GCSE EXAMINERS' REPORTS

GCSE
MATHEMATICS - NUMERACY

NOVEMBER 2018

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Annual Statistical Report

The annual Statistical Report (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

MATHEMATICS - NUMERACY

GCSE (NEW)

November 2018

UNIT 1 FOUNDATION

There was no evidence to suggest that the examination paper was too long for candidates, as there were responses in later questions.

The paper differentiated well, with different styles of questions and a graduation in the level of difficulty.

As item level data is available to all centres, by centre and for individual candidates with comparison of all candidates sitting these examinations, this report will focus on common errors and misconceptions to aid the interpretation of the data available rather than focus on whether each question was well answered or not.

Candidates need to:

- be able to calculate the height, width and length of a net of a cuboid;
- understand the word modal;
- be able to identify reflex angles and know how to draw a reflex angle;
- recognise the method used for finding fractions of quantities;
- know that when finding the best buy, they need to compare the costs of the same number of items.

Question	Comments
1	Many candidates were able to write the number 4035; however, there was some that reversed digits and some that gave the answer as 4000 30 5. Most candidates were able to recognise that rounding 4035 to ten thousand was not a good estimate and were able to give a valid reason as to why. Many candidates understood that -£21 means that the bank is owed money or that Rob marsh was in debt, although some did find this difficult to express. Some thought that Rob Marsh had gone underbudget or went over his limit and some just thought that they owed GM Shoes money. Many candidates could calculate -21 + 50 although a common incorrect answer was 71 where the candidates added the values.
2	Candidates interpreted the given information quite well. Some candidates did not understand the word modal in (b). In (c), many candidates were able to calculate the range; however, some candidates only identified the highest and/or lowest and did not subtract them. Some did not identify the largest or smallest even though the data was in numerical order for them in terms of the number of points. Common incorrect answers in (d) were GD = GA – GF and GD = GF × GA. However, many candidates did obtain the correct answer following the interpretation of the given key.

3	Most candidates could engage with part (a), although a few candidates just repeated the information that was given in the question without calculating any costs. A common error was the answer to 45 × 100 given as 450. Errors in place value, when setting up calculations, were also evident. In part (b), many candidates obtained some marks. However, some candidates did not subtract 1000 from the original amount and some took off 1000 later in their workings. Most could find 10% of their 2400 although many did not subtract this from their 2400 to find the amount left that was split into 20 equal payments. In part (c), most candidates knew to subtract 2 hours and 30 minutes; however, some errors in numerical work often hindered some candidates. Most candidates could convert from 12-hour to 24-hour clock. For those candidates that did give an incorrect answer, the most common of these was 15:45.
4	Many candidates found visualising the cuboid difficult; there were consequently many errors in part (a). Candidates attempted to add multiples of 4, 5 and 6 for these measurements. Common errors in part (b) usually came from using the dimensions from the response in part (a). Few candidates visualised the edges of the cuboid in order to answer this question correctly. Therefore, it is evident that working in three dimensions from a two-dimensional representation causes many problems for candidates.
5	In part (a), very few candidates knew the name of the given angle as being a reflex one. There were a variety of different answers including it being a right angle. The most common incorrect answer was obtuse. In part (b), many candidates obtained marks for drawing 100˚ and both 6cm and 5cm; although many candidates were not quite accurate enough. Very few candidates were able to draw an angle of 210˚; although what they did draw was usually a reflex one. However, the diagram helped them with this. For those candidates that did gain some marks in part (c), many gave their final answer as 6 (the number that did not complete the cycling test) rather than subtracting to find those that did complete the cycling test. Some candidates only found 1/9 of 27 rather than 2/9. Many candidates did not recognise the method that was required for this style of question. This is common at the foundation tier.
6	Part (a) was not answered well. A common incorrect response in part (a)(i) for the range was to indicate an answer of 4 or 5. The answer of 4 is the greatest number of visits and an answer of 5 was gained from 5 – 0. The range should have been 4 – 1 = 3. In part (a)(ii) a common incorrect response for the median was 5 visits, yet there were no entries in the table for 5 visits. Another incorrect answer was to circle both 2 and 3. In part (b) many candidates did connect that the mass of 5 books is 1750g. If an error was made it often was that the mass of 7 books is 1750g. Dividing 1750 by 5 caused a number of candidates some difficulty. Very few candidates were able to write an equation for the information in (c) (i). Some just stated 400 here not $x = 400$. Several candidates wrote 3200 ÷ 10. In (ii) some candidates gained the marks as they went back to the problem and worked with the numbers and did not engage with an equation. Many candidates did not know that they needed to divide by 8 and multiply by 12. A common incorrect answer was 3200.

