GCSE EXAMINERS' REPORTS

GCSE
MATHEMATICS

NOVEMBER 2018

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MATHEMATICS

GCSE (NEW)

November 2018

UNIT 1 FOUNDATION

Even if the later questions in the paper were challenging, most candidates attempted most questions.

Candidates still have difficulty with answering questions involving rotational symmetry (Q13). Also, many are not secure with basic number work, particularly multiplication tables. As this is a non-calculator paper, candidates need to be confident with methods of addition, subtraction, multiplication and division.

Converting quantities written in metric units proved difficult. Even if candidates knew that they needed to multiply by 1000 to change kilometres to metres, they couldn't manage to do the multiplication itself (Q7).

Questions involving place value (Q17(b)) continue to be challenging. Also, the knowledge of parallel line facts was not secure (Q21).

Question	Comments
1	(a) Well answered though some thought that they needed to work out 324 + 186 instead of the correct 324 – 186. Some candidates randomly subtracted the larger digit from the smaller digit whatever its position in the columns in the sum. (b) Well answered though knowledge of the 8 times table was not always secure. Many thought that 56 ÷ 8 is 6. (c) Excellent. (d) (i) Very well answered. (d) (ii) The question asked candidates to calculate 48 – 7 x 5. Very many wrongly worked out 48 – 7 = 41 first, and then multiplied that answer by 5. The correct order of doing mathematical operations escaped them.
2	Both questions were answered very well.
3	Plenty worked out the correct answer of 42, the multiple of both 3 and 7 between 30 and 50. Even more found at least one multiple of either 3 or 7 within the specified range.
4	Excellent. Only a few reversed the coordinates, wrongly plotting (6, 4).

5	Many seemed uncertain of which line was the diagonal, wrongly measuring the length of the rectangle rather than its diagonal. So the answer was given as 12 cm instead of the correct 13 cm. Others wrongly worked out the perimeter.
6	This was the OCW question. Both parts of the answer had to be engaged with before either the OC or the W marks could be accessed. So the subtraction sum had to be seen and some attempt at converting a time from 12 hour clock to 24 hour clock. To gain the OC mark, we needed to see statements like: Journey began at 7 p.m. – 2 hrs 25 mins, OR Time journey began = 7 p.m. – 2 hrs 25 mins. Some words introducing the calculation were essential for the OC mark. To gain the W mark, it was necessary to use correct mathematical form in their calculations. So, 7 – 5 = 2 – 25 gets W0. Also, for W1, p.m. had to be included in the 12 hour clock time but not in the 24 hour clock time. Many worked out the start time using 12 hour time but did not change their answer to 24 hour time. It was possible to have M0 A0 followed by B1 for changing a wrong time, which had to be between 1 p.m. and midnight, correctly to 24 hour time. A significant number worked out the hours correctly (7 – 2 = 5), but then added 35 minutes instead of subtracting it. So a frequent wrong answer was 5:35 p.m.
7	(a) Very good. Changing cm to m correctly appeared to be straightforward for most candidates. (b) However, many found this part more difficult. Multiplying 9·07 by 1000 meant that 0 had to be written at the end of the given digits, with no decimal point. Where to put the extra 0 caused problems with 9007 being a frequent wrong answer as well as 9000·07.
8	(a) A few did not seem to know which numbers are odd or tried to find the mean of the numbers on the cards rather than use the mode. But, generally, this was answered well. (b) In this part of the question, there are 8 cards. So the probabilities needed are fractions with 8 as the denominator. The length of the given probability line is 8 cm. It would have helped candidates if they had marked the line every cm. There were a lot of 'hit and miss' answers which could have been avoided. A tolerance of up to ± 1 cm is allowed but there were still many wrong answers.

9	(a) Many knew that 9 x 4 = 36 but they could not place the decimal point correctly when working out 9 x 0·4. The most common wrong answer was 0·36. (b) Excellent.
10	To answer the question, both 15% of £600 and ¼ of £320 needed to be calculated. The easiest method to use for working out 320 ÷ 4 was to halve 320 and then to halve the answer of 160, giving 80. Others tried to use a conventional method of doing the division, but sometimes weren't able to work out 32 ÷ 4 = 8, e.g. getting 7 as the answer. Very much the most common method used to find 15% of £600 was: 10% of 600 = 60 5% of 600 = 30 15% of 600 = 60 + 30 = 90. To gain the M mark, a full correct method needed to be seen. So 10% of 600 = 60 5% of 600 = 15, say 15% of 600 = 75 would be awarded M0 A0 as no correct method was seen. The final answer needed the larger amount of money to be specified and so £90 should be written in the answer space. To be awarded the final B mark, this answer needed to be seen as well as 80 somewhere in the working.
11	Despite the word 'calculate' in the question, many still used their protractors to measure the size of angle x. This gave them the wrong answer as the diagram was not drawn to scale. The size of the angle of a square was commonly known to be 90°, but less well known was the size of an angle of an equilateral triangle to be 60°. Using the sum of the angles on a straight line gave the value of x.
12	Not many fully-correct answers were seen but very many managed to get 1 mark. A common omission was not writing the number 2 in the space within the rectangle but outside the two circles. 2 is neither a factor of 15 nor a square number. Many did not write the number 1 within the overlap of the two circles. Some wrote down a number more than once, in which case all of these repeated numbers were ignored even if one was correct.
13	Very many were unable to give the correct orders of rotational symmetry. Some wrote down angles, e.g. 180°. Others wrongly wrote the answers as fractions, e.g. 3/6 or 2/8.

