



GCSE EXAMINERS' REPORTS

**GCSE
MATHEMATICS**

NOVEMBER 2018

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Component	Page
Component 1 Foundation	1
Component 1 Higher	10
Component 2 Foundation	14
Component 2 Higher	18

MATHEMATICS

GCSE

November 2018

COMPONENT 1 - FOUNDATION

To perform well in this examination, candidates need to show sufficient method so that marks can be awarded even when the final answer is not correct; this is especially the case for any solution that requires more than one step. Candidates need to read each question carefully and pay attention to key words and phrases. Rereading the question once they have completed their solution to check that they have answered all that is required often reduces slips and omissions. Candidates who present their work neatly are less likely to make errors such as miscopying their own writing.

Candidates were able to make some progress with many of the questions and syllabus coverage appeared to be fairly good. Candidates were not allowed to use a calculator and better candidates showed reasonable arithmetic skills. Weaker candidates could clearly improve their arithmetic skills, particularly those involving negative numbers, fractions and decimals. Some candidates attempted to use partitioning methods to divide and multiply. Occasionally these methods were unsuccessful as candidates offered, $8 \times 10 \times 2$ for 8×12 rather than $8 \times 10 + 8 \times 2$, for example. Some candidates provided many calculations/trials in the working space without any indication of their final answer. This was common in Question 5 (b), for example. In these cases, the last attempt was usually marked and this was not always the best attempt. Candidates should be aware that they should indicate their answer in some way if they are not making use of the answer spaces where provided.

Candidates performed reasonably well on routine questions but found problem-solving questions quite challenging. Some questions involved candidates giving an explanation. Many found this also quite challenging, with some candidates contradicting themselves.

All candidates seemed to have sufficient time to answer those questions that were within their capability.

Question		Comments
1		Many candidates found this simple assessment of arithmetic skills to be a reasonable start to the examination.
	(a) (i) - (iv)	A good proportion of candidates were able to find the answers to parts (i) to (iii) correctly. Many candidates also applied a successful partitioning approach to find 40% of 150, usually $10\% \times 4$ and most candidates explicitly showed full method, which was an improvement on previous sessions.
	(b)	This was much less well answered. Many candidates offered an inequality sign instead of $\neq$. Some corrected the statement and gave the answer $5 - 3 = 2$, misinterpreting what they were being asked.

2	(a)&(b)	These parts of the question were usually answered correctly. Occasionally candidates omitted to mark the position of <i>D</i> or reversed the coordinates.
	(c)	A reasonable number of candidates were able to find the correct length of the perimeter, 32. Some also gave the correct unit, cm. However, many stated cm ² and some were unsure of what was being asked as, for example, 'Perimeter = 32 cm units 32' or 'Perimeter = 32 cm units 64' were seen several times. Some candidates found the area and a few were unable to count the side length as 8 or only found the total length of 3 of the sides.
3		Candidates found even this most basic level of algebra to be challenging. Very few candidates were able to form and simplify the correct expression. Some candidates were substituting values for <i>c</i> and giving numerical answers, missing the clue given by the keyword 'expression'.
4	(a)	Very well answered with the large majority of candidates reflecting the shape correctly. A few candidates translated it.
	(b)	Candidates found this much more testing. A reasonable number drew an acceptably accurate parallelogram. Many other candidates drew a trapezium, often isosceles, whilst a few others drew triangles. Some sensible use of tracing paper was evident.
5	(a) (i)&(ii)	The difference in part (i) was usually found correctly and some candidates were also successful in finding -40 in part (ii). However, many answers of 40 and some of -8, through the incorrect use of the summer temperature in the South Pole, were stated. Candidates who offered 40 as their answer may have corrected this if they had assessed how reasonable this was.
	(b)(i)	A fair number of candidates were able to earn 1 or 2 marks here. Commonly, candidates who did not were attempting to multiply two negative values. It was evident that many believed the product of two negative values to be negative. This part was intended to lead candidates into the next part of the question.
	(b)(ii)	It was rare to see a correct answer for this part. Most solutions did not involve two negative values, as was needed. Some candidates were able to earn B1, most commonly for -5, 3 and 2.
6	(a)	Fairly well answered with a reasonable number of candidates understanding the simplest method of solution was to multiply 4500 by 4. Some attempted to multiply 4500 by 3 and those few who attempted $\frac{4500}{15} \times 60$ were not as successful.
	(b)	Some correct answers were offered with many able to use their answer to part (a) correctly and earn the mark here. Many candidates, however attempted to find $18000 \div 60$ and did not take note of how unreasonable a speed of 300 km/h was for a man on a bicycle. Even if they had thought it was a motorbike, it was still rather fast.
7	(a)	Most candidates interpreted the key to the pictogram correctly and were able to find at least two of the four costs. Many were able to sum four correct values, although there were some slips in arithmetic on occasion. A few candidates needed to read the information at the beginning of the question more carefully as they, on occasion, gave either only the cost of the beginners' course or only the cost of the club badge as the answer to this part.

	(b)	Again, most candidates interpreted the method correctly and were accurate with their arithmetic, although a few slips were evident. A few candidates misunderstood the cost of the grading test and attempted to find $16 \times 12.50 + 16 \times 5$.
	(c)	Very few candidates were able to find the correct percentage. Some started correctly with $\frac{6}{600}$ but were unable to complete the solution successfully with many finding $6\frac{100}{600}$. Many candidates attempted to find 6% of 600 and the answer 36% was commonly stated.
	(d) (i)&(ii)	It was intended that candidates use the information 'Simon is 12 times as old as Anil' given at the start of part (d), to complete the ratio in part (d)(i). Many candidates did so. More candidates, however, looked at the information for part (d)(ii) and gave '60 : 5' in part (d)(i). Sometimes candidates confused themselves using this approach as '60 : 12' was seen, for example, and a few others were unable to divide 60 by 12 correctly. Candidates who offered an incorrect ratio using 60 as the first part generally miscalculated Josh's age in part (d)(ii), compounding their error. Candidates who gave answers greater than 60, such as 180, would have done better to read the question more carefully as it was clearly stated that Simon was the oldest club member and 180 years is not reasonable.
8	(a)	Most candidates deduced that David needed 6 paving stones, although a few worked out how many 'more' stones he needed, assuming he already had one, and gave the answer 5.
	(b)	Candidates needed to express themselves clearly and not contradict themselves to be rewarded in this part. There were many miscalculations of $52 + 52 = 1.4$ m, when simply stating $52 \text{ cm} + 52 \text{ cm} = 1 \text{ m } 4 \text{ cm}$ would have been sufficient here. Some candidates were unable to recall the names for the parts of a circle correctly and gave answers based on radius or circumference, not diameter.
	(c) (i)&(ii)	Presentation in this part of the question was often poor, with much work in various places. This made the logic of what was being attempted difficult to follow. Many candidates were able to use the offer correctly but omitted to round any value, finding 12×7.19 . Some candidates did find 12×7.20 , although few used 10 instead of 12, which would have resulted in an easier calculation. A few candidates added an extra bag 'in case David needed it.' Whilst this may have been a perfectly reasonable thing to do in real life, it was not condoned here as the buying of extra bags was not mentioned in the question. It seemed as if some of these 'adjustments' were made in response to part (c)(ii) as they were commonly made by candidates who had not estimated how much he had to pay for his 12 bags. Many candidates were able to correctly determine whether they had underestimated by rounding down or overestimated by rounding up. Occasional contradictions were seen with, for example, overestimate being ticked and an underestimate being described.

9	(a)	Only a few candidates observed that the simplest and quickest method of solution here was to find the difference between the hourly rates and multiply by 30. Most candidates attempted the difference between 30×8 and 30×8.50 and many made place value errors in their attempt. Again, presentation was often poor in this part, often making method difficult to imply when it was not explicitly stated.
	(b)	A reasonable number of correct solutions were seen. Common incorrect answers were £210, using 35×6 ; £190 from an incorrect order of operations error $6 \times 30 + 5 \times 2$; £220 from $30 + 5 \times 2 = £40$, rather than 40 hours, then $180 + 40$.
	(c)	Candidates who were correct in part (b) were often correct here. Those who had found 35×6 in part (b) usually repeated that error and were mostly unable to state an answer. Some candidates clearly made optimistic guesses, mostly incorrect, as several answers were stated with no supporting work.
10	(a)(i)	Many correct answers were offered, although the incorrect answer 'blue' was also commonly stated.
	(a)(ii)	Generally, well answered with most candidates offering zero in some form and few candidates offering descriptive answers such as 'impossible', which was not condoned if it was the only answer.
	(a)(iii)	A reasonable number of candidates were able to state $\frac{3}{10}$ in an acceptable form. As mentioned in the Guidance for Teaching, probabilities may be given as decimals, fractions or percentages but not as ratios. Many candidates would have benefitted from rereading the question as the answer $\frac{7}{10}$ was common.
10	(b)	This part of the question was more challenging. Many candidates made no real progress with this part. A few candidates were able to determine that there were now 30 balls in the tub, using equivalent fractions $\frac{2}{5} = \frac{12}{30}$, but many did not realise that the original 20 needed to be subtracted from this value. Some candidates worked successfully with proportions, counting up the number of 2's that make 12 and then applying that to 3's, having correctly deduced the proportion of green balls now being $\frac{3}{5}$. Other successful methods included $\frac{2}{5}$ being 12 balls and so $\frac{1}{5}$ had to be 6 balls and the answer followed. Common wrong answers were 8 from $\frac{2}{5}$ of 20 and 4 from $12 - (\frac{2}{5} \text{ of } 20)$.

11	(a)	This part of the question was not well answered. Those who did correctly select Carmen rarely gave a valid supporting explanation. For example, the suggestion that it was Carmen as '3 goes in to 21 but 5 does not go in to 18' was seen several times. Comments needed to be about the range only and not involve the mean. Many chose Green Knight because the mean was smaller, or the range was higher.
	(b)	A good number of candidates totalled the four given values correctly. Many of these divided the value they obtained by 4. Few candidates found $5 \times 13 = 65$ and worked out the difference. Some candidates treated the 4 given values as a sequence and looked for a pattern.
12	(a)	Many candidates were able to circle the fractions $\frac{2}{3}$ and $\frac{4}{6}$ but few were able to identify $\frac{30}{45}$. Some candidates circled $\frac{2}{3}$, $\frac{4}{6}$ and $\frac{15}{25}$. Attempts to cancel fractions down were rarely seen. This may have improved the performance of some.
	(b)	The best explanations involved finding the correct answer or cancelling $\frac{3}{21}$ to show it is the same as $\frac{1}{7}$. Some candidates offered sensible explanations in words but others contradicted themselves or were insufficiently clear with their comments to be credited. Confusion with conversion from a mixed number to an improper fraction was common as the calculation $7 \times 3 = 21 + 1 = \frac{22}{7}$ was seen several times.
	(c)	Some excellent answers were seen for this part. Many used the LCM and were successful. Others used a denominator of 24 and were equally successful. A few omitted to convert to equivalent fractions correctly with $\frac{3}{24} + \frac{1}{24}$ being not uncommon in this case. It was unfortunate that a few candidates were able to state a correct pair of equivalent fractions but had not summed them. The most common incorrect answer was $\frac{3+1}{4+6} = \frac{4}{10}$.
13	(a)	Some candidates were able to rotate shape A through 90° and most of these were rotated in the correct direction. Many candidates needed to take more care over the centre of the turn as, although a rotation was commonly offered, the centre was often not the origin. Some candidates may have benefitted from the use of tracing paper.
	(b)	The few candidates who drew lines through the corresponding corners to find the point of intersection were the most successful. Many candidates marked the position of P somewhere on or within triangle B or C.
14	(a)	A fairly good proportion of candidates found the correct answer, usually by considering 300, 300 and 150 grams. A few candidates gave the answer 40, disregarding the 150 grams. This was not condoned as it was clearly stated in the question that Sharon <i>used</i> 750 grams. A few candidates attempted to use the 1800 grams in this part, which was not required, and they consequently confused themselves. A few candidates understood that $2\frac{1}{2}$ batches were made but neglected to convert the batches into pieces of shortbread.

14	(b)	Many candidates correctly found that Sharon had 1050 grams left although some arithmetic slips were seen. Most then counted up in 200's to work out the number of cakes and many were successful. An answer of 5 was only accepted provided it did not arise from slips in arithmetic.
15	(a)	Some good answers were seen for this part. Candidates dividing 18 by 2 and then by 2 again were usually successful. A few candidates divided 18 by 3, making the solution easier and many divided 18 by 7, making it harder. These were equally incorrect. Some candidates used box diagrams to show what they were doing. This was a good idea but would have been much improved by supporting calculations, which were often omitted meaning that the method had to be implied.
	(b)	Candidates were more successful in this part as this was 'sharing in a given ratio', a technique with which many candidates seemed more confident. A good number found 1 part of the ratio to be equivalent to 4 hours and correctly found the difference between 28 and 8. A few arithmetic slips were seen and some candidates lost concentration as they multiplied one or two of the values in the ratio by something other than 4.
16	(a)	All that was required here was to find the area of a 10cm by 10cm square. A reasonable number of candidates did understand this and calculated the area correctly. Some candidates found the perimeter of the square, others found the volume of the cube. Some candidates made no attempt to answer.
	(b)	Again a reasonable number of correct answers were seen. Some candidates gave the answer 80 which, if they had thought about it, was not sensible. The best approaches used techniques similar to currency conversions etc: $\begin{array}{lcl} 1 \text{ kg} & \rightarrow & 10 \text{ N} \\ \times 0.8 & & \times 0.8 \\ 0.8 \text{ kg} & \rightarrow & 8 \text{ N} \end{array}$
	(c)	As the formula needed was, on this occasion, given to candidates, this should have been a straightforward solution. Those candidates who had persevered with the question usually earned at least one mark for using the formula correctly. It was rare to see a correct fraction to decimal conversion, however, and clearly this is an area that could be addressed to improve candidates' performance.
17	(a)	A few neat and accurate solutions were offered for this part of the question with many candidates confident about the number of degrees around a point and in a triangle. Those who marked their angles on the diagram as they found them seemed more able to construct a sensible series of steps to form a solution. Some candidates who found 116° went on to divide this value by 2, without subtracting it from 180 first. Some candidates seemed confused by the 'hat' notation for the angle as on occasion a correct answer was spoiled by 180° on the answer line. Weaker candidates tended to find $180 - 128$ and then divide their answer by 2.

17	(b)	Although the geometry needed was fairly basic, the problem solving nature of this question made it the most challenging question on the examination paper. Candidates rarely made any progress and those that did usually earned a mark for marking 3 correct and useful angles on the diagram or for marking 2 correct and useful angles and stating a valid reason for one of them. Reasons were generally poorly stated, with many being badly worded, incomplete or muddled. Many candidates marked angles on the left hand side of the diagram without any real justification. Many candidates assumed the lines were parallel in order to find angles needed. No candidate was able to successfully conclude an argument.
18	(a) (i)&(ii)	Candidates commonly misinterpreted the notation and found 8^3 in part (i) and 25×25 in part (ii). Perhaps greater knowledge of simple cube numbers and square numbers may have helped candidates here. Some candidates showed more promise, offering $2 \times 2 \times 2 = 8$, without explicitly state an answer, in part (i) or offering $\sqrt{25}$ or $\sqrt{5^2}$ in part (ii).
	(b)(i)	A few candidates understood the standard form notation and, without resorting to writing in decimal notation (ordinary numbers), found the answer quickly and easily. Some candidates offered an answer of 6×10^7 , clearly being confused about what to add and what to multiply. Candidates who did attempt to write the values in decimal notation often made place value errors. Many candidates made no attempt to answer.
	(b)(ii)	Again, few candidates made much progress here. The most successful solutions involved writing 3×10^5 in decimal notation and then working out $40\,000 \times 7$ and comparing them. Some candidates earned a mark for writing 3×10^5 as 300 000 or for 40 000 as 4×10^4 . These candidates often went on to try to multiply the values they had found.
19	(a)	This was very well answered with most candidates reading the correct value from the graph. Occasional misreads of the scale were seen with an answer of £15.60 being offered.
	(b) (i)&(ii)	In part (i), a good number of candidates understood that the graph represented values that were in direct proportion. The other 3 options were chosen randomly, it seems, by those who were not sure. In part (ii), very few candidates made any attempt to find the value of the gradient with most commenting on the increasing nature of the relationship instead. Some candidates were able to make a sensible, acceptable statement that the gradient represented the cost, in £, per mile of the delivery. Occasionally, a clear and unambiguous implication of this was accepted.
20		This proved to be a reasonably good question for many candidates.
	(a)	A good number were able to draw a reasonable line of best fit. Some lines were too steep and did not follow the trend of the data. Candidates who joined the end points were unsuccessful as that produced a line that was too high. Candidates need to ensure that some points are above and some are below their line and that their line follows the trend to be confident that a line is acceptable.

20	(b)	A good number of correct estimates were given.
	(c)	Many candidates successfully suggested that the dog was unlikely to be a West Highland Terrier as it was quite a bit taller than the dogs represented in the scatter diagram. A few candidates contradicted themselves and therefore could not be credited. Candidates need to keep explanations clear and be careful to avoid contradictions.
21		This question required the use of two skills, similarity and Pythagoras' theorem. It was easier to apply Pythagoras to the smaller triangle as the values were easier to work with. Many were able to earn a mark for marking <i>BC</i> as 5 cm on the diagram or by stating or clearly implying this in their working. Few went on to apply Pythagoras and most tried to compare the areas of the two triangles. Those who did apply Pythagoras were often unable to find $\sqrt{169}$.
22		Fully correct answers, whilst seen, were rare. Candidates did not often understand that, after 1 hour, all 5 park keepers would be able to prune trees. Those that did often omitted to take into account that, in the first hour, the 3 park keepers who would be pruning would have completed 3 trees. The most common answer was 5 hours 20 mins from 1 hour to weed the flower beds + 4 hours 20 mins to prune 13 trees. Many candidates made no attempt to answer.
23	(a)	This level of algebra was beyond the capabilities of the majority of candidates in this entry. A few earned a mark for a pair of factors of the correct form. The answer $x(x+2)-15$ was not uncommon from those who attempted the question.
	(b)	Candidates did not understand the connection between the parts of this question and virtually all candidates were unable to offer any sensible solution to this part.

24	(a)	Candidates were expected to read the value of x and of y from the graph and identify them as such in the answer space. Some candidates were able to write down one of the values, commonly x , but did not identify it as being x and therefore they could not be credited for it. Some candidates saw the words 'simultaneous equations' in the question and attempted an algebraic solution, without success. Other candidates stated the values of the y intercept of $y - x = 3$ and the root of $x + 2y = 1$.
24	(b)	Very few candidates understood that the most efficient method of solution was to set up and solve a pair of simultaneous equations, using an elimination technique to find the value of each unknown. A few candidates wrote, for example, $\begin{array}{rcl} 2A & 3C & 72 \\ 3A & 1C & 66 \end{array}$ and would have earned a mark if they had only inserted the appropriate '+' and '=' signs. Most candidates carried out trials. This method is not efficient and was only successful as the answers in this case were integers. As the question had not demanded an algebraic solution, trials were permitted but were only credited if a complete and correct solution had been found as far as the cost of each type of ticket. The trials carried out were variable in quality and presentation was often poor with working and logical progression very unclear. Some candidates were able to earn a mark for the very last step but only if the values they were using satisfied at least one of the equations.
25		Fully correct solutions were rarely seen. Candidates generally did not engage with the 'capture and tag/recapture' sampling technique used here. A good solution would have considered a proportion of fish tagged (either a fraction of the original 100 fish tagged or a fraction of the fish taken for the second sample) and inferred that the population should be about 500 either using '10 is to 50 as 100 is to 500' or '10 is to 100 as 50 is to 500'. Commonly, scientists who use this approach apply the rule $\frac{\text{number in first sample} \times \text{number in second sample}}{\text{number tagged in second sample}}$ and some investigative work using proportions could be used to develop this idea.

MATHEMATICS

GCSE

November 2018

COMPONENT 1 - HIGHER

To perform well in this examination, candidates need to show sufficient method so that marks can be awarded even when the final answer is not correct; this is especially the case for any solution that requires more than one step. Candidates need to read each question carefully and pay attention to key words and phrases. Rereading the question once they have completed their solution to check that they have answered all that is required often reduces slips and omissions. Candidates who present their work neatly are less likely to make errors such as miscopying their own writing.

Candidates performed reasonably well on routine questions but were less able to identify a correct method of solution to problem-solving questions. Question 12 exemplified this point as part (a) was well answered but candidates found part (b) to be challenging.

All candidates seemed to have sufficient time to answer those questions that were within their capability.

The November series is a resit opportunity only, so as expected, the number of entries was low. Points that have arisen from the candidates' solutions have been included in this report along with comments regarding the most efficient approach in places, particularly where the majority of candidates made no response to a question.