7	In part (a), many candidates were able to compare 4 lots of the 25 tiles with the box of 100 tiles but struggled with a comparison with the box of 40 tiles. There were also a number of arithmetic errors seen. For those candidates that did try to compare all 3 boxes, a very common error was to correctly compare 100 tiles for the 1st and 3rd boxes but use 120 tiles for the '40 tiles for £11.20' box. In part (c), the regular pentagon (box C) was often incorrectly selected as a shape that tessellates.
8	Part (a) was quite well answered. In part (b), very few candidates appeared to have knowledge of no correlation. Many stated that the graph didn't go up to 9000 people or that 9000 was too many people.
9	In part (a)(i), the majority of candidates did not use methods of multiples or LCM to show that 168 is the least possible number. The question asked to show the least possible number of metal buttons and pins. Instead some candidates only found the common multiple of 168 by calculating 42 × 4 and 24 × 7. Where 168 was found in (i), 168 was then seen frequently in (a)(ii). A common error in (i) was to calculate the cost of the buttons and the cost of the pins. In (ii), many had different numbers for the badges or some just added their number of pins and their number of buttons together. In part (b)(i) many candidates understood that they needed to multiply the number of badges by 2.5cm but did not then divide this by 60 to gain the number of rolls. In (ii), a few candidates were able to attempt to calculate their 168 × 50p but did not always correctly evaluate this. They could also find the cost of the badges and the cost of the pins but did not always engage in the cost of the rolls of sticky tape.

MATHEMATICS - NUMERACY

GCSE (NEW)

November 2018

UNIT 1 INTERMEDIATE

The paper differentiated well, with different styles of questions and a graduation in the level of difficulty.

Item level data is available to all centres by centre and for individual candidates with comparison of all candidates sitting these examinations. This report will focus on common errors and misconceptions to aid the interpretation of the data available rather than focus on whether each question was well answered or not.

Candidates need to be aware of the following points:

Question	Comments
1	Many candidates found visualising the cuboid difficult; there were consequently many errors in part (a). A common error was to give the height as 18cm from 4cm + 5cm + 4cm + 5cm. Common errors in part (b) included calculating the volume, using the dimensions from the response in part (a), and also areas of faces. Few candidates visualised the edges of the cuboid in order to answer this question correctly. As a consequence, it is seen that working in three dimensions from a two dimensional representation causes many problems for candidates.
2	A common incorrect response in part (a)(i) for the range was to indicate an answer of 4, which is the greatest number of visits, the range should have been 4 – 1 = 3. In part (a)(ii) a common incorrect response for the median was 5 visits, yet there were no entries in the table for 5 visits! In part (b) many candidates did connect that the mass of 5 books is 1750g. If an error was made it often was that the mass of 7 books is 1750g. Dividing 1750 by 5 caused a number of candidates some difficulty. A number of candidates did not use their answer from part (c)(i) to answer (c)(ii), rather starting again to use logic to answer (c)(ii). There were many correct answers in this part, although a common error was to work with 10 dictionaries.

3	In part (a), many candidates started by looking at a comparison with the third box of 100 tiles. Then looking perhaps at 10 or 200 for a full comparison. There were a number of arithmetic errors seen. A fairly common error was to correctly compare 100 tiles for the 1st and 3rd boxes but use 120 tiles for the '40 tiles for £11.20' box. Candidates generally organised their work well, either in three columns or under headings for the different boxes. Units were sometimes omitted and equal signs were sometimes misused. But overall, many candidates organised their work well. In part (b) a number of candidates did not look carefully at the units of the wall and the tiles. This led to an error of thinking that 10×20 (cm^2) was a greater area than 3×4 (m^2). Candidates who drew sketches of fitting the tiles along and down the wall often did find the correct number of tiles across and down, but then there was sometimes an error made by deciding incorrectly to add these number of tiles rather than multiply. In part (c), the regular pentagon (box C) was often incorrectly selected as a shape that tessellates.
4	Part (a)(i) was well answered. Many candidates did notice that there is no correlation or that it was a small sample to answer part (a)(ii). Part (b) was fairly well answered with many candidates realising they needed to calculate 4×130230. A common misconception was to find ¼ of 130230.
5	In part (a)(i), the majority of candidates did not use methods of multiples or LCM to show that 168 is the least possible number. The question asked to show the least possible number of metal buttons and pins. Instead candidates found only that the question did give a common multiple. However, 168 was seen frequently in (a)(ii). In part (b)(i) many candidates did have a method to find the number of rolls of sticky tape. However, a number of candidates unnecessarily rounded the 2.5cm pieces to 2cm or 3cm, which was condoned, although the accuracy mark was not awarded for using 2cm pieces as the answer for the number of rolls would have been insufficient. Rounding the number of rolls down from use of 3cm pieces was allowed, as compensation from rounding up initially. There were a number of arithmetical errors in part (b)(ii) and also some misunderstanding of how to calculate the profit.
6	Parts (a) and (b) were not well answered, with very, very few candidates drawing any sketch to help visualise the bearings. 295° was a common incorrect answer for part (a). 030° was a common incorrect answer for part (b). Parts (c) and (d) were well answered.

7	Although there were many errors in a, b and c, the most significant to consider was the error for d. The answer for d was quite often 107°, having used a line not parallel to the line on which d lies. In this question it was important to distinguish between the lines to decide which were parallel.
8	Although in part (a) many candidates did select the correct modal group, 13 to 18, other candidates indicated '8' instead, which isn't the group. Many candidates did indicate 'No' in part (b), with many giving appropriate reasons, such as the small sample. Some candidates indicated that gender should have been asked, but did not continue to mention that this would still have been too small a sample to generalise.
9	This question was fairly well answered, with many candidates engaging with the full problem to solve. A number of candidates correctly evaluated Jade's total savings for 20 weeks but did not proceed to calculate how much Jade's father needed to pay. There were inaccuracies in calculation, but also examples of fully correct working in part (a). Part (b)(i), it was quite well known that 1 litre = 1000cm^3. In party (b)(ii) many candidates did have an idea of how to express as a percentage, but some did not. A number of candidates omitted to calculate 100% - 12% to answer the question asked. Part (b)(iii) was not well answered, demonstrating lack of knowledge of dimensions in formulae. Part (c) was reasonably well answered, with many candidates engaging with mathematical similarity. There were some errors made with place value, due to misinterpretation of units.
10	Part (a) was not well answered, with many candidates clearly not understanding the term 'plan view'. Candidates' knowledge of map scale is generally weak. In part (b), many candidates do not start by considering the meaning of the scale as 1cm to represent 50000cm. Without this understanding, candidates were unable to work with any change of units from cm to m to km. Part (c) was not well answered, with candidates not understanding either what a perpendicular line would look like or not having knowledge of construction. A common error was to construct the perpendicular bisector of the road. However, a few candidates did indicate placement of the Efail turbine and interpreted the distance correctly.
11	In part (a) quite a number of candidates did not label the scale, time in seconds, although did have a uniform scale. A number of candidates did have the idea of the outline of a box-and-whisker diagram, but many had no idea. The interpretation from the bullet points was not always accurate. A number of candidates were unable to interpret part (b), not understanding that 23 seconds being the lower quartile considers 25% of the text messages.

12	The idea of systematic samples is not well understood. A few candidates in part (a) indicated the position in the queue for the second voucher as the 12^{th} position, but this 12 was not shown as the start of a pattern increasing in 12s. It is helpful to show working such as $96 \div 8 = 12$. A common incorrect response in part (b) was £144, from incorrect interpretation of the question, £120 is 80% of the original. This question was not about increasing by 20%.

MATHEMATICS- NUMERACY

GCSE (NEW)

November 2018

UNIT 1 HIGHER

The majority of candidates appeared to have had sufficient time to attempt all the questions, and the paper differentiated well. Candidates generally performed well on questions at the lower end of the paper, but some of the arithmetic involved in the A and A* questions did cause problems to some, and may have resulted in these candidates failing to complete the paper.
This report will focus on common errors and misconceptions to aid the interpretation of the item level data available to all centres.

Candidates need to be aware of the following points:

- The need to be able to find fractions of amounts that involve larger than usual numbers, by cancelling and/or performing multiplication and division accurately.
- The need to be able to perform all four operations with decimal numbers.
- The ability to be able convert between metric units of length, mass and volume is an important skill that candidates will encounter in everyday life.

Question	Comments
1	Candidates showed a good understanding of time differences, but found the bearing question far more difficult. The lack of a diagram made the question harder than usual, but there was ample room for candidates to draw their own diagram, to aid in the calculation.
2	Many candidates gave correct responses for angles a, b and c. However, a large number of candidates were drawn into using the supplement of the 73º angle for angle d, as it was close in proximity, and formed by a line that was close to being parallel to the line that formed angle d.
3	Part (a) was well answered, with many stating the sample size was too small, and others stating Mrs Butler used a biased sample as she only asked her friends. Part (b) was less well answered, with some candidates misunderstanding the question completely, while others did not give a complete set of groups spanning 1 to 18 pairs of shoes. This type of response gained no credit.
4	In part (a), the Mathematics involved was generally well done by candidates, with many gaining all four marks. This was the OCW question in the paper, and most candidates gained a mark for their accuracy in writing. The mark for organisation and communication however was often withheld, for a lack of sufficient labels to their calculations, with only a conclusion appended at the end. It was pleasing to note that only a few essay-style responses were seen. In part (b), the percentage question was quite well answered, although some calculated the percentage of the 25kg that the empty suitcase took up. The dimensional analysis part of the question was not well answered, suggesting many candidates had not covered this straightforward topic.

	Part (c) was well answered, with most candidates showing a good understanding of similarity, although some showed incorrect conversions between cm and mm.
5	This question was not well answered. In part (a), many candidates did not know what a plan view was, and although in part (b), most understood they needed to multiply 4.2 cm by 50 000, few showed correct work to convert their answer correctly into km. The construction in part (c) also caused problems. Some credit was given to the construction of the perpendicular bisector of the road, and most used the scale correctly to convert their distance between Efail and Dwr into km. However, very few candidates showed the construction required in order to gain full marks.
6	Most of the marks available in part (a) of this question were gained by the candidates. Some did not label the time axis causing the loss of a mark, and some did not show an understanding of how to use the inter-quartile range correctly to plot the upper quartile and complete their box. Good responses were seen by most candidates in part (b) also, with candidates showing a good understanding that the lower quartile of 23 was at the 25% point of the data.
7	Part (a) of this question was testing systematic sampling. It was not well answered however, with many candidates giving the multiples of 6 for the positions in the queue. Part (b) tested reverse percentages, and it was pleasing to see a better than usual facility in this topic.
8	Most candidates knew how to begin part (a) of this question, and substituted appropriate values into the AER formula given at the front of the exam. If they did this correctly and were able to calculate the value of the expression inside the bracket, they would then have realised that they needed to be able to calculate 1.02^2. Multiplying a decimal number by another decimal is a skill that should have been covered at KS3 for higher ability candidates, but very few were able to do this successfully. Many correct explanations were given by candidates in part (b), showing they had a good understanding of the reasons why banks use AER. There were two methods that candidates could use to answer part (c). To work out the value of the investment after 1 year, they could increase the £3000 by the AER they had calculated in part (a), or they could use the nominal annual rate of 4% given in the question to calculate that 2% interest would be added every 6 months, and increase the £3000 by 2% twice. Both methods were seen, however a number of candidates who arrived at a whole number answer for their AER in part (a) could only access special case marks in part (c), as the work involved was not of equivalent difficulty to the work that was involved with using the actual AER of 4.04%.

9	It was pleasing to see a number of good explanations why the median may not be 70 in part (a) of this question. Many referred to the fact that the data had been grouped, and that the raw data could be anywhere in the group 61 to 80, therefore meaning the median could be anywhere in this range. A high number of correct responses were also seen in part (b), where candidates needed to show a good understanding of the cumulative nature of the data shown in the graph.
10	The majority of candidates showed a good understanding of the method required here, but quite a number of them were unable to evaluate the calculations correctly. The ability to work with complex fractions of amounts has been tested in many series, in work relating to sector areas and arc lengths, but the extra twist here where 2 of the answers came to non-integer values caused problems for some.
11	To calculate the least possible time in part (a) of this question, candidates had to realise they needed to use the lower bound for s (distance travelled), but then the upper bounds of both u and v (initial and final velocities). Those who did this tended to gain the majority of the marks, although again some calculation errors were seen, both in the multiplication of 192.5 by 2, and then the division of 385 by 20. Part (b) of the question again tested bounds, but also rearranging a formula. The vast majority were able to rearrange the formula correctly, although some forgot to divide by 2 to isolate the distance travelled, s. To answer this question correctly, candidates needed to use the upper bounds of all 3 measurements, and those who failed to realise would not have been able to access the majority of the marks available.
12	Many candidates clearly did not appreciate the difference between 'sloping edge' and 'sloping face' in part (a) of this question, as many gave the length of the sloping face. More gained a single mark for $7^2 + 8^2$ than any other calculation. Some arrived at the 98, with few getting all the way to the 162. Very few indeed simplified their surd correctly, which was disappointing. Better work was seen in part (b), with many candidates dealing well with the change of units to arrive at a scale factor of 20, and then multiplying the 74 cm^2 by the area factor of 400.
13	The expression for the area of the curved surface caused the most difficulty in this question. A number of candidates simplified the fraction 300/360, while some calculate the circumference and area of a whole circle and subtracted 1/6. Only a minority of candidates arrived at the correct final answer.

MATHEMATICS - NUMERACY

GCSE (NEW)

November 2018

UNIT 2 FOUNDATION

The paper contained questions that were accessible to the whole range of ability.
The questions that were common with the intermediate tier allowed candidates of all abilities to score marks, despite the content being the top-grade range for this paper.

A calculator paper is designed to assess the use of the calculator. Although non-calculator methods can yield correct responses, they often increase the difficulty of the question and result in unnecessary errors. Candidates should be encouraged to use a calculator as much as possible on Unit 2 but must remember to show their working where appropriate.

Item level data is available to all centres by centre and for individual candidates with comparison of all candidates sitting these examinations. This report will focus on common errors and misconceptions to aid the interpretation of the data available.

Question	Comments
1	Many correct answers were seen in every part of this first question. In part (a), many candidates found the difference between 2018 and 1974 correctly. I'm not sure that Kelly Jones would be pleased with the answer of 80 years old one candidate gave! In part (b), some candidates thought that the number of followers was in the millions and a few thought that the number of followers was in the billions. In part (e), many candidates used a calculator efficiently to calculate $1000 \div 73$ or equivalent but then could not interpret their answer to find the number of **full** rows. Common answers given were 14 or 13.6 or 13.7. These responses gained B1. Many non-calculator methods were used including long division, repeat addition and a small number of candidates drew and grouped 1000 lines. Candidates should be encouraged to use their calculators where appropriate.
2	Candidates engaged with this question and many could interpret the information to find the correct number of UK users in part (b). Candidates were given credit for the intention of drawing a quarter of a symbol and three-quarter symbols. 2(c) was not well answered. Many showed that half 65 640 000 was 32 820 000 or that double 32 000 000 was 64 000 000 but then could not interpret this within the context of Rahman's statement. Many thought that the statement was correct "because 32 820 000 is more than 32 000 000". Candidates gained E1 for ticking the no box and giving a valid explanation comparing half the population with the number of Facebook users or equivalent. In part 2(d), candidates were more successful working with time rather than working with the mean. In part 2(d)(i) many candidates successfully converted 15 hours into minutes or 870 minutes into hours. A number of candidates decided to find the mean of all the times in the table.

3	This question assessed the quality of organisation, communication and accuracy in writing. Many candidates managed to find an answer of £205.59 as the cost of the panels but then failed to give their answer correct to the nearest pound. Candidates should be encouraged to re-read the question to check that they have answered all requirements of the question. One method seen was finding the total length of the fence, the number of panels and then the total cost of the panels. Another common method was to work with the sides separately finding the cost of the 9m side and the 5.4m sides and then finding the total cost. Candidates using this method sometimes forgot that there were 3 sides and used only £56.07 and not £112.14 in their calculations. Many candidates were able to show their calculations. However, not all calculations were labelled, operations were not written for each calculation when using column methods for addition and multiplication, and units were not always given. Some candidates used the = sign inappropriately (e.g. $9 \div 1{\cdot}8 = 5 \times 18{\cdot}69 = 93{\cdot}45$) A lack of appropriate terminology, such as units of money, was penalised.
4	Many candidates misread the scale of the vertical axis and the common answers of 5·25lb were seen in part (a) and 6·8lb in part (c). Part (b) was well answered, with candidates demonstrating an understanding of using a formula in words. Although the question asked for the answer in minutes, full credit was given to answers given in hours and minutes. If a candidate gave a correct answer of 100 minutes, full marks were given even if they then continued to convert the answer into hours and minutes incorrectly. Part (c), candidates were expected to go back to the graph to convert 3kg into pounds. This gained B1. Candidates could gain up to additional two marks for successfully finding the cooking time using their conversion. No credit was given for using 3kg in the formula.
Questions 5 to 9 were common with the Intermediate Tier	
5	Candidates were more successful calculating a percentage than calculating a fraction of a quantity. A number of candidates calculated only the discount not the sale price. Many candidates attempted unsuccessfully to convert 3/8 (or 5/8) into a decimal. Many non-calculator methods were seen which increased the difficulty of the question and resulted in unnecessary errors. Again, candidates should be encouraged to use their calculators. There were many mixed responses in part (c), with 37/43 being a fairly common incorrect answer.
6	This question was not well answered. Some candidates managed to gain the first B1 mark for completing the “Red” paint line correctly in the table, but very few engaged fully with the question. Some candidates made errors in their calculations. In particular, 50 × 200 was often incorrectly evaluated as 1000 ml, instead of 10 000 ml.
7	Many correct responses were seen, by either of the following methods: (55 + 48) × 220 + (48 + 14) × 18 or 55×220 + 48×(220 + 18) + 14×18. This being two ways that the intersection could be correctly considered. Many candidates did not engage with the intersection at all and only calculated 55×220 + 14×18. This response gained M1.

