mean in part (b).

Q.6 (a) Very well answered.

(b) Fairly well done, although despite it being a calculator paper many gave £42.99 − £20.99 = £22.99.

(c) Generally well done, although many candidates showed very little working. A common error was to find the £38.39, but not write down the service used.

Q.7 Most candidates recognised the need for a multiplying factor, although they used a wide range of values rather than the required 12. Estimates for the actual heights were often given with incorrect units, e.g. 1 cm or 1·5 cm. Candidates did not show any working. It is essential for candidates to show their working so that full credit can be awarded for correct reasoning.

Q.8 Well answered with many fully correct answers or correct on follow-throughs after an initial error.

Q.9 (a) Most candidates were able to do part (i) but part (ii) proved more difficult. Omission of brackets in (17 + 3) / 4 often led to an incorrect answer of 17·75.

(b) Well done, although a few gave answers like 'doubling backwards' in part (ii) which is not a suitable rule for finding the next term.

Q.10 Either very well answered or very poorly answered. Putting numbers along the sides of the rectangles to mark their lengths could have helped some candidates mark the relevant numbers on the axes.

Q.11 (a) Fairly well done. The first part was well answered, but, as expected with negative numbers involved, candidates had more difficulty in finding the second number.

(b) $x = 2$ was a common incorrect answer, having calculated $8 \div 2$ rather than the correct 4×8.

(c) Many could calculate either -3 or -10 but then had difficulty in adding them together correctly.

Q.12 (a) Very many did not realise that 'at least 3 visitors' meant that they had to add the frequencies for 3, 4 and 5 visitors, giving 18/50 rather than 21/50 as their answer for the required probability.

(b) A frequent answer was 50, the number of patients in the hospital, rather than the number of visitors (the sum of the products of the number of visitors by the corresponding frequency).

Q.13 (a) Well done by many, but there were far too many non-calculator solutions attempted leading to errors. Candidates need more experience at deciding when to use calculator and non-calculator methods.

(b) Candidates found this more difficult than part (a), sometimes trying to find 78% of 120 rather than expressing 78 as a percentage of 120.

Q.14 Well answered by the better candidates.

Q.15 (a) Many measured the length of AB inaccurately. Some multiplied by 2, rather than dividing by 2, to find the distance in km. A common incorrect solution was 5km suggesting that their measurement was not sufficiently accurate.

(b) Many found it difficult to draw the correct bearing of 146° from A, though they could draw the length of the line correctly.

Q.16 Most candidates gained some marks for this question, but few scored full marks. Finding the correct number of units used was particularly problematic, but many managed to follow through correctly with 'their units' and then get the total charges. Many gave 105% of the total for the VAT.

Q.17 (a) Well answered.

(b) Very well answered.

(c) Many wrote down the probability of obtaining green and the probability of obtaining blue, but were unable to find a single probability of green or blue.

Q.18 (a) Quite well answered by the better candidates with many others getting as far as £15.84.

(b) Many left their answer as 15.3 / 1.9. Also many did not round their answer correct to 1 decimal place.

Q.19. There were very few correct answers. Most candidates did not attempt to express 24 and 54 as a product of their prime factors.

Q.20 A number realised that they had to use the method of trial and improvement but not all of these were able to indicate that one evaluation was too small and the other too big compared to 20.

Q.21 Rarely were fully-correct answers seen. Many did not recognise the need to use Pythagoras' theorem to find AB and many candidates simply multiplied together the three figures on the given diagram.

Higher Tier (Two Tier) Paper 1 and Paper 2

Evidence suggests that candidates were not short of time to attempt all the questions.

Questions that required thinking and development of strategies caused more difficulties for a number of candidates than the more straight forward style of questions.

Specific comments about individual questions are as follows:

Paper 1

Q.1 This question was well answered, with few descriptions rather than stating the type of correlation in part (b) and some good explanations in part (e).

Q.2 Part (a) was generally well answered; the mixed summer fruits proved to be the most difficult conversion. Many candidates answered part (b) correctly, but others either did not know that 1000ml is one litre, or they did not have a strategy to use to solve the problem.

Q.3 Although the vast majority of candidates round the values in part (a) to a suitable degree of accuracy for an estimate, many candidates make errors in the simple calculation.

A common incorrect answer in part (c) is 95%. A number of candidates selected the correct fraction in part (d) but did not show how they reached their decision, which is a requirement of the question. Expressing all the fractions given in the question, including the quarter, in a common format would have been sufficient to show how they made the decision.

Q.4 Part (a) (i) contained a number of errors with the sign for $-3g$, and there was some misunderstanding of the expression in (ii).

Part (b) was well answered, but a number of candidates lost the mark by inserting brackets incorrectly.

Part (c) (ii) was well answered, but a number of candidates incorrectly wrote “+7” as an answer to (i).

Q.5 Clearly a number of candidates are insecure in their knowledge of quadrilaterals and their properties in part (a).

The explanations in part (b) were generally very good, with many candidates having a clear understanding of the formation of a triangle, and having the ability to express this in words.

Part (c) was also reasonably well answered, with only a few candidates having a misunderstanding about interior and exterior angles of a triangle.

Q.6 In part (a) many candidates correctly converted 1·5kg to grams. The greatest problem seems to be whether to divide or multiply by the 300. The clue is in the units, g/cm^3!