Question		Comments
1		This proved to be a good initial question for the majority of candidates. Most drew a line of best fit that followed the trend of the data with some points above and below. All candidates were able to use the line to predict a value. The final part of the question required candidates to infer that a dog with a particular mass and height was unlikely to be of the type given in the original data set. Most candidates were able to give a sensible statement for this inference.
2		Again, most candidates found part (a) and part (b)(i) quite accessible. Part (b)(ii) was more challenging. Candidates had to find the gradient of the line and interpret it in context. Most candidates were unable to find the gradient and they found the interpretation quite challenging. Comments along the lines of 'as one increases so does the other' were not acceptable.
3		Candidates needed to be able to work with values in standard form to succeed in this question. Most earned at least one mark for converting 3×10^5 to 300 000 or 40 000 to 4×10^4 . Several candidates gave a complete argument, usually comparing 300 000 with 280 000.

4		The formula for the surface area of a sphere is given in the list of formulae on page 2 of the examination booklet. Some candidates were able to make the substitution into the formula correctly. Candidates were generally unable to simplify what they then had, with squaring $\frac{3}{4}$ being beyond most of them. Candidates should be aware that, when an answer is requested as a multiple of π they should not use an approximate value such as 3.14 for π in the formula.
5		Most candidates attempted this question. A good proportion were able to earn full marks for part (a). A few candidates treated the vectors as if they were fractions. Success in part (b) was less common. Some candidates attempted division of vectors, indicating a lack of understanding. The most successful approach was to find or use $x \begin{pmatrix} 7 \\ -2 \end{pmatrix} = \begin{pmatrix} 21 \\ -6 \end{pmatrix}$.
6		A key step in the solution of this problem was to find that, after 1 hour, all 5 park keepers were available to prune trees and that there were 10 trees left to prune. Some candidates were able to determine this. However, very few candidates were able to offer any correct method to produce 5 park keepers taking 2 hours to prune 10 trees and thus state the final answer.
7	(a) (b)	This assessment of the graphical solution of a pair of simultaneous equations was poorly answered. Candidates did not identify their values as being for x or y and often attempted to combine the values they had stated in some way. Most candidates understood that the most efficient method of solution was to set up and solve a pair of simultaneous equations. A reasonable number used elimination to find the value of each unknown. Some candidates carried out trials. This method is not efficient and was only successful as the answers in this case were integers. As the question had not demanded an algebraic solution, trials were permitted but were only credited if a complete and correct solution had been found as far as the cost of each type of ticket.
8		In part (a) candidates needed to factorise a quadratic expression. Many understood the instruction 'factorise' but not in relation to a quadratic with $x(x+2)-15$ offered as a solution more than once. Occasionally candidates were unable to interpret the instruction 'factorise' as an incorrect solution was offered in part (a) but they then factorised in part (b) in order to solve the equation. This was rather unfortunate as the marks could not be post-awarded.
9		Most candidates attempted this question and earned at least one mark for the Venn diagram for correctly placing the 2 and 5. Commonly candidates omitted to take note of the 2 when interpreting that 6 shoppers liked both oranges and bananas and stated 6 where they should have placed 4. A few candidates then misinterpreted the remaining information which should have resulted in values of 6 and 3 stating 17 and 10 respectively in those positions. Most candidates omitted to record any value for the number of shoppers who did not like any of the 3 fruits, even though this was needed for the next part of the question. All candidates who attempted the question earned the mark for the correct or the follow through interpretation of the Venn diagram in part (b). However, the conditional nature of the probability requested in part (c) was too challenging for many.
10		Candidates did not engage with the 'capture and tag/recapture' sampling technique used here. A good solution would have considered a proportion of fish tagged (either a fraction of the original 100 fish tagged or a fraction of the fish taken for the second sample) and inferred that the population should be