14	(a) Very many incorrectly gave the answer as 8x – 2y, which was awarded B1 only. The answer had to be given as an expression, so 8x and -6y written separately gained only B1. Other further incorrect work lost a mark, e.g. 8x – 6y = 2xy. (b) Despite reaching 2m = 19, many candidates either stopped here or were unable to continue to find m = 9·5 correctly. Answers of 9 remainders, 1 was not accepted. Others tried to find the answer using trial and improvement, usually unsuccessfully. Embedded answers within the equation, e.g. 2 x 9·5 = 19, were allowed but frequently a wrong final answer, e. g. m= 12, was given so marks would be lost. (c) Very many could substitute the numbers, reaching 5 x -4 + 3 x 7. However, they couldn't proceed correctly. Wrong methods included 5 – 4 = 1 and 3 + 7 =10. Others worked out -20 + 21, but then just stopped or proceeded to a wrong answer of 41 or -1. An answer of -20f + 21g gained no marks. This was a frequent wrong answer.
15	(a) Many could draw AB = 6 cm correctly so were able to deal with the scale but then misread the protractor or drew the line AC wrongly, so were awarded only B1 out of a possible 3 marks. (b) Very many candidates were unable to measure BC correctly. Even if they did this, they were not able to multiply their answer by 3 accurately. The answer was expected to be given to 1 d.p. if necessary, e.g. if BC is measured as 6·7 cm then the answer should be given as 20·1 (m) and not 20 (m).
16	Many were able to indicate that x = 3, either labelled on the diagram or shown in the working space. But fewer were able to go to find the width of the rectangle and thence, its area. Several wrongly worked out the perimeter of the rectangle rather than the area. Others ignored the x on the diagram and worked out the area as 6 x 2 = 12.
17	(a) This was an estimation question so to gain any marks at all, sensible approximations had to be made. However, very many candidates tried to work out the calculation exactly. Most of those who attempted to approximate the numbers used (60 x 300)/2000. They were frequently able to work out 60 x 300 = 18000, but couldn't always divide 18000 by 2000 correctly, giving the answer as 9000. So the marks awarded were M1 A0. The only other acceptable approximations were (59 x 300)/2000 and (60 x 301)/2000. (b) Candidates found both parts of this question very challenging, many not attempting them. Those who found the correct digits were unable to place the decimal place correctly.

18	This was a difficult question for many. Even if they could identify that there was a probability of 2/5 of choosing an even-numbered ball, many did not know how to use this to find the expected number of balls. It is important to consider the size of the answer which may have been found. E.g. working out 5 x 75 = 375 as the expected number of even-numbered balls would be impossible as there were only 75 balls to start with. Those who favoured the straight-forward method of identifying that each number could be chosen 15 times and then said that as there were 2 even numbers, the total would be 30, did well.
19	Candidates found these bearings questions difficult. In (a), a very frequent wrong answer was 146° as if the turn for a bearing were anti-clockwise instead of clockwise.
20	Most candidates attempted this question. Some appeared to choose an answer randomly, but others did draw the given rotation and get the correct answer.
21	This was a difficult question for very many candidates though correct answers were seen, particularly in (a). However, many did not seem to know parallel line or angles. In (b), many random mathematical words were used to describe the triangle, e.g. perpendicular.

MATHEMATICS

GCSE (NEW)

November 2018

UNIT 1 INTERMEDIATE

In terms of the complexity of the questions, the paper was similar in standard to previous Unit 1 Intermediate papers.

However, for a number of candidates, it appeared that some of the topics being tested, especially in the latter part of the paper, were less accessible in terms of understanding.

Topics such as Bearings, Locus (of a point), Volume of a cylinder, Metric conversion, Index notation, Circle Theorem, Relative frequency and Surface Area all proved difficult for many of the candidates.

There was evidence that some candidates were not familiar with the whole of the Intermediate specification content.

Question	Comment
1	A list of numbers were given at the start of the question. Most of the candidates adhered to the instruction that only numbers from this list were to be used. Some lost marks for using other numbers. (a) (i) Three <u>cube</u> numbers were to be identified. A number of candidates gave square numbers as their answer or part of their answer. An incorrect number that was often seen in one of the answer spaces, was the number 36. (ii) In this case, 36 is the only number in the list that satisfies both of the required conditions. A common distractor from the list was the number 90, being a multiple of 9, with candidates forgetting that the answer also had to be a square number. (iii) It was mainly in this part of the question that numbers were offered that were not in the given list. 9 was a popular answer that gained no marks. (b) Again there were answers that used a number not on the list. Mainly *'Dividing 90 by 3'*. Far more prevalent however was the incorrect answer of '*Dividing 4 by 125'*. This often following a clear indication in the space below that the candidate had in fact evaluated 125 ÷ 4.
2	(a) On the whole, the scale drawing was drawn accurately. Where errors did occur it tended mainly to be a misread of their protractor and drawing an angle of 45° as opposed to 55°. (b) Fairly well answered. Candidates should be aware that in order to gain the final mark an accurate multiplication of their measured length of BC must be carried out. e.g. If their BC measures 7·2 cm then an answer of 21·6(m) is expected and not 22(m).

3	(a) The answer had to be given as an expression. Those who simply wrote 15x − 7x = 8x followed by −2y – 4y = −6y did not gain both marks. Some candidates lost a mark for their incorrect further work e.g. 8x – 6y = 2xy. (b) Having successfully reached 2m = 19 a few candidates lost the final mark by writing m = 19/2 = 9·1. Embedded answers such as 2×9·5 – 7 = 12 were allowed. This form of presentation however should not be encouraged as marks would be withdrawn if, as many did, a final answer of m = 12 was given. (c) Well answered. An answer of −20f + 21g gained no marks.
4	An equation was not asked for, so any indication that x = 3 gained the first two marks. Those who did write x + 8 + 7 = 18 did guarantee themselves a method mark even if they consequently made an arithmetic error in calculating the value of x. Most candidates successfully used their value of x to find the area of the rectangle.
5	(a) In this type of question the candidates must show that the given numbers are sensibly approximated to numbers that can be evaluated using a 'single digit' calculation. In this case the only permissible first step approximation were (60 × 300) / 2000, (60 × 301) / 2000 and (59 × 300) / 2000. Candidates who attempted an exact calculation were not awarded any mark and they lost valuable examination time. It is extremely worrying that so many candidates, having gained the method mark for writing (60 × 300) / 2000 failed to equate this to 9. Even 18000 /2000 was often incorrectly evaluated. (b) More correct answers seen than for this type of question on previous papers. (i) Rather than be overly concerned about the 'rule' when multiplying decimal numbers, a realization that 3·41 × 5·7 is in the region of 18 (3 × 6) should indicate that an answer of 19·437 is more likely than 194·37. (ii) Again 19437 / 570 is in the region of 40 (20000/500), so 34·1 more likely than 3·41. Not as well answered as part (i). Probably as they did not have a 'rule' to follow.

6	Candidates should be made aware of what is taken into consideration when awarding the OC and W mark. Responses should be structured with explanations that are clear and logical to the reader at the point in the solution when they are presented (not a series of calculations followed at the bottom of the page with a detailed explanation). For the OC mark (organising and communicating) we are looking for an explanation for each step of the work e.g. ‘Probability of choosing an even number = 2/5’ rather than simply writing ‘2/5’ in isolation. For the W mark (accuracy in writing) it includes accuracy in mathematical writing. Correct mathematical form is required. We do not want to see, for example, ‘2/5 × 75 = 30/75’ or ‘2/5 × 15 = 30/75’. Candidates performed well on the question itself, but few candidates gained both of the OCW marks.
7	In both parts of this question the candidates were being tested solely on their understanding of bearings. There was no requirement to measure or draw any bearings. The poor response indicates that this understanding is lacking for many of the candidates. (a) Knowing that ‘you turn clockwise from looking North’ was all that was required to realise that the correct answer was 180° + 34° = 214°. (b) (i) ‘East is 090°’, so 107° is ‘turning clockwise slightly beyond’ showing that point A is the required point. (ii) Again linking the compass points with their three figure bearing would have shown that E was the required point.
8	Several candidates used the diagram to show the size of some of the angles. This is to be encouraged as it helps to visualize the steps from one answer to the next. (a) Surprisingly it was a failure to recognise that opposite angles at a vertex are equal that gave rise to most incorrect answers. (b) It was not the intention of the question for candidates to assume the triangle was isosceles and then evaluate x and y! In the interest of fairness to all candidates (not always obvious that this ‘reverse thinking’ had been employed) marks were awarded for giving the correct values (or correct on a follow through from previous answers) of x and y, whichever direction of thought the candidate had employed.
9	(a) It was surprising how may candidates just drew the one final triangle with no indication of the position of the first reflected triangle. (b) Those who had actually drawn the rotated circle on the grid were far more likely to choose the correct coordinates.

10	(a) An incorrect answer often seen was $3x^3 - 6$. This gained just 1 mark, (b) A simple marking scheme gave credit for the two steps required to answer the question. First mark for correctly isolating the 3g (or −3g) term. Second mark for correctly dealing with the 3 (or −3). This could be a follow through from their ±3g =±f ± 2. Candidates who gave –g rather than (+)g, as their subject did not gain the final mark. Candidates who gave a final answer of (2 – f)/3 without showing the 'g =' did not gain the final mark as in this case there is no formula. Most candidates displayed poor algebra work. (c) (i) Any answer that used the '=' sign throughout the solution, as opposed to an inequality symbol, did not gain any marks. (ii) Some candidates gave the correct answer of 4 without having answered part (i). They only gained the one mark available for this part.
11	This was a loci rather than a construction question. A clearly defined single, unambiguous point P shown in the correct position (within given tolerances) would gain all 3 marks. Marks could also be awarded if the point satisfied either or both of the first two conditions. If no point was shown, then marks could be awarded for a bisector of angle BAC and/or an arc, radius 6cm. centre B. Few candidates gained all 3 marks.
12	A question of two halves if ever there was one! (a) Well answered. (b) Questions involving reciprocals have been eased from those set on previous papers. However if candidates do not know what is meant by 'reciprocal' then simplifying the calculation makes little difference to the outcome. Most of the candidates did not appear to know what is meant by 'reciprocal'.
13	(a) It is expected that candidates at the Intermediate tier know the formula for finding the volume of a cylinder. Many clearly didn't. Did candidates expect this type of question to only be asked on Unit 2? (b) As there were so few meaningful answers given in part (a) it was difficult to judge whether candidates would have correctly converted from cm^3 to litres.
14	This question was well answered. One error was to assume the number written in the middle box was the median value when the five numbers had not been written in ascending (or descending) order. Similarly the range would not always be the difference between the number in the last box and the number in the first box, unless the numbers were in order.

15	(a) A multiple choice question with four parts. All poorly answered. There was more success shown in part (ii), recognising that 12^0 is equal to 1, than in the other three parts. The 'popular' incorrect answers were as follows. (i) √28 (ii) 0 (iii) 15 (iv) −81 (b) Hardly any correct answers were seen.
16	If this had been an OCW question not many would have earned the marks for clearly explaining their work. Many candidates failed to consider the angle AOB in any form. This meant there was no opportunity for any follow through marks to be awarded. Most of those correctly evaluating angle AOB as 148° failed to state the angle property of a circle used for this calculation. There was a mark given for the correct statement.
17	(a) Previous questions of this nature have asked questions of the form '*Which reading should be taken as the best estimate for ….'.* The question has on the whole been suitably answered. e.g. '*the last one'* or '*one with most trials'* etc. Perhaps these were rote learned as adequate responses, because few successfully realized that 0·32 was the required answer in this case. (b) (i) Not only poorly answered but impossible answers such as 0·34 being offered as the number of sixes thrown in 600 throws. (ii) Little or no opportunity for any follow through marks to be awarded.
18	In the candidates' minds, any question about a cuboid that gives the reader three separate dimensions has to be about volume! The majority of those attempting this question started off with 35x = 142.

MATHEMATICS

GCSE (NEW)

November 2018

UNTI 1 HIGHER

As in previous examination series, pupils' performances reflected the increased demand of later questions in the paper. The low number of questions not attempted demonstrated that candidates had been appropriately entered for this tier.

Question	Comment
1	Part (a) was usually well-answered, with the most common error being a failure to multiply the second term by $3x$. Only very few were penalised for going on to (inappropriately) combine terms. In part (b), the majority produced a correct rearrangement of the formula, though there were also many sign errors. Most were able to isolate x in the inequality in part (c)(i), but often went on to give a final answer of $x < 4{\cdot}57$ or $x < 4{\cdot}6$; candidates need to understand that it is not appropriate to give a rounded decimal in the solution to an inequality like this, as the number involved needs to be exact. (The exact answer could be given as a recurring decimal, vulgar fraction or mixed number in this case.) It is also worth noting that candidates were penalised for replacing the inequality with an equation (unless their final answer was then correctly expressed as an inequality – though this practice should not be encouraged). For part (c)(ii), some candidates did not seem to know what was meant by an 'integer'.
2	This question on locus was generally done well. Candidates were helped by the fact that construction methods (using ruler and compasses but no protractor) were not required.
3	In part (a), almost all knew they needed to divide £720 by 9, and usually obtained both correct answers, though there were occasional errors in arithmetic. In part (b), although most appeared to know the meaning of 'reciprocal', they did not always 'calculate the value' (as specified on the question) e.g. leaving the answer as 10/2 or even 5/1. There was some mis-use of the 'equals' sign, such as writing 2/10 = 10/2.
4	(a) The volume of the cylinder was usually correctly calculated, although some omitted to square the radius. (b) The majority understood the need to truncate their answer to part (a) in order to obtain a whole number of litres. It was a concern that some candidates thought there were 100 cm^3 (or ml) in a litre.
5	This was well-answered by most. Candidates showed secure understanding of median, mean and range. However, choosing not to write the list of numbers in ascending order sometimes resulted in a median which was too small or a range which was too large – these errors might have been more immediately apparent, and hence avoided, by simply listing in order.

6	(a) Some candidates struggled with this multiple-choice question on indices, particularly parts (iii) and (iv). It was also disappointing that, at the higher tier, some thought that 12^0 was equal to 0 or 12. As has previously been the case with multiple-choice questions, those candidates who made good use of the working lines (for written calculations) tended to be the most successful. (b) The response to this part of the question was very poor indeed. Only a few recognised 4 as being 2^2, and even fewer added the indices correctly to obtain an answer of 30. Common incorrect answers included (4 × 28 =) 112 or (28 ÷ 4 =) 7. Although it was unnecessary to do so, some chose to write out a product of thirty separate 2s in order to demonstrate how many there were altogether.
7	Many candidates performed well in this OCW question on circle theorems. The majority found $A\hat{O}B$ to be 148°, and many gave a sufficiently formal statement of the related circle theorem. The need for appropriate terminology (e.g. 'circumference') should be noted, however. (Furthermore, statements such as 'Arrowhead theorem' are not acceptable in place of 'Angle at the centre is twice the angle at the circumference'.) For the OCW requirement of the question, again plenty performed well, presenting well-structured solutions. However, some lost the mark for 'accuracy in writing' due to multiple errors such as mis-using the 'equals' sign, mis-spelling words (particularly 'isosceles') or failing to use correct notation to denote angles or lines. Some were penalised for not showing sufficient calculations to explain how they arrived at their final answer (despite the instruction in the question to 'show all your working').
8	For part (a), the majority knew to take the final relative frequency reading from the graph in order to use the largest number of throws. Some incorrectly opted for 0·3, presumably because it made two appearances on the graph. In part (b)(i), most knew to multiply 600 by 0·34. However, some candidates did not understand that the number of throws was cumulative, instead reading the graph as if each set of 200 throws was recorded separately, and calculating 200 × 0·4 + 200 × 0·3 + 200 × 0·34 to obtain an incorrect answer of 208. Part (b)(ii) was usually well-answered, with candidates knowing that they needed to subtract 100 from their answer to part (i).
9	The response to this question was disappointing, with far too many candidates failing to engage with the surface area of the cuboid, working instead with volume (and therefore gaining no marks). There were a significant number of good solutions, however, and those who constructed a correct equation usually went on to solve it correctly and gain full marks. Of those who did realise that they needed to add the areas of (six) faces, some did not identify all of them, tending to have too many repeats of a particular one.
10	The enlargement was often well-described, though common errors included giving the scale factor as (+)2 or ± ½. Some failed to observe the requirement to describe a 'single' transformation, giving a sequence of transformations instead (usually an enlargement with a positive scale factor followed by a rotation through 180°). Candidates should be encouraged to use correct terminology, namely (in this case) 'enlargement' (not e.g. 'expansion'), 'centre' (not e.g. 'origin') and 'scale factor' (not e.g. 'multiplier'). (Some candidates showed a lack of understanding of the idea of a linear scale factor, stating incorrectly that the shape had been made 'twice as big'.)

11	Plenty of candidates gained full marks here, although drawing the line y = -1 instead of x = -1 was a surprisingly common error. This could in fact be an expensive error, as follow through marks were only awarded for a closed region for which the inequalities had all been correctly observed (and this could not be true for the closed region formed above the line with equation y = -1).
12	Some excellent solutions were seen here. The question did not explicitly require the candidate to find an expression for F in terms of d, but those who set out to do so were generally most successful in answering the whole question. A minority seemed to mis-read 'inverse proportion', proceeding instead as if it were direct proportion. Others missed the fact that d was 'squared', and proceeded instead as if F was inversely proportional to d.
13	Re-arranging the formula was often successfully completed. However, having collected terms in c on one side, candidates were sometimes unable to go any further (by factorising). Weaker candidates struggled with the appropriate order of operations throughout.
14	In this question, most candidates produced a correct expression for the area of one or both sectors but were not always able to proceed any further. Some created extra difficulty by using 3·14 for π, often undertaking lengthy (unnecessary) multiplication. Those who left their areas in terms of π were simply able to cancel and easily obtain the final answer of 10 cm.
15	(a) This was often well done, though there were some place value errors in multiplying the recurring decimal by a power of 10. Another (less common) error was to treat the given decimal as if it were entirely recurring, namely 0·37373737…. (b) (i) Whilst many fully correct answers were given, there were too many sign errors in expanding the brackets, with the final term sometimes given as -2 rather than (+)2. More able candidates succeeded in using the alternative method of rewriting √8 as 2√2 and simplifying the contents of the brackets before squaring. (ii) This part of the question challenged many candidates, and they often mistakenly multiplied all three surds by √3 (rather than once each for numerator and denominator). (c) Many correct answers were given, though there was a wide selection of wrong answers e.g. ±64.
16	Whilst there were some fully correct simplifications here, it was surprising that, having successfully factorised the quadratic expression in the numerator, some failed to factorise the (linear) denominator and therefore could not eliminate any sets of brackets. Only very few were penalised for further incorrect 'simplification' after obtaining the correct expression.

17	(a)	Whilst many correct answers were seen, it was common for candidates to fail to allow for the two possible orderings of red ball and green ball. A small number of candidates demonstrated confusion between adding and multiplying fractions, or failed to account for the non-replacement of each selected ball.
	(b)	This part of the question was relatively well-answered at this late stage in the paper. The very ablest candidates did calculate the correct probability, usually via the efficient method of subtracting the probability of two balls of the same colour from 1. Some arrived at the answer through various alternative valid methods (although these methods were prone to errors as they were more long-winded).
18	A good number of candidates knew that they needed to translate the curve 4 units to the right, and indicated this clearly. Others wrongly translated the curve vertically as well as horizontally. Some created unnecessary work and confusion by expanding brackets and attempting to plot a variety of points, mostly incorrectly.	

MATHEMATICS

GCSE (NEW)

November 2018

UNIT 2 FOUNDATION

The paper was similar in standard to the previous Unit 2 Foundation papers set and contained many questions on topics that were tested in previous examination series and the Specimen Assessment Materials (SAMs).

Candidates found most of the questions on the earlier part of the paper accessible, though found the common questions with the Intermediate tier very challenging.

As in previous series, there was evidence that some candidates were not familiar with the whole of the Foundation specification content.

Question	Comment
1	Most candidates handled the conversions between pence and pounds well in this question. Some candidates wrote £0.74p in the missing box for the second calculation, and this poor use of units, which is seen in many grocer shops across the country, was condoned – however, candidates who wrote £74p weren't awarded the mark. It was also common to see candidates write 42p or £42 when completing the last calculation – spurious units were ignored in this calculation.
2	(a) This was very well answered by candidates, with over 85% of candidates writing a correct response. The most common incorrect answer was 30.25, obtained by candidates misreading 13 as 30. (b) Candidates found this part marginally more challenging than (a), with over 80% of candidates giving a correct response. Some candidates writing an answer of 'six hundred and forty-three', demonstrating poor understanding of place value. (c) Candidates found (i) a lot more accessible than (ii). Part (i) was the best answered question in the paper, with over 85% of candidates being able to write the largest possible number using the 4 digits provided. Candidates struggled with (ii) where they had to use only 3 of the digits to make the smallest even number. Less than half of candidates gave a correct response to this part. It was common in this part to be see responses which were odd.
3	(a) Incorrect responses for this part were typically the result of candidates making mistakes when finding the sum of the numbers, or just finding the sum and doing nothing else. Very few candidates confused the mean with other averages, such as the median or the mode. (b) This part was well answered by candidates, with over 3/4 of candidates giving a correct answer. Most responses correctly referred to Neil forgetting to write the list in ascending or descending order before finding the middle number. A few candidates gave instructions to calculate the mean instead of the median.

4	(a)	Less than half of candidates were able to correctly identify 6110 as a multiple of 13, despite them having a calculator to check their answers. The most common incorrect response was 3213, with candidates seemingly being tempted by the 13.
	(b)	This part was answered more successfully by candidates, with nearly 2/3 providing correct responses. There were few workings shown in candidates' responses, suggesting that most were using a scientific calculator and were able to use it efficiently to work out this calculation correctly.
5	(a)	Candidates found completing the figure quite challenging, in particular drawing the third line. Many diagrams consisted of two lines and a curve, with candidates simply overlooking the third line, which is subtler than the other two.
	(b)	This part was answered correctly by over half of candidates. There was no pattern seen in the incorrect responses chosen.
	(c)	Over 3/4 of candidates were able to identify this shape as a cylinder. Many had difficulties in spelling 'cylinder', though incorrect spelling was not penalised if their intention was clear.
6	(a)	Candidates engaged well with this part, with many correct responses seen. Some candidates carried out the first step (getting to 108) but were unable to identify two numbers which multiply to give 108. Some incorrectly gave two numbers which add to 108, with 54 + 54 commonly seen.
	(b)	This part was answered less well, with many candidates finding it difficult to find Jac's original number after being told what 25% of it is. Some candidates incorrectly started by calculating 25% of 35, rather than multiplying it by 4. 1 mark was awarded to candidates who were able to work out 1/10 of what they had unambiguously indicated to be Jac's number, except for those who used 35, clearly ignoring the first stage of this problem.
7	(a)	This part was well answered by candidates, with over 3/4 of responses being correct.
	(b)	This part was answered correctly by just over 50% of candidates. Many incorrect responses of 27 were seen, obtained by candidates struggling to subtract w from 27w.
	(c)	This was very well answered, with 95% of candidates being able to correctly find the next term in the sequence.
	(d)	This part was answered significantly worse than (c) as candidates had to provide the rule of the sequence. In previous series, it has been evident that candidates seem to find it considerably easier identifying the rule when it's adding or subtracting a value – they seem to find it a lot more challenging when it's multiplying by a value, and the same was true in this series. Many incorrect responses of 'add 8' were seen, with candidates clearly just calculating the difference between the first two terms and not checking to see if it works for the other terms in the sequence.
	(e)	It was clear in this question that many candidates have limited knowledge of prime numbers, with just over a quarter providing a correct response. Some candidates confused prime numbers with square numbers and even numbers. It was clear that some candidates didn't realise that all of the numbers in the sequence were in the 8 times table.

8	Candidates should be made aware of what is taken into consideration when awarding the OC and W mark. For the OC mark (organising and communicating) we are looking for a clearly presented and structured response which is well-communicated to the reader. For the W mark (accuracy in writing) it includes accuracy in mathematical writing. Correct mathematical form is required. As this question heavily involves units, candidates who failed to include the units in their responses weren't awarded this mark. Candidates found this question challenging, with some confusing area and perimeter. Very few candidates were able to identify the three different rectangles with an area of 20 cm^2. Those which did were typically awarded all 3 marks.
9	Despite this being a calculator-allowed paper, some candidates did not use their calculator to carry out this calculation. This not only wastes valuable examination time but also leads to errors when pre-approximation takes place e.g. '1% of 83·5 = 0·84'. Rounding errors were sometimes seen, as were answers given to an incorrect level of accuracy – typically two decimal places.
10	In this question candidates had to find the height of the cuboid and it required them to have knowledge of how to calculate volume. Very few candidates demonstrated this knowledge, with many simply adding the three values given in the question.
11	Candidates found this question challenging, with most just drawing two sectors of a pie chart without putting much thought into their size. Candidates who correctly calculated the sizes of the sectors typically went on to draw their pie chart correctly. The mark for labelling the sectors was for 'awake and asleep' and not for '240° and 120°', nor for '16 hours and 8 hours'. Many candidates incorrectly identified 'asleep' as the largest sector of their pie chart.
12	The candidates were guided in the question to choose a number. Many of those who did, found this question relatively easy to answer. If a number was not chosen, full marks were still on offer as long as candidates did not confuse a number with a percentage. e.g. 1/5 of 25% = 5% or 0·05. It is not true that 1/5 of 25% = 5. This was frequently seen.
13	It was very common for candidates to think that triangle ABC was an equilateral triangle, with many stating that angle CBA and CAB were 76^0. Follow through marks were available for candidates who incorrectly

14	(a) Embedded answers such as 9·6/2 = 4·8 were allowed. This form of presentation however should not be encouraged as marks would be withdrawn if, as some did, a final answer of m = 4·8 was given. The most common incorrect answer was 2.4, obtained by candidates halving 4.8 instead of doubling it. (b) Candidates found this question very challenging. This part had the lowest attempt rate in the paper, with over 40% of candidates not attempting this part. Some candidates listed the first six terms of the sequence, rather than simply calculating 3×6 – 20 = -2.
15	Candidates who gained marks in this question typically started this problem by listing all the possible 16 different numbers, before going on to identify the three multiples of 7 included in their list. Most candidates who were awarded the first two marks went on to write their probability correctly, though some candidates used incorrect notation, for example writing it as '3 out of 16' – this was penalised by 1 mark. It was very common for candidates to write that there were only 8 possibilities (the sum of the possibilities on each of the spinners).
16	In the specification for both Mathematics-Numeracy and Mathematics, it is written that: *'Candidates will be expected to know the following approximate equivalences: 8 km ≈ 5 miles, 1 kg ≈ 2·2 lb, 1 litre ≈ 1·75 pints.'* If candidates do not know these conversions, no marks can ever be gained on a question such as 16(a) no matter how simple the calculation may be. (a) As most candidates did not know that 5 miles is approximately 8 kilometres, it was extremely unusual for candidates to be awarded full marks in this question. It was common for candidates to write that '1 mile = 1000m'. There were no follow through marks were awarded for candidates who used incorrect equivalences. (b) This question was very poorly answered, with very few candidates giving the correct answer of 40 000. The most common incorrect answer was 400, obtained by multiplying 4 by 100 instead of 100^2.
17	Candidates found this question very challenging, with very few fully correct responses seen. Most of the candidates who were awarded marks in this question, earnt them by correctly calculating the area of the square. The mark available for showing that the perpendicular height of the triangle CDE is 4·3 cm was only awarded if it was clear that the candidate did not think this was the slant height DE.

MATHEMATICS

GCSE (NEW)

November 2018

UNIT 2 INTERMEDIATE

The paper was similar in standard to the previous two Unit 2 Intermediate papers set, and contained many questions on topics that were tested in the Specimen Assessment Materials (SAMs).

Candidates found most of the questions accessible.

The topics that caused most difficulties were conversion between metric and Imperial units, percentage change, and, knowledge and use of y = mx +c to represent a straight line.

There was evidence that some candidates were not familiar with the whole of the Intermediate specification content.

Question	Comment
1	(a) Nearly all the candidates displayed correct calculator work. The majority of them, however, gave their answer correct to 2 decimal places rather than correct to 2 significant figures. (b) Some candidates did not use their calculator for the calculation. This not only wastes valuable examination time but also leads to errors when pre-approximation takes place e.g. '1% of 83·5 = 0·84'. Unlike part (a), the answer was almost always given to the required degree of accuracy.
2	Most candidates indicated at least three out of the five correct responses. The two incorrect responses most often seen were; that 'all rectangles are similar' and that 'not all regular hexagons are similar'.
3	Well answered with most candidates gaining some marks. Marks were lost by those who converted the 8 hours into 1/3 or 33⅓% but did not engage with the 360°. They tended to estimate the division of the pie chart into two appropriate sectors. The mark for labelling the sectors was for 'awake and (a) sleep' and not for '240° and 120°', nor for '16 hours and 8 hours'.
4	The candidates were guided in the question to choose a number. Those who did, found the question relatively easy to answer (even the candidate who for some reason thought 20·6 was a good number to choose!). If a number was not chosen then full marks were still on offer as long as they did not confuse a number with a percentage. e.g. 1/5 of 25% = 5% or 0·05. It is not true that 1/5 of 25% = 5.

5	Candidates should be made aware of what is taken into consideration when awarding the OC and W mark. Responses should be structured with explanations that are clear and logical to the reader at the point in the solution when they are presented (not a series of calculations followed, at the bottom of the page, with a detailed explanation). For the OC mark (organising and communicating) we are looking for an explanation for each step of the work. e.g. 'the calculation for angle CBA should precede the calculation for angle CBP' (structure), 'CBA = 52°' rather than '52°' in isolation (communication). For the W mark (accuracy in writing) it includes accuracy in mathematical writing. Correct mathematical form is required. Units, where appropriate, should be shown. We do not want to see, for example, 'CBA = 180 − 76 = 104 = 104/2 = 52°'. Candidates performed well on this question even when the OCW marks were not fully gained.
6	(a) Well answered. Embedded answers such as 9·6/2 = 4·8 were allowed. This form of presentation however should not be encouraged as marks would be withdrawn if, as some did, a final answer of m = 4·8 was given. (b) Candidates had equal success in extracting the common factor 'y' in (ii) as they did in extracting the common factor '3' in (i). 6(x − 2·5) is not an acceptable factorization of 6x – 15. (c) (i) Some candidates listed all the first six terms rather than calculate 3×6 – 20. (ii) Many did not relate the statement to the given sequence and simply offered e.g. '53 is odd and is greater than 50'. Lots of candidates chose the 51st term to disprove the statement by stating that 3×51 – 20 = 133 (an odd number greater than 50). They obviously gained the mark, but one wonders what the response would have been if the statement had been, say, '*There are no odd numbers greater than 59 in this sequence*.' Would they write 3×60 – 20 = 160 and come to an incorrect decision?
7	Very well answered with most candidates listing all the possible 16 different numbers. Few candidates justified the 16 possibilities using 4 × 4 = 16. The three multiples of 7 included in the list were almost always identified. The probability was correctly shown as a fraction 3/16. An incorrect notation of this probability, e.g. '3 out of 16' would be penalised (−1 mark).

8	I quote again from the Specification for both Numeracy and Mathematics (for all tiers), *‘Candidates will be expected to know the following approximate equivalences:* *8 km ≈ 5 miles, 1 kg ≈ 2·2 lb, 1 litre ≈ 1·75 pints.’* If these are not known then no marks can ever be gained on a question such as 8(a) however simple the calculation may be. (a) As most candidates did not know that 5 miles is approximately 8 kilometres, then the straightforward 3 marks for stating, ‘1 mile = 1·6 km = 1600 metres, 1·5 km = 1500 metres, so Difference = 100 metres’, was not available. (b) Very few candidates gave the correct answer of 40 000. There was no appreciation that it was an area rather than a distance that was being converted.
9	If this had been an OCW question not many would have earned the marks for clearly explaining their work. Apart from those who simply multiplied 10·7 by 6·4, candidates scored well on this question. The mark available for showing that the perpendicular height of the triangle CDE is 4·3 cm was only awarded if it was clear that the candidate did not think this was the slant height DE. Any pre-approximation of a calculated value, e.g. ‘Area of ABCE given as 41 cm^2’ would be penalised (−1 mark).
10	(a) This multiple choice question tested their understanding of repeated proportional changes and the use of multipliers. It was not well answered. The incorrect answer most often seen was $0{\cdot}12^3$. (b) A correct first step of any method used must involve the original value as the denominator of a suitable fraction, either ‘increase’/’original’ or ‘new’/’original’. This would gain the first method mark (M1). An appropriate second step would be the correct method to convert this fraction to the required percentage answer. This would gain the second dependent method mark (m1).
11	Unlike many other Venn diagram questions, where the diagram is given and candidates are asked to interpret the information shown; for this Venn diagram question, it was a requirement for candidates to draw a Venn diagram. Only a single mark was at stake for their display. In order to gain this mark candidates had to draw two intersecting circles, both appropriately labelled, and placed within a rectangle. The symbol for the universal set was not a requirement. The remaining two marks were for the correct placement of the integers 74 to 80 inclusive.