Many candidates thought through the problem in part (b) to give a correct answer. There were many incorrect answers in part (c), with a number of candidates not engaging at all with the idea of bounds.

Q.7 This question was generally well answered. The most common error was in part (c) (ii) in not multiplying throughout by five, omitting to multiply the seven by five.

Q.8 The tree diagram was often correctly completed, but a few candidates had more difficulty with part (b). Not with the probabilities to use, but whether to add them or multiply them. The calculation of $0{\cdot}4 \times 0{\cdot}7$ caused difficulties for a few candidates also, the common incorrect answer being 2·8.

Q.9 Candidates either find standard form straight forward, or they show misunderstanding of the entire concept of powers of ten.

Part (c) was not well answered, with many candidates not having a strategy to use.

Part (e) was not well answered, demonstrating insecure knowledge of negative indices.

Q.10 This question was not well answered, with many candidates unable to write expressions for the quantities of red and white paint.

Q.11 Any errors in part (a) were followed through into part (b) where the majority of candidates chose a suitable scale and plotted points correctly. A small number of candidates incorrectly decided to join the points with a straight line.

Q.12 Part (a) caused many problems, and only candidates with a high level of algebra skills tackled these questions well.

It is disappointing to see that basic factorisation with a coefficient of the term in x^2 not being one causes such difficulty.

Q.13 A number of candidates showed little understanding of histograms. To other candidates this question was fairly straight forward, with only the first group not being of equal width to the other groups causing a problem. There was some good evidence of logical reasoning in part (d).

Q.14 A number of candidates clearly have no idea about the shape of trigonometric graphs. To others this question was an easy two marks.

Q.15 Many candidates did not have any idea how to transfer the information given to the diagram. This question was not well answered, and omitted by many candidates.

Q.16 Part (a) was well answered, with the scale given. A number of candidates have no strategy to find the values of *a* and *b* in part (b), which is a pity.

Paper 2

Q.1 This question was well answered, with very few errors or misunderstandings.

Q.2 Although this question was generally well answered, some common errors included incorrect position of the enlargement in part (a) and the selection of an incorrect line for the reflection in part (b).

Q.3 In part (a) a number of candidates did not know how to cope with a time of one and a half hours with a calculator, however the vast majority of candidates realised the need to divide the distance by the time. Parts (b), (c) and (d) were generally well answered.

Q.4 It would seem that many candidates did not know how to apply their knowledge of prime factors to attempt to answer this problem question. Only a few candidates were able to or realised the need to establish $2^4 \times 3^4$.

Q.5 Many candidates answered this question correctly, using mid-points. A few candidates seemed to have no understanding of the table, incorrectly adding values and dividing by five.

Q.6 Many candidates showed they had the understanding of this trial and improvement method for solution.

Q.7 A number of candidates displayed little understanding of the concept of volume, whilst others applied Pythagoras' Theorem correctly, found the area of the cross section and multiplied this by 3·5 cm. A number of candidates decided to use their knowledge of trigonometry in this question.

Q.8 Part (a) caused some difficulty for some candidates who found it demanding to cope with the variable *p* being on the right hand side of the formula, or it being negative on the left hand side.

Part (b) was generally well answered, although some candidates solved an equation and did not gain marks as they left their answer as an equation rather than an inequality.

Q.9 This question was not well answered. Many candidates showed no understanding of cumulative frequency, with many drawing blocks in part (b). Very disappointing responses to this question.

Q.10 Part (a) was well answered. A number of candidates showed insecurity with formulae in part (b), selecting an incorrect formula and not using the radius. Part (c) was straight forward for those candidates who understood the idea of reverse percentage. Other candidates had an incorrect strategy, finding 5% of 68.25 dollars.

Q.11 Part (a) caused a few problems, with a selection of incorrect answers, from adding the 3 and 2, to multiplying indices. Part (b) was fairly well answered, but a number of candidates had difficulty in collecting like terms. A number of candidates only partially factorised part (c), whilst others seemed to have no idea of the concept of common factors.

Q.12 Many candidates were successful in calculating the required angle, by many different methods. Other candidates did not have a complete pathway through the problem, applying trigonometry or Pythagoras' theorem without a goal.

Q.13 A number of candidates had difficulty in establishing the meaning of "exactly one of the selected marbles is blue". They incorrectly thought both marbles being blue would be included in this statement.

Q.14 This question was not well answered, although many candidates did realise that the angle subtended at the centre is twice the angle subtended at the circumference.

Q.15 Many candidates were able to answer both parts of this question correctly, using their answer from part (a) to find the angle at *C*. However, many other candidates demonstrated no knowledge of trigonometry apart from ratios for right angled triangles.

Q.16 Although a number of candidates solved the equation correctly, few were able to apply their algebra skills all the way through the "show that" section of the question. Many candidates were able to express the volume of the cones in algebraic terms, whilst for other candidates this question was clearly beyond their algebraic mathematical ability. A number of candidates answered part (b) in part (a).

Q.17 Very few candidates had knowledge of the use of tangents to find estimates for speed. This question was not well answered.

Q.18 Many candidates had some idea of multiplying, but how and where was a mystery to many, but the majority of candidates made an attempt at answering this question. For other candidates this was a clear straight forward finish to the paper.

WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk