GCSE EXAMINERS' REPORTS

GCSE (NEW)
MATHEMATICS – NUMERACY

SUMMER 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)

Summer 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 aware of the following points:

- Know that the word difference means to subtract (Q1c)
- Be able to draw a variety of graphs, including a vertical line diagram, not just a bar chart (Q2)
- Know that they should show evidence of counting squares when finding the area of irregular shapes (Q3)
- Know that the range is not an average (Q9a)
- Be able to work with time (Q10)

Question	Comments
1	Candidates found interpreting the information difficult in this question. Various answers were given in parts (a) and (b) with the most common incorrect ones given as -26.1˚C and 95˚F respectively. In part (c), many candidates used the highest and lowest values for the UK rather than for Wales. The most common incorrect answer, using the correct values, was 11.9 ˚C. Many candidates do not know what is meant by the word difference in a mathematical context with some candidates just writing down the highest and lowest values but not completing a calculation.
2	In part (a), candidates made errors in counting the frequency for each TV channel. Some did not complete a tally table to help them with this. Very few candidates knew how to draw a vertical line diagram. Most either drew a bar chart or just plotted the points. In part (b), most candidates appeared not to know that in order to check that all of Jane's data was included they had to add each of the frequencies to see if it totalled to 40. Most made a statement saying count again or make a tally chart. It was pleasing to see that the majority of candidates knew what was meant by the modal TV channel in part (c).

Question	Comments
4	This question was generally well answered. A common incorrect answer in part (a) was 9; candidates only calculated the number of bulbs in the 4^{th} set rather than the 5^{th} set. A common strategy for part (b) was to continue the sequence – numerical errors were sometimes made in doing this especially with candidates continuing from what they thought was set 5. In part (c), some candidates ticked no but then said that the rule was multiply by 2 rather than add 2. Some thought that the rule was to multiply by 3!
5	Many candidates obtained at least 2 marks in part (a). Errors were made in interpreting the 'buy 2 get 1 free' from Cornell's supermarket. Many candidates calculated 6 lots of £1.80 rather than 4 lots of £1.80. The common error in calculating the cost at Larkman's supermarket was usually in calculating 12 litres of orange juice rather than 6 litres – these candidates thought the bottles held 1 litre rather than 2 litres. In part (b), the most common incorrect answer was 40mm. Candidates just added two 20mm. A common incorrect answer was 30mm; candidates only gave the diameter rather than the radius. Many candidates did not deal with the change of units.
6	Many candidates found finding 15% of a value difficult. Some candidates just added 15 onto £720. For those candidates that were able to find 15%, many gave the final answer as £108 and did not add it to £720. Very few candidates went on to find what each friend (or Suzanna) would pay in October. Some candidates did attempt to work with what one person would pay from the start and usually gained 1 mark.
7	For part (a), many candidates did not realise that they only needed to half the 115 miles (100 nautical miles) to find out what 50 nautical miles was in miles. Many attempted to find out what each 2mm square was on the vertical square. This led to errors. For those that did try to half 115 miles, a common incorrect answer was 55 miles. This question was not well answered, with many candidates not having a strategy to make an attempt. Some tried to do 8 lots of what their 50 nautical miles was rather than 16 lots. For those that did have a strategy and attempted 8 lots of 115, the numerical work let them down.