8	In part (a) most candidates calculated that the profit was 5% of the pie chart. However, a few candidates made a lot of work for themselves by working out 50%, 25%, 10%, 5% and 5% of £9100 and then subtracted the total from £9100 million. The main errors seen were due to place value errors of working with millions. A few candidates worked with 5% incorrectly as 0.5. In part (b), a fairly common incorrect choice was 0.37. Part (c) was fairly well answered. Candidates selected their own way to show the statement was correct, either expressing a fraction as a percentage or calculating a percentage of a quantity. Some candidates knew how the bill should be calculated in part (d). Many could find the cost of the units and add the standard charge. There were errors due to place value or units, when working with both £ and p. A number of candidates calculated the correct VAT but failed to add it to £214.04 or mistakenly subtracted it.
9	This question was not well answered. The format of the question, although set in dollars, uses the identical layout as on the HMRC website. The candidates that attempted the question mainly attempted to fiddle their response to be $2400 in part (a), without showing the $12000. When asked to show a result it is important to show the calculation that would lead to $2400, such as 0.2 × 12000. In part (b), it was clear that many candidates did not have knowledge of the hierarchy of the tax rates. There were many misunderstandings, including taxing the full $25000 at 25%.

MATHEMATICS - NUMERACY

GCSE (NEW)

November 2018

UNIT 2 INTERMEDIATE

The paper differentiated well, with different styles of questions and a graduation in the level of difficulty.

Item level data is available to all centres both by centre and for individual candidates allowing comparison with all candidates sitting these examinations. This report will focus on common errors and misconceptions to aid the interpretation of the data available rather than focus on whether each question was well answered or not.

Candidates need to be aware of the following points:

Question	Comments
1	Although many candidates engaged correctly with calculating a percentage and a fraction of a quantity, a number of candidates calculated only the discount not the sale price. This was especially evident in part (b), where many candidates had part (a) correct, but in part (b) only calculated 3/8 of £43.60. This showing that candidates are more secure in working with percentage discount that fractional discount. There were many mixed responses in part (c), with 37/43 being a fairly common incorrect answer.
2	Although many candidates answered this question correctly, other candidates made errors in their calculations. In particular, 50 × 200 was often incorrectly evaluated as 1000 ml, instead of 10 000 ml. Many candidates did know that 1 litre = 1000 ml, so conversions were often correct.
3	Many correct responses were seen, by either of the following methods: (55 + 48) × 220 + (48 + 14) × 18 or 55×220 + 48×(220 + 18) + 14×18. This being two ways that the intersection could be correctly considered. However, one error seen was to portion the intersection of 48 tablets and 48 covers incorrectly as 24 tablets and 24 covers, giving an incorrect method such as: (55 + ***24***) × 220 + (***24*** + 14) × 18.

4	In part (a) most candidates calculated that the profit was 5% of the pie chart. However, a few candidates made a lot of work for themselves by working out 50%, 25%, 10%, 5% and 5% of £9100 and then subtracted the total from £9100 million. The main errors seen were due to place value errors of working with millions. A few candidates worked with 5% incorrectly as 0.5. In part (b), a fairly common incorrect choice was 0.37. Part (c) was fairly well answered. Candidates selected their own way to show the statement was correct, either expressing a fraction as a percentage or calculating a percentage of a quantity. Part (d) was generally well answered, with many candidates knowing how the bill should be calculated. There were errors due to place value or units, when working with both £ and p. A number of candidates mistakenly subtracted the VAT. With answers to this question, many candidates organised their work well with clear labels and units as well as a final statement. These candidates were awarded OC1 and W1.
5	This question was not well answered. The format of the question, although set in dollars, uses the identical layout as on the HMRC website. Many candidates attempted to fiddle their response to be $2400 in part (a), without showing the $12000. When asked to show a result it is important to show the calculation that would lead to $2400, such as 0.2 × 12000. In part (b), it was clear that many candidates did not have secure knowledge of the hierarchy of the tax rates. There were many misunderstandings, including taxing the full $25000 at 25%.
6	In part (a)(i), many candidates calculated 300/2000 but did not multiply by 60 to convert correctly to minutes. Instead a common error was to interpret 0.15 as 15 minutes. In part (a)(ii) and (iii) the assumption and impacts accepted included 'walking in a straight line', 'not stopping' followed by 'it would take longer'. Candidates were often not clear if they were referring to the lawn mower, Emyr or the time in their responses. It is important to have clarity in any statement made. In part (b) a number of candidates attempted the start of two different methods, finding 7500 metres and 4.5 ÷ 25 = 0.18 litres, but made no further progress. In part (c) it was essential to know a conversion between metric and Imperial units. Some candidates had learnt 1.75 with pints and litres, but incorrectly thought that 1.75 litres was equivalent to 1 pint. With the correct equivalence, many of these candidates did show relevant working to reach the conclusion 'no'. In part (d) clearly many candidates did not know a relationship between kilometres and miles.

7	Part (a) was generally well answered. In part (b) a common incorrect response was to say that it wasn't possible as there are only 10 little squares to represent the months, when 12 was needed. However, a number of candidates did realise that intermediate values have no meaning. Part (c) was generally well answered. In part (d), although a number of candidates wrote '80% is 4000 bikes' they clearly showed this was information extracted from the question, not an interpretation of the situation. A common error was to work with 20%, 80% or (95% - 80% =) 15% of 7000. Part (e)(i) was well answered by candidates who had knowledge of calculating the estimate of the mean from a grouped frequency table. There were some errors made with mid points, these errors were only followed through if the mid point used actually fell within the group (including the upper bounds).
8	In part (a) many candidates did calculate 595.2 CHF correctly, with a number of these candidates realising this meant 590 CHF could be purchased. The final stage, although seen correctly evaluated, was sometimes incorrect due to wrongly changing the rate of exchange to use 1.28 CHF. A number of candidates did not attempt this final stage. Part (b) was fairly well answered, although accuracy was an issue, as many candidates did not work with the pence within the conversion, consequently rounding inappropriately.
9	This question was not well answered. Of the few candidates who realised they needed to work with Pythagoras' Theorem in part (a), many of these found the sum of 1.8^2 and 0.7^2 rather than the difference. The formula for the volume being the area of the uniform cross-section multiplied by the length was not well known. Many candidates used the product of the three different dimensions given to find the product, thinking this was the volume. There were few correct responses in part (b).
10	There were many correct answers seen in parts (a) and (b), although there were many errors too. Errors were generally as a result of selecting an incorrect operation to use.
11	In part (a) there were candidates who used estimation of the height of a step to then select the correct answer. In part (b) there were candidates who did not use or have trigonometry knowledge, candidates who used the incorrect trigonometry ratio, candidates who inverted the fraction in the tan ratio and lastly those candidates who worked correctly.

MATHEMATICS - NUMERACY

GCSE (NEW)

November 2018

UNIT 2 HIGHER

Candidates appeared to have had sufficient time to attempt all the questions, and the paper differentiated well. The majority of candidates performed well on questions at the lower end of the paper, and it was pleasing to see better responses to some of the A and A* questions compared to previous series.
This report will focus on common errors and misconceptions to aid the interpretation of the item level data available to all centres.

Candidates need to be aware of the following points:

- Once you have answered a question, it is advisable to check the wording of the question again to make sure you have answered it fully.
- Bearings are often used to describe angles in these papers, and therefore it is important that candidates know how to work correctly with them.