		about 500 either using '10 is to 50 as 100 is to 500' or '10 is to 100 as 50 is to 500'. Commonly, scientists who use this approach apply the rule $\frac{\text{number in first sample} \times \text{number in second sample}}{\text{number tagged in second sample}}$ and some investigative work using proportions could be used to develop this idea.
11		This question assessed repeated proportional change. The best method was to find the product of the multipliers 1.01 and 0.9. Candidates who calculated $101\% - 10\%$ would have done better if they had formed the relationship ' <i>90% of (101% of the original value)</i> ' in steps starting with the statement in brackets. These candidates had not understood that 10% of the value after the increase by 1% was not the same as 10% of the original value.
12		Candidates performed well in part (a) but found part (b) very challenging. They needed to use their knowledge that when squaring a number the powers of all the prime factors of that number will be doubled. Thus the prime factors of a square number must all have even powers. The only prime factor with an odd power here was 3 and so 3×8112 would produce the correct result.
13		This question assessed indices and roots. It was poorly answered by some candidates. The questions themselves were fairly standard and should have been routine. Candidates who did make progress may have improved their performance if they had been able to identify 64 as a square number and find the value of 5^3 correctly, as this was not accepted as a final answer to part (b)(ii) given that they had been asked to 'find the value '. Another common error was to calculate $16^{\frac{3}{4}}$ as $16 \times \frac{3}{4}$.
14		Candidates did not seem to have a great understanding of how to represent inequalities using a graph as very few reasonable attempts were seen.
15		Some candidates had a somewhat limited understanding of cumulative frequency and histograms. Less than half of all candidates successfully drew a cumulative frequency diagram with the remaining candidates attempting a bar chart or histogram. Those that did have a correct cf diagram were able to find the median but not the inter-quartile range. In the part (d)(i), candidates needed to interpret a histogram and also use the information they had found in part (a). Very few candidates were able to make any progress in interpreting the histogram. Some candidates were able to make sensible comments in the final part of the question and were rewarded for not giving up too soon.
16		Candidates are clearly still not particularly skilled in solving problems involving circle theorems. Part (a) required the use of opposite angles in a cyclic quadrilateral and the alternate segment theorem. In part (b), candidates did not need to use any circle theorems as the whole proof was constructed using knowledge of the parts of a circle, the angles in a triangle and the angles around a point. Many candidates did not attempt either part.

17		There are many useful approaches to solving this problem. The best solutions were based upon it taking 8 seconds for the front face of the block of clay to travel from A to B and another 2 seconds for the block to exit the pipe. Some candidates made no attempt at a solution.
18		Even though this was a question in context, it was still a standard process. Candidates were unable to interpret what was needed, however, and the common answer offered was 14. Many candidates made no attempt to answer.
19		Very few candidates wrote anything of value for this question even though most attempted to answer each part. Some understood how to rationalise the denominator in part (a) but were unable to complete the process. Some wrote $9\sqrt{7} + 25\sqrt{7}$ for part (b) so had not fully understood what was needed. Candidates found part (c) and part (d) particularly challenging, making simplification errors such as $4 \times \sqrt{5} = \sqrt{20}$. Even though part (d) was the last part of a question about surds, candidates who attempted it more commonly tried to complete the identity with integers.
20		Candidates continue to struggle with the simple skill of dividing the numerator by the denominator to in order to write a fraction as a decimal. Even though in this case the decimal would have been recurring, the general method is not well applied. There was a little more success in part (b)(i) with the writing of the recurring decimal as an improper fraction. No candidate was able to square their improper fraction correctly. Most candidates made no attempt to answer part (b).
21		Those candidates who attempted this question generally said 'Yes' Janesh was correct in part (a). Very few made any comment that was creditworthy in part (b). The best criticism made in this part commented on the graph crossing the axis when it should not have done.
22		Many candidates offered no solution and those that did were unable to find the inverse function correctly and misinterpreted $gg(x)$ as the product of $g(x)$ and $g(x)$.
23		No attempts were made to draw a sine curve. Very few candidates made any attempt to answer.
24		This question assessed students understanding of the product rule for counting. Some students did not seem to be familiar with this part of the syllabus and made no attempt. A few candidates did attempt to use a product of some sort but it was rare to see a solution of any merit.
25		Candidates were assessed on their understanding of the iterative process 'decimal search'. In fact, this is simply a version of the process that many will use when carrying out a trial and improvement process. Slips were made with signs in part (a) although most candidates attempted it. Some good observations re the change of sign were made in part (b). No candidate offered any solution of merit for part (c). Again, this could be compared with the final stages of the process that many are familiar with when using trial and improvement.
26		Candidates seemed unfamiliar with this part of the syllabus as a large proportion made no attempt to answer and those that did were unable to interpret either of the circle equations given, correctly.