12	(a) Calculating the correct value for y when substituting $x = -2$ into the quadratic proved difficult for many of the candidates. A common error was to evaluate $-2^2 = -4$ instead of $(-2)^2 = 4$. (b) Most plotted their points accurately. As many had a follow through point of (−2, −13) to plot, which would not be on the given graph, no marks were deducted for this particular 'missing' plot. There has been an improvement in the drawing of a smooth curve. (c) The question asked for the line $y = 2$ to be drawn. In cases where this line had not been drawn (at least 2 cm long) then a mark was lost regardless of whether the correct values of x were given The negative value of one of the points of interception was sometimes overlooked, resulting in an unnecessary loss of a mark. Another error often seen was to misread the negative scale on the x-axis and give an answer of −5·4 when it should have been −4·6.
13	The mark scheme allowed for 1 mark for each occurrence in which their chosen number was correct as regards the 2nd, 3rd, and 4th conditions. 70 is the only number that is correct for all three conditions and thus gains 3 marks. Nearly all of the candidates gained at least one mark.
14	Those candidates familiar with this type of question usually gain all four marks. Many lost the final mark as they did not give their answer correct to 1 decimal place. A number of candidates, although gaining all the marks, carry out further unnecessary calculations even though they have already calculated sufficient values to identify the correct answer. Some did not carry out the necessary check required (e.g. looking at 5·65) to establish that the answer was 5·7 and not 5·6, and therefore only gained two marks.
15	A multiple choice question. More correct answers were seen by those who made use of the answer lines, as opposed to those who made no use of this space. Parts (a) and (b) tested candidates knowledge and use of the form $y = mx + c$ to represent a straight line. A topic on the Mathematics (Algebra) Intermediate tier specification. Most of the candidates displayed little knowledge or understanding. There were no 'popular' incorrect choices which suggests that the choice of answer was a random pick for many of the candidates. Parts (a) and (b) may have been poorly answered as the topic is at the 'higher end' of the Intermediate tier content. However. (c) A very poor response to what should have been a very accessible question. Candidates failed to see the connection between coordinates (*x, y*) and some simple linear equations. Given that $x + y = 7$, this should have immediately ruled out three of the five choices on offer. Of the two left, then the fact that $x – y = 3$ identifies the correct coordinates.

16	Most candidates realised that finding the length of the side of the square was the first step in solving the problem. Those who then recognised that finding the length of the diagonal involved using Pythagoras' theorem did so accurately.
17	(a) Very well answered. A few incorrectly gave 0·02 on the 'Not a Saturday' branch. The question states that the decision on how to travel is independent of the day on which the meeting is held. Some candidates ignored this information and gave different probabilities for the 'Not Saturday' travel choices to those on the 'Saturday' travel choices. (b) A testing question in that candidates' had to be aware of the independent events (Day and Travel) as well as the mutually exclusive events (Plane or Car). Those candidates who indicate on the tree diagram in part (a) the six probabilities of the different combinations, must transfer the required information to the answer space for part (b)
18	An accessible seven marks for those who were familiar with using trigonometric relationships in a right-angled triangle. It appeared, however, that many candidates had not covered this part of the specification. (a) A few candidates could not resist using Pythagoras' theorem in order to find the length of AC. If they then used a correct trigonometrical relationship to find the size of angle x, all the marks were available. (b) Some mistakenly thought P was the mid-point of line AB, and used AP = 4·1 cm. There were no follow through marks awarded in this case. Of those candidates who understood and knew how to use trigonometric relationships in a right-angled triangle, a number slipped up by going from the correct 'sin 52° = 7·9 / AQ' to an incorrect 'AQ = 7·9 × sin 52°'

MATHEMATICS

GCSE (NEW)

November 2018

UNIT 2 HIGHER

This is the fifth series of the new specification and there is a sense that the candidates are more attuned to the style of the papers along with the assessment objectives. There are some topics which were well answered by the cohort.

The standard of the paper is comparable to the papers already sat, with some questions deemed to be slightly more accessible than the earlier papers.

The multiple choice questions were not very well answered – candidates need to utilise the working lines provided to show some thinking skills, their workings and/or to check their answers.

Some of the AO3 questions were better answered than in previous series, with the majority of candidates making a start on most questions – seldom were questions left not attempted. Although the paper was deemed to be more accessible, the impression was that the candidates entered seemed better prepared.

Areas of the syllabus that require attention include:

- Setting up Venn diagrams,
- Gradients and y-intercept of straight line graphs,
- Standard form,
- Sketching the graph of y = tan x,
- More challenging factorisations,
- Dependent probability,
- The trapezium rule,
- Multi-step sine rule and cosine rule,
- Solving equations containing algebraic fractions.

Question	Comment
1	(a) This part of the opening question was fairly well answered, but a notable amount of candidates did not recognise ‘x 0.88^3’ as the correct multiplier. (b) Although most candidates were able to get started on this part of the question, many candidates finished their answer with 0.08, 1.08 or 108(%), which only gained one mark. A significant number gained no marks in this question, usually dividing by 42.5.
2	Although the majority of candidates could arrange the numbers correctly in their correctly labelled intersecting circles (if values were omitted, they were usually the 77 and 79 outside), many did not draw the rectangle to define the universal set.