Question	Comments
9	This question was not well answered. Very few candidates understood what is meant by mean and range in a question when they needed to interpret data. In part (a), many candidates did not concentrate on the question, instead they responded about the mean or median or referred to the number of games played, rather than discussing the range. In part (b)(i), a common error was to consider 5 ÷ 8 incorrectly as 8 ÷ 5, rather than realise that the mean for 1984 was 5/8. Candidates found an answer for the mean as a fraction difficult to understand and interpret. Several candidates attempted to find the mean goals for the 2 years rather than for each year so that a comparison could be made. In part (b)(ii), some candidates were able to give a reasonable response, based on different players, different number of goals, different teams or different number of matches
10	Part (a) was well answered. In part (b), there were several correct answers of 1 p.m., however, there were also many errors seen in repeatedly adding 20 minutes and far more errors in adding 45 minutes. Candidates did not use knowledge of lowest common multiple to answer this question.
11	Many candidates had a good understanding of reading and interpreting the scatter diagram. Some errors were made in reading the scale, particularly with an incorrect age of 13 years 5 months seen rather than 13 years 6 months from the misinterpretation of the scale in (aii). The correct answers were quite often reversed in both parts in (a). In part (b), many candidates were able to correctly state Lekan's age but were not always able to correctly give a reason why his parents were right to complain about paying too much for his mobile phone. Some candidates only ticked either yes or no without giving a reason for their choice.
12	This question was quite well answered for the last question on the paper. However, there were a number of calculation errors. The most common error was in trying to convert 3 ½ ounces to grams.

MATHEMATICS – NUMERACY

GCSE (NEW)

Summer 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	This question was generally well answered, with candidates using sensible values from the conversion graph.
2	Part (a) was generally well answered, although errors included selecting the incorrect column and including a charge for Anton when his entrance would be free. Another fairly common error was to correctly find the total standard charges (£15.80) but not go on to subtract this value from £20 to find the change. Part (b) was well answered, with many candidates correctly working with 10%. In general, many candidates did show calculations and label them. Unfortunately there were a number of candidates who made errors with units, with a number of candidates giving the final answer as 0.24p instead of 24p. In part (c) there was a very common arithmetic error. This was 714000 ÷ 7 to incorrectly give 12000. So many candidates were not awarded an accuracy mark, although many did show the full method.
3	In part (a) many candidates did not concentrate on the question, instead responding about mean or median or referring to the number of games played, rather than discussing the range. In part (b)(i) a common error was to consider 5 ÷ 8 incorrectly as 8 ÷ 5, rather than realise that the mean for 1984 was 5/8. Candidates found an answer for the mean as a fraction difficult to understand and interpret. In part (b)(ii) many candidates were able to give a reasonable response, based on different players, different number of goals, different teams or different number of matches
4	Although there were many correct answers of 1 p.m., there were also some errors seen in repeatedly adding 20 minutes and more frequent errors in adding 45 minutes. Candidates did not use knowledge of lowest common multiple to answer this question.

Question	Comments
6	This question was generally well answered, although there were a number of calculation errors.
7	Many candidates seem to have little understanding of map scales and also 5 miles is 8 kilometres. Consequently, this question was not well answered. Many candidates made no attempt to work with the scale.
8	In part (a), candidates needed to work with the area then multiply by 0.2 to find the volume. Within this a common arithmetic error was in calculating 15 × 15. A common error for 15 × 15 was to incorrectly work as 1 × 1 = 1 and 5 × 5 = 25, so 15 × 15 must be 125. Many candidates tried to find the perimeter rather than the area. In part (b) there were many correct responses, although some candidates did omit to add on the fixed standard delivery charge or attempted to add £35 four times.
9	Many candidates correctly evaluated 49 × 20, to find £980. But very few candidates knew how to find the interest as a percentage of the original amount. This technique is not well understood.
10	Part (c)(i) was often answered accurately by those candidates who knew to divide 8400 by 200. Part (c)(ii) was generally well understood by candidates but dividing 8400 by 12 caused problems for a considerable number of candidates.
11	In part (a), a number of candidates made errors in finding 2%, with place value errors. However, many candidates did correctly evaluate 2% of £3000. A number of candidates calculated simple interest over the two years instead of compound interest. In part (b), very few candidates have knowledge of working directly with reverse percentage. Some candidates did answer correctly, by making attempts to find possible original amounts. The most common error by far was to add 20% of £72 to the £72 (to give £86.40).
12	Many candidates do not have understanding of inaccuracy in measure. Greatest values were not always seen, with many candidates totally ignoring the statements that measures were given correct to the nearest centimetre.
13	Part (b) responses highlighted a lack of understanding regarding grouping of data and plotting at upper bounds. In part (d), a number of candidates did not engage correctly with the scale on the horizontal axis.
14	Many candidates did not have sufficient understanding of box-and-whisker diagrams in order to answer this question. In particular in (c), many candidates did not focus on the upper quartile to select North entrance, nor the lower quartile to select South entrance.

MATHEMATICS – NUMERACY

GCSE (NEW)

Summer 2018

UNIT 1 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, but it was evident from the number of blank and very poor responses to the A and A* questions that some candidates had not completed the syllabus or had been entered at the wrong tier for their ability.

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 numbers in the hundreds, by cancelling or performing division/multiplication accurately.
- The need to be able to perform calculations with the standard form versions of numbers.
- The need to be able to calculate bearings from a diagram.
- How to convert between metric units of area and volume.
- The need to give only one reason in questions that ask for one. Candidates who give a correct and an incorrect reason will be given no credit.

Q.1 (a) Most knew they had to cut up the given area into rectangles. Some calculated volume of each cuboid then added, whereas some added the areas of each rectangle and then calculated the volume. More errors were seen with those that attempted to calculate the volume of each cuboid and then adding, with the multiplication by 0.2 causing the most problems. The answer to 15 x 15 was also a common error.

Some chose to change the measurements into cm to avoid the multiplication by 0.2, but most then converted their areas or volumes back into m^2 or m^3 incorrectly.

This was the OCW question on this paper. Lost marks here were due to incorrect terminology (squares, rectangles, cuboids, area, volume), abbreviating area and volume to A and V, giving incorrect units and misuse of the equals sign.

(b) Many correct responses were seen here. Some incorrectly thought that the delivery charge had to be multiplied by the volume of concrete ordered. A calculation error that was seen on occasion was 180 + 35 = 115.

Q.2 Nearly all candidates correctly calculated the amount that Olga would be paying back to clear the loan. The majority of candidates then chose to write different percentages of £400 so as to find what percentage £580 is, but many worked up to £980 which meant method marks were lost. 580/400 x 100 should not be a difficult calculation without a calculator for Higher Tier candidates, yet not many showed this calculation.

Q.3 Candidates in general answered both parts of (c) well, showing a good understanding of sharing in a ratio. Less success was seen with the bearings questions in parts (a) and (b). 170º was a common wrong answer seen in (a) which was the anti-clockwise angle, although some gave an answer of 010º which was the bearing of Gwyndir from Allthir (the opposite way around to what was required). As expected, slightly less success was seen in (b), as more work was required to calculate the bearing.

Q.4 (a) This compound interest question was answered quite well on the whole, although some candidates used simple interest and therefore lost the majority of marks. The doubling of £30.60 was a source of error for some, as was the adding of £61.20 onto £3060.

(b) It was pleasing to see a better response from candidates in general to this reverse percentage question. Some chose to divide £72 by 0.8, where others divided £72 by 4 and said this was equal to 20%, and then added this on to £72. As usual though, a significant number calculated 120% of 72, which was given no credit.

Q.5 Full marks were gained by many candidates in this question. The upper bounds of both of the dimensions involved did not have to be used in this question to prove that 7 mugs would not fit onto the shelf, and some merit was given for those who did not use the upper bounds. Some incorrectly worked with 8 mugs, while some showed errors in their addition.

Q.6 (a) Answered well on the whole.

(b) Many incorrect responses seen here. Some thought that yes, it was certain that the last runner finished at 45 minutes, while others did not show an understanding of the grouped nature of the data.

(c) Better responses were seen here. It was clear that most realised that cumulative frequency meant the number of runners in this question, and worked with percentages of 50.

(d) It was disappointing that many candidates could not read the scale on the time axis correctly. Other errors were in the notation of 1.5 minutes, with 1.30 seen occasionally.

Q.7 (a) A significant number gave an answer of 2250, from thinking that the upper quartile was at the ¾ point of the data, and thus calculated ¾ of 3000. It was clear though that some were not working with percentages of 3000, and were just giving responses based on the scale of the time axis.

(b) Not many correct responses seen here, although some gained full marks on the follow through of their incorrect response in (a). Not many realised that their estimate needed to be 2/3 of 25% of 3000.

(c) Again, not many correct responses seen here. Most correct responses commented on ¾ of the people got into the stadium quicker at the North Entrance, although some did give the South Entrance as their answer, saying that ¼ of the people got in quicker there.

The majority of incorrect responses tended to be focussed on the interquartile range being smaller for the North Entrance. Those who gave a correct reason and an incorrect reason were given no credit.

Q.8 (a) Many candidates arrived at a correct fraction (usually 375/900), but many did not simplify it to its lowest terms. 15/36 was a typical final answer seen here. Some candidates thought that the decimal was 0.4161616… instead of 0.416666… No method marks were given to these candidates.

(b) For those who got to a final answer of 5/12 in (a), this mark was easy to obtain. For those that didn't get to 5/12, they had to realise that they needed to multiply their fraction by 12. Many correct responses were seen this way.

Q.9 It was pleasing to see many correct responses to this question where lots of information was given to candidates, and they had to decide which bits they needed and how to use them. It was clear that most knew how to work with fuel consumption and speed. Also, it was pleasing to see many correct answers to 150/60, 105/70 as well as 2.1 x 50 without a calculator. Some did not complete the last stage of the question, thinking that the distance travelled was all that was required.

Q.10 In both parts of this question, many disappointing responses were seen. A number did not think that they needed to approximate the distances involved in either part. In (a), some just focussed on showing that 50AU was greater than 5.913×10^9. No credit was given here, as the question required candidates to estimate the distance of Pluto from the Sun in AU.

In both parts, most candidates chose to convert the distances to ordinary numbers first, rather than work with the standard form numbers.

Q.11 This question resembled one that was included in one of the Specimen Papers. Many correct responses were seen in (a), but very few could use what they were doing here to give the correct formula for the mass of the particle after t seconds. Most thought that t needed to be a multiple in the formula rather than a power.

Q.12 Once again, many disappointing responses were seen here. Most thought that dividing the areas gave them the scale factor, that they then needed to use with the heights of the vases. No credit was given to candidates who worked in this way. Most who realised that they needed to square root their answer to arrive at the scale factor went on to gain full marks.

Q.13 (a) Many correct bars were drawn, while a large number gained a mark for showing the division 24/5, but typically gave an answer of 4.2 or 4.4.

(b) Most candidates gained marks for adding the areas of the bars to arrive at the total number of girls measured, although some calculating errors were seen. Most knew that the lower quartile would be at the 25% mark, but were unable to show correct working to arrive at 146.5 cm.

Q.14 (a) Many correct responses seen.

(b) Those who knew the correct formula for arc length generally gave a correct answer for the arc length of BC, as they realised that 120/360 was equivalent to 1/3. The arc length of DE proved far more difficult as 150/360 did not simplify easily, and again most did not realise that working with 150/360 x 6 was not that difficult.

A number of fully correct responses were seen, which was pleasing though.

(c) Most gave answers of 1800 (which came from 1.5 x 1200), or 3600 (which came from 1.5 x 2400). The latter answer was given credit as they just needed to divide 2400 by 1.5 to arrive at the correct answer of 1600. Another way to get to the correct answer that was seen on occasion was 1200 x 4/3.

MATHEMATICS – NUMERACY

GCSE (NEW)

Summer 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.

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.

Teachers and candidates need to be aware of the following points:
In general:

- A calculator paper is designed to assess the use of the calculator. Although mechanical methods can yield correct responses, they often increase the difficulty of the question and result in unnecessary errors.
- Candidates should be prepared to interpret and extract appropriate information from data given in written or tabular form, carry out calculations and present an answer with meaning in the context of the question.

Question	Comments
1	Part (a) was reasonably well answered although the weakest candidates did not engage with the need to find the difference in mileage readings. In part (b) the need to give the answer correct to the nearest thousand miles was often ignored or misread. Credit was given for correct rounding of incorrect answers due to errors in part (a).
2	There were few errors made in finding the total distance of the six stages of the cycle route. Non calculator methods of addition were sometimes in evidence. Though (a)ii was not mathematically challenging, it required a comprehension of the constraints introduced in the question in order to plan a cycle route. This proved challenging for some candidates. Part (b) was seldom fully answered though many variations on a partial explanation were seen and received credit. It was again a weakness in comprehension skills, rather than mathematical ability, that resulted in this being badly answered.
3	Part (a) and (b) were well answered although a common incorrect response to part (b) was “Celsius”. Part (c) involved finding the difference in time given in minutes and hours. Most candidates were familiar with 60mins = 1 hour but some struggled with “one and a half hours”. The question specifically asked for an answer in minutes but a correct alternative was accepted.

Question	Comments
4	The use of the ruler to measure and application of a simple scale was well done in part (a) and (b). Part (c) required comprehension skills and was not well answered. There were a variety of reasons for an incorrect response. These included failure to use the scale, failure to add the correct four figures and failure to comprehend that an extra measurement was required. Some candidates mixed figures that had been scaled with figures that had not been scaled.
5	This question assessed the quality of organisation, communication and accuracy in writing. The five marks available for the mathematical content were often scored in full. Most candidates were able to calculate the total sales figure and most understood how to calculate the profit. Errors in calculations sometimes appeared due to inefficient use of the calculator or attempts to use non calculator methods. The two marks available for OCW were seldom scored in full. Although calculations were often presented in a clear and logical manner, responses often lacked explanation, labelling or conclusions. Incorrect mathematical form in working involved incorrect use of the equals sign and incorrect order of subtraction. A lack of appropriate terminology, such as units of money, was penalised.
6	This question on the use of a formula given in words in a context was well answered. Part (a)i being a one-step calculation and part (a)ii being a two-step calculation. Part (a)iii linked the two. In most cases, incorrect responses of any of the three parts stemmed from an inability to extract the values of the variables from the information given in the question. Part (b) assessed the addition of time and required an interpretation of the result in context. A common error was the use of decimals in time calculations so that 4 hours 30 minutes was written as 4.3. This resulted in doubling to give 8.6 hours. Part (c) required the calculation of 8% of 1760 with the aid of a calculator. It is disappointing that this was badly answered with some candidates using non calculator methods with varying degrees of success.
Questions 7 to 12 were common with the Intermediate Tier.	

Question	Comments
7	As in previous examination sessions, this pie chart question was badly answered, part (b) having the lowest facility factor in the paper. In part (a) the presence of the right angle lead to incorrect responses of 90 despite the question asking for the number of students rather than an angle. There was little evidence of measurement of angles in part (b) and working with a fraction of a quantity was beyond many of the candidates sitting this paper. This E grade question was only attempted by approximately 75% of candidates. Part (c), again highlighted a deficiency in the skill of finding a percentage of a quantity with a calculator. In addition to this, the information needed interpretation. The number of males taking part in the survey was required but the percentage figure related to females. The combination of poor skills in interpretation and poor mathematical skills resulted in a low facility factor
8	Some candidates were able to use the calculator to multiply decimals to obtain the relevant costs. The total for 'waste water' involved 3 decimal places but rounding or truncation was not penalised. If incorrect calculations of costs were shown it was possible to score the final mark by reaching a correct conclusion based upon the candidate's costs. The interpretation of 'under charge' or 'overcharge' was not always consistent with the figures given. Often no interpretation was given at all.
9	The diagrams in the question seemed to aid the candidates and it was therefore relatively well answered with many achieving full marks. Some candidates used the cost of 3 apples as the cost of one apple and some 'invented' the cost of an apple. In each case follow through marks were available for correctly calculating the change from their derived values. Unfortunately, some candidates did not attempt to calculate the change from £5.
10	Parts (a), (b) and (d) were multiple-choice questions. There was a good response to (a) but (b) and (d), less so. Part (c) required interpretation of the water or the depth of the water in the river. Many gave statements such as 'it goes down' but gave no reference to water or depth.

Question	Comments
11	In part (a) the pictogram had an increased difficulty as there were 24.25 symbols in the pictogram. It was possible to gain two marks by showing correct calculations with an incorrect number of symbols providing the answer was rounded to the next integer value. This highlights, again, the weakness of many Foundation candidates in interpreting results in context as answers for the number of people were often left as a decimal. Part (b) involved a percentage of a quantity with a calculator, in the context of a problem. This has already been highlighted as a weakness. This time the percentage was a multiple of 10% and so non calculator methods gave a greater chance of success. Some candidates correctly calculated 40% of 590. This gave the amount of euro spent. The problem required the number of pounds left over and so this was incomplete working and gave no credit in isolation. Conversion of Euro to pounds was often done by multiplication instead of division.
12	This question involved a substantial amount of information but was not mathematically demanding with the aid of a calculator. Some candidates calculated 15% of £80 via various methods to obtain the discount of £12 off the helmet. Not many subtracted this from the original cost to obtain the discounted cost. The calculation of the fuel cost was more demanding with few correct responses. Provided five relevant costs were added it was possible to gain the last two marks by dividing the total cost by 60 to obtain the number of months. Rounding was necessary to achieve the number of 'complete' months. This was another case where candidates did not always apply rounding to make sense of the context of the question.

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Summer 2018

UNIT 2 INTERMEDIATE

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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	In part (a) a common incorrect response was to select an answer of 90. Part (b) was not well answered, with many pupils not measuring an angle, instead working with an initial value of 360 or 720. Part (c) was reasonably well answered, with many candidates correctly calculating the number of males. However, some candidates calculated the number of females.
2	In part (a) many candidates showed and labelled calculations, giving also a final conclusion. There were errors in deciding on calculations necessary, however many candidates did engage with this question well. Part (b)(i) was generally well answered, with many correct responses seen. If an error was made it was either in the accurate use of a calculator or an initial incorrect decision to divide rather than multiply. Part (b)(ii) was not well answered. Very few candidates mentioned that the conversion was approximate.
3	This question was well answered, with many candidates showing the steps from starting with finding the cost of an apple through to a correct response of £2.88. Some candidates correctly found the total cost of the 5 pears + 2 apples but omitted continuing to find the change from £5.
4	Parts (a), (b) and (d) were multiple-choice questions, with mixed responses. Part (c) required interpretation of the water or the depth of the water in the river. Statements such as 'it goes down' were insufficient due to ambiguity; it could be the graph goes down. Clear responses for questions asking for explanations, reasons or description are essential.

Question	Comments
5	In part (a) many candidates did count accurately that there were 24.25 symbols in the pictogram. Consequently, the correct response of 400 people was often seen. A few candidates did however work with an incorrect number of symbols. And some pupils tried to avoid division by looking at product trials of number of symbols towards an answer of 9700 people. A common incorrect response in part (b) was 6 : 4, a ratio not in its simplest form. In part (c), Mexico was a common incorrect response. In part (d) many candidates had some correct thinking, either in working with percentage or with exchange rates. A common error was to calculate 40% of 590 euros rather than calculating 60% of 590 euros.
6	A number of candidates calculated 15% of £80, in working out the cost of the helmet to find £12, but did not treat this as the money off the cost of the helmet. A number of candidates were unsure of the calculation required to work out the cost of fuel for one month. A common error seen was to use 350 x 1.26 x 20 (rather than 1.26 x 350/20) to give an unrealistic value for the cost of fuel. Most candidates realised the need to divide the total cost by 60 months to find the number of months. The question required the number of complete months of saving before the purchase, which meant rounding the answer up to a whole number.
7	In part (a) a number of candidates were not able to establish the number of months, nor decide which operation to use in order to answer this question. The 'million' was often omitted. Part (b) was generally well answered compared with part (a).
8	Part (a) of this question was not well answered. Although many candidates did have an understanding of speed, distance and time. A very common error was in the interpretation of the time 0.25 hours, which was very often used incorrectly as 25 minutes.
9	Many candidates did attempt to apply Pythagoras' Theorem in part (a)(i). Although a number of candidates did not give their answer correct to 3 significant figures. It is important for candidates to realise an answer of 12.40 cm is not correct to 3 significant figures, 12.4 cm is required. Candidates were not as confident in the application of knowledge of right angle triangle trigonometric ratios in part (a)(ii) as they were with Pythagoras' Theorem. In part (b) a common error was to use subtraction of lengths rather than to consider a scale factor.

Question	Comments
10	Parts (a) and (b) were not well answered, as many candidates did not identify the area required. Part (c) was answered reasonably well, although a number of candidates made place value errors with money.
11	It was pleasing to see that candidates were, in the main, able to access the information and apply understanding to substitute into the formulae given. Although there were errors in decisions for values there were also many correct answers seen. A number of candidates substituted the correct values but then failed to apply the order of operations correctly. In the second formula, incorrect calculator use led to T = 350 + 200/26 being evaluated rather than (350 + 300)/26.
12	In part (a) some candidates were able to write down midpoints and many found there were 10 missing days. As usual the calculation of the estimation of the mean was either well understood or candidates made fundamental errors, including finding the total of the midpoints and dividing by either 3 or 4. In part (b) only a few candidates mentioned they had used the midpoints to represent the data from the group. Consequently, part (c) was not well answered, as clearly many candidates did not understand the principle of representing the group by using the midpoints.

MATHEMATICS – NUMERACY

GCSE (NEW)

Summer 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, but it was evident from the number of blank and very poor responses to the A and A* questions that some candidates had not completed the syllabus or had been entered at the wrong tier for their ability.

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:

- How to convert between decimal amounts of hours and a number of minutes.
- Understand the assumption that is used when calculating an estimation of the mean of grouped data.
- The need to know the conversions between metric and imperial units specified in the Numeracy syllabus, and how to use them.
- How to use the fraction button on modern scientific calculators so that the order of complex operations does not need to be considered.

Q.1 (a) This was the OCW question in this paper. Not many calculations needed to be performed in this question, but in general, poor labelling of work was seen, together with a significant number of errors in calculating the number of months involved. Other errors included the misunderstanding of the size of numbers like 16.8 million, and the omission of the £ sign in their final answer.

(b) Very well answered, with most saying the amount given to charity would have reduced in September 2014.

Q.2 (a) Many correct responses were seen in this question. The most common error was thinking their answer to 5.5/22 was 25 minutes rather than 0.25 hours (or 15 minutes).

(b) The majority of candidates circled the correct answer of 66, although incorrect answers of 70 (from 231/3.3) and 1.1 (from 231/210) were quite common.

Q.3 It was pleasing to see the majority of candidates answer all parts of this question well, with Pythagoras, trigonometry and similar shapes applied correctly. In (c), some incorrectly thought that the question was asking for the hypotenuse of the triangle rather than the base of the triangle.

Q.4 Part (b) of this proved difficult for many candidates. Although most knew the correct formula for the area of a circle, some thought that the area of just one circle needed to be calculated, where others subtracted either the area of 2 semicircles or subtracted the area of the circles, but then doubled their answer.

In part (c), many did not give their answer correct to the nearest pound, which resulted in them losing the accuracy mark.

Q.5 This question was answered well by most candidates, showing they could extract the correct information from the question, and substitute values correctly into the two formulae. Some candidates arrived at incorrect answers by not using appropriate brackets in their calculations. Scientific calculators now allow the input of complex divisions via the fraction button, which means that the order of operations does not need to be considered.

Q.6 (a) Most candidates answered this estimating the mean question well. Very few did not show a correct method. A special case mark was awarded for the odd candidate who just estimated the mean of the data shown on the page (leaving out the 10 days where the temperature was between 23ºC and 24ºC).