Question	Comments
1 (a)	This was answered well by most candidates. Incorrect responses usually involved candidates increasing 4000 by 15%.
1. (b)	Both parts of part (b) were answered well. The group widths in the table were easier to deal with than some in previous papers, and this helped candidates to give correct mid-points and gain full marks for estimating the mean.
2. (a)	Many correct answers were seen for the time it took Emyr to cut his lawn. The vast majority divided the distance travelled of 300 m by the speed of 2000 m/hour, although some incorrectly thought that the answer of 0.15 meant the time taken was 15 minutes. The most popular correct assumption that candidates gave was that Emyr did not take any breaks. Usually when candidates gave a correct assumption, they followed it with a correct impact of their assumption. There were a number of candidates who were not aware of what was required here, and gave irrelevant responses.
2. (b)	Well answered on the whole, although some candidates stopped after calculating how much petrol was used per cut, forgetting that each cut was 300 m long, not 100 m.
2. (c)	Candidates who knew a correct conversion between litres and pints generally went on to gain full marks in this question. However, it was disappointing to note that many candidates did not know a correct conversion.

3	Most candidates correctly converted the £480 into Swiss francs, and realised that only 500 Swiss francs could be bought. However, many incorrectly thought that to work out the cost of buying 500 Swiss francs, they needed to use the exchange rate for selling francs to buy pounds.
4. (a)	Many candidates answered this question well mathematically, although some rounded inappropriately during their calculations. A number of candidates failed to realise that Pythagoras was required. The standard of candidates' organisation and communication could have been better, with very few of them labelling their Pythagoras work, to explain they were calculating the vertical height of the triangular cross-section.
4. (b)	Only some of the candidates knew how to convert between m^3 and cm^3. The typical incorrect choice was $20cm^3$ as they thought they only needed to multiply by 100.
5. (a) (b)	Both parts of this question were very well answered, with most candidates knowing how to use the formula for density appropriately.
6. (a) (b)	Again, both parts of this question were answered well, especially part (b) where the vast majority of candidates used trigonometry correctly to find the angle of elevation. There were some who relied on the use of the sine rule, and therefore these candidates had to use Pythagoras first to calculate the length of the hypotenuse of the triangle.
7. (a)	Parts (i) and (ii) of this question were answered well, although some candidates went on to find the percentage increase in the population in (ii) rather than just the value of the increase. Less success was seen in (iii), and it was disappointing that many candidates who gave a correct method failed to give their answer to the nearest whole number. There were those who only worked out what percentage 380 000 was of 300 000. No credit was given to these candidates.
7. (b)	Many correct responses were seen here. A typical incorrect answer was that the graph paper only went up to 100 years of age.
7. (c)	It was crucial that candidates realised that the question involved the same group of people. It was pleasing to see that many did, and gave a correct explanation that the rise in population must have been due to people coming to Wales to live.
8. (a)	Many candidates knew what to do in part (i) of this question, but the majority of them only gained 1 out of the 3 marks as they did not use consistent units in their calculation. The conversion from mm^3 into m^3 proved difficult for the majority of candidates in part (ii) with most only dividing by 1000 rather than 1000^3.

8. (b)	Very few fully correct diagrams were seen. For those who showed a correct representation of the voyage, most did not show a correct angle inside the triangle. Follow through marks were available however for correct trigonometry, provided candidates showed their incorrect angle inside the triangle.
8. (c)	Compared to similar questions in previous papers, it was pleasing to note a better facility shown by candidates in this question. There were still many who did not work appropriately with the values correctly however.
9. (a)	Better answered than in previous series. Many more candidates drew a suitable tangent, so were able to access marks however some tangents missed the required point or visibly crossed the curve. A minority misread one or both scales on the graph. A minority had the gradient formula upside down.
9. (b)	Both parts of this question were answered well, with the majority of candidates choosing to sum the 4 individual trapeziums rather than use the trapezium rule. There were some who misread the velocity axis, but provided some of their areas were correct, they were still able to gain the majority of the marks available.
10. (a)	Many candidates had the correct idea as to how to solve this problem. However, some only equated the sum of their expressions for the volume of both shapes to 10 rather than 10 000, while others either did not use appropriate heights for each shape or rearranged their equation incorrectly.
10. (b)	Very few candidates drew fully correct graphs. Those who gained 1 out of the 2 marks available, generally drew 2 straight lines that joined at the appropriate point.

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