3	(a) This question was well answered, although the most common incorrect value seen was $y = -13$, for $x = -2$. (b) The majority of candidates plotted well. There was the occasional misreading. (c) As the question specifically asked candidates to draw the line $y = 2$, it had to be shown. This was done correctly by the majority of candidates, as was the reading of the ordinates where the line intersected the curve.
4	This question was answered well, with many candidates gaining all 3 marks, and most of the remaining candidates gaining 1 mark. Seldom did candidates achieve 2 marks. Many candidates appeared to confuse themselves with lots of calculations which ultimately had no use in the final answer. For this type of problem-solving number question, a better strategy could be to simply list all the possible numbers and then cross them off if they do not fulfil the stated criteria.
5	The majority of candidates were familiar with this type of question and it was well answered. A few still did not carry out the necessary check which was required in order to find whether the answer was 5·6 or 5·7 (e.g. looking at 5·65).
6	These were all multiple choice questions on the properties of straight line graphs. (a) Here the candidates were expected to rearrange the equation into the form y = mx + c, and then identify the value of m, the gradient. This was generally done badly, with the majority of candidates not utilising the working lines to show the rearrangement. It may be questionable whether a significant number of candidates knew that it would be useful to rearrange into the form y = mx + c. Unfortunately, both the 6 and the 3 were often chosen. (b) The candidates would have found it useful to rearrange the equation into the form y = mx + c, once more, in order to identify the value of c, the y-intercept. Again this was poorly answered, with just as many candidates opting for 3 as those who chose the correct answer, -3. (c) Here, candidates were expected to find the coordinates of the point of intersection of two given lines. There appeared to be a general lack of understanding of how coordinates are linked to equations of lines. All 5 choices were offered by candidates – it seemed as if their answer was chosen at random. There was no common incorrect answer.
7	This was the OCW question. This question was well answered, with a good majority of candidates identifying the need to employ Pythagoras' Theorem and gaining all 4 marks for the mathematics. Both OCW marks were often gained by the candidates who had attempted to find the length of a side of the square and also the length of the diagonal. However, a number of candidates often left out the units for their solution, or even wrote cm rather than m, meaning they lost the W mark.

8	(a) This question was answered very well, with almost all candidates being able to correctly complete the tree diagram. A few careless arithmetical mistakes were seen (0.2 on the first branch, probably from calculating 1 - 0.8), but rarely from a lack of understanding. (b) Having completed the tree diagram correctly, this follow up question was not answered quite as well as part (a). Some candidates only calculated the probability of either P(Saturday and plane) or P(Saturday and car). Another correct method, often seen, was to combine the probability of travelling by plane or by car, and therefore showed 0.08 x 0.55 = 0.044 for all 3 marks. Furthermore, some candidates had the correct intention by writing 0.08 x 0.4 + 0.15, but then forgot the order of operations on a calculator (BIDMAS), therefore obtaining the incorrect answer.
9	This question was a multistep question, requiring candidates to use trigonometry twice. The first part required candidates to use 'tanx = opp/adj' to find the angle marked x. Although candidates generally used the expected method to gain the correct answer, a small number of candidates used a two-step method, by applying Pythagoras to find the hypotenuse and then applying the sine rule. It was then a fresh start to find the angle *PAQ*, and then trigonometry to find the length AQ. This second part was generally well answered, when attempted, using either x = 37.9, or FT 'their 37.9'.
10	This was a multiple choice question testing a candidate's understanding of basic arithmetic of numbers in standard form. The candidate had to understand what happens to a 1×10^{100} when divided by ten and then multiplied by 9 (90%). This is, in fact, a simple indices question, but it was poorly answered. One googol cannot be used on a calculator, so this may be one reason why so many candidates failed to answer this question correctly – they gave up when they realised this. However, the working lines given in the question were there to do some workings which could have helped the candidate.
11	Although candidates have a fair idea of the shape of the graphs of y = sin x and y = cos x, it is apparent that the majority of candidates are not able to sketch the graph of y = tan x. As they have their calculators for this paper, candidates should have considered evaluating some values for y = tan x, e.g. every 30°, which would have helped them sketch the graph.
12	Many candidates knew how to calculate the surface of the sphere (or were aware it is on the formula sheet), and of those candidates, the majority realised that the hemisphere was half of it. Unfortunately, many candidates failed to add the circular base area, and therefore could only gain a maximum of 2 marks.

13	(a) This question was poorly answered in general, with many incorrect or partial factorisations being offered. The most common partial answer seen was $c(c^2 – d^2)$. An incorrect factorisation of the difference of two squares, $(c – d)(c – d)$, was awarded B1, rather than the B2 for a correct factorisation. Hence, many candidates gained a fortuitous B2 for $c(c – d)^2$. Many other incorrect factorisations gained no marks at all. (b) This part of the question was again poorly answered, and more so than part (a). The instruction to 'factorise' and then 'simplify' might have confused a number of candidates. For the expected method, the instruction to 'factorise and simplify' would be appropriate, but taking a common factor of (e – 1) from both terms was seldom seen. The majority of candidates tended to try to expand the brackets, and collect terms together to form a quadratic expression, which could then be factorised. The majority of candidates failed to expand the brackets correctly, especially the $5(e – 1)^2$, and collect the terms together. Having got this far, the vast majority of candidates stopped without attempting to factorise the quadratic expression, be it correct or otherwise.
14	This question seemed to be answered better than most of the other questions at the higher grades. Many candidates realised that this was a Pythagoras' Theorem question but it was rare to see it being done in one step, i.e. $\sqrt{(3^2 + 5^2 + 7^2)}$. The vast majority did it in two steps. The diagonal of the first face was calculated to a certain degree of accuracy, usually to 2 decimal places. Unfortunately, depending on which face was chosen initially, this rounding led, in some instances, to getting an incorrect final answer, when rounded to 2 decimal places.
15	(a) Well answered. (b) Full marks were seldom seen. Most candidates that gained any marks, tended to either calculate one combination with exactly three 5's e.g. 1/6 x 1/6 x 1/6 x 5/6 or calculated the probability of gaining four 5's, or both. Some candidates were given two marks, B1B1, for explicitly calculating 1/6 x 1/6 x 1/6 x 6/6, but nothing was awarded for 1/6 x 1/6 x 1/6. Few candidates realised that there were four combinations for getting exactly three 5's.
16	The majority of the candidates tended to work out the areas of each individual trapezium (including one triangle) and then add the areas together. These candidates generally tended to get better marks than the candidates who employed the trapezium rule. This was because the candidates using the trapezium rule usually made errors in substituting into the correct formula or, more often, quoting the formula incorrectly.
17	This sine/cosine rule question fared better than similar questions from previous series. It was attempted by the majority of candidates and they generally knew that the sine/cosine rules should be used. In incorrect solutions, the sine rule tended to be used correctly more often than the cosine rule. Although there was no right angle noted on the diagram, nor referred to in the stem, a few candidates used right-angled triangle trigonometry for either one or both triangles. If an angle had been derived for ABE, then most candidates were able to gain the one mark for identifying the vertically opposite angle, CBD.
18	Although a good proportion of the candidates were able to gain either 1 or 2 marks for attempting to rearrange the fractional equation to form a quadratic equation, few could get the equation fully correct =0. For the candidates that did set up a quadratic equation =0, most knew to employ the quadratic formula. Incorrect substitution errors were seen when using the formula.

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