(b) Those who understood what the question was asking were in the minority. Typical wrong answers included 'There were 10 days where the temperature was between 23ºC and 24ºC', and others just stating their final answer to (a).

(c) Very few candidates gave a correct explanation. Most either wrote about the accuracy of the measurements being different, or the possibility that they measured the temperature at different locations in the hallway. Some explanations were close to being correct, but they didn't go far enough, and therefore we couldn't be sure that they understood the reason.

Q.7 (a) Well answered on the whole, although some gave the time when the tap was being opened, and others again read the scale incorrectly, giving an answer of around 8 seconds instead of 9 seconds.

(b) A slightly better response was seen to this type of question compared to previous series. There were still many that did not draw a tangent and gained no marks. The tangents that were drawn were usually of a good standard, and although some did not read the scales correctly, most knew they needed to find a 'difference in y coordinates' divided by a 'difference in x coordinates'.

(c) It was disappointing to note that very few candidates knew the correct conversion between litres and pints. Some gave conversions that were close to being correct, but the only ones that were merited fully were 1 litre = 1.75 pints and 1 gallon = 4.5(46) litres. Candidates were able to gain 1 out of the 3 marks by showing the correct use of 2 litres/second with any two of 1.75, 8 and 60, or for the correct use of 2 litres/second with 4.5(46), and many were able to gain this mark. We allowed follow through from their answer in (c)(i) into (c)(ii), and the majority of candidates showed good understanding of how to use their answer to (i) to decide whether the 90-gallon tank could be filled in 3.5 minutes.

Q.8 Most candidates worked correctly with the upper and lower bounds of the two measurements to arrive at the smallest and greatest number of pictures that could be fitted in the row. Most errors were with the upper and lower bounds of 15 cm, correct to the nearest 0.5 cm, with incorrect values of 14.5 and 15.5 cm typically being given. Very few candidates did not work with both sets of bounds. Those who only worked with one set of bounds were only able to gain 1 mark out of 5.

Q.9 (a) A significant number of candidates gained at least 1 mark out of the 2 in this True/False question which was pleasing to see.

(b) The aim of this reverse compound interest question was to show the link between the AER formula and how compound interest works. Some candidates tried to use the AER formula, but most who did either introduced an error by substituting 0.036 for the nominal annual interest rate 'i', or thought the AER was 1.036 instead of 0.036.

Those who arrived at the correct answer either used the idea of compound interest in reverse, or used trial and improvement.

Q.10 (a) The majority of candidates used the correct formula to calculate the volume of the cylinder, although some incorrectly used the diameter of 6 mm in the formula instead of the radius of 3 mm. The volume of the prism caused more problems, with some not using the correct formula for the area of the triangular cross-section, while others incorrectly used the slant length 11.3mm in their formula. The vast majority used the correct intention of adding the two volumes then multiplying the result by 500.

(b) To be able to calculate the total surface of the door handle, candidates needed to know the formula for the area of the curved surfaces. It was pleasing to see a significant number knew the formula, but most were unable to correctly arrive at the correct total surface area, mainly due to them failing to account for the hidden surfaces correctly.

Quite a number of candidates used volume formulae in their calculations, and no credit was given to these candidates. Most however showed a good understanding of how to calculate the percentage reduction, and follow through marks were gained by many for using the area of the shaded surface and their total surface area correctly in the calculation.

Q.11 (a) The majority of candidates used Pythagoras correctly to arrive at the distance AB, although some lost a mark if their final answer was deemed to have lost too much accuracy. The main errors seen were that some only used Pythagoras in one plane and did not use it a second time in a plane that had AB as the hypotenuse, while others thought that they needed to subtract 20 cm from the dimensions of the cuboid.

(b) Those who correctly used Pythagoras in (a) tended to show correct trigonometry to show that angle BAE was 61.3º. Those who had lost accuracy in (a) arrived at an angle that was close to 61.3º, and this should have prompted them to go back and seek more accuracy, but most did not. Also, candidates who had not used Pythagoras in the correct plane in (a) could not gain any marks in (b) as their lengths were not appropriate.

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