MATHEMATICS

GCSE

November 2018

COMPONENT 2 – FOUNDATION

Question		Comment
1	(a)(i)	Most candidates found this an accessible start to the paper. Where mistakes were made it was either in not using a calculator for addition of the amounts of money, or for incorrect numbers of the meals from the menu.
	(a)(ii)	Most candidates were able to round their answer given in (i) to the nearest ten, with a small minority misreading and rounding to the nearest whole number.
	(b)	A relatively easy task on a calculator to add amounts of money. Where mistakes were made, it was usually from not reducing the bill by removing the cheapest meal.
2	(a)	Whilst many candidates were able to identify multiples of both 3 and 5, there were a significant number who did not manage to identify all three numbers.
	(b)	Many managed to demonstrate that 37 is a factor of 888 by dividing by 37 to get 24. A few others gave more imaginative but still correct responses such as prime factor decomposition.
3	(a)(i)	Most candidates gave the correct decimal here, with a few giving the fraction equivalent.
	(a)(ii)	Rounding to 2 decimal places unfortunately causes issues for some candidates, usually from not rounding up. Common incorrect responses include 0.78 (not rounding up) and 0.88 or 0.89 (incorrect rounding up).
	(b)	Many correct responses giving one of the two reverse calculations involving division.
4	(a)	A relatively simple calculation, if candidates read and use the second line of the sign in the stem of the question.
	(b)	Candidates need to be encouraged to set this type of answer out in a more structured way. Many managed to do calculations that demonstrated understanding of the question. The best answers on this part showed clearly the price of 3 rides and 4 rides without the wristband and the price of 3 rides and 4 rides with the wristband, allowing a comparison to take place.
5	(a)	Many correct responses, although some candidates neglected to multiply by 5 after dividing to calculate the amount of fat in 1 piece.
	(b)(i)	This was relatively well answered; with most saying that they assumed the pieces were the same size.
	(b)(ii)	Candidates need to be aware that their impact statement must match the assumption they have given. In this case, the amount of fat could be more or less in (a) and a reasonable number of candidates managed to state this.
6		This question was well answered, with occasional slips, usually mixing up '2 – n' and 'n – 2' if they made any errors. Candidates should be encouraged to draw the lines in a neat way.

7	(a)	A lot of good responses here, usually about the lack of the label 'frequency' on the vertical axis, or for the large gap between 0 and 1. Candidates have to be careful with wording used here, because 'bars of different sizes' could only refer to the heights, which are meant to be different. They must refer to the different widths to get the mark for this.
	(b)(i)	A well answered question filling in tally and frequency.
	(b)(ii)	Many candidates drew a correct and neat bar chart. Some candidates need to take care that the scale they choose for the vertical axis is suitable for the heights of bars needed. Other candidates need to remember that the axes need to be labelled (frequency) and that bars and any gaps need to be uniform.
8	(a)	This question is trying to highlight the error that candidates make, with the interpretation of decimals for money. Some candidates need to note that the question says 'what is wrong with this answer'; therefore, 'nothing – it is correct' cannot be a correct response.
	(b)(i)	There are still a sizeable number of candidates who try to use a 'non-calculator' method to calculate a percentage of amount such as this. The use of an efficient calculator method is to be encouraged.
	(b)(ii)	Those who managed to get (i) right were usually able to follow on to get this related part correct as well.
9	(a)	A very well answered question, with most candidates giving all three missing numbers correctly.
	(b)	Although there were occasional numerical slips, many were able to complete this well.
	(c)	Many candidates were able to select the correct group here.
10	(a)	The number of correct responses here was disappointing. The correct response of 2.5 hours was only given a few times. Incorrect responses were mainly 2.3 or 2.7 hours.
	(b)	Many candidates were able to select the correct train, with a few slips from giving the arrival time rather than the departure time.
	(c)	This was well answered, with many getting both marks.
11	(a)	The two correct terms were regularly seen.
	(b)	There were a few variations on the correct theme. 'doubling' or 'multiplying by 2' were good, regular responses, with others giving 'add the last term'. Some candidates need to be encouraged to give a short, accurate explanation here.
	(c)(i)	Most managed to give the correct response of 228.
	(c)(ii)	Whilst the correct answer of 52 was regularly seen, a number of candidates gave this as the 6 th term and went on to find the next term, thinking that was the 7 th term. Whilst subsequent work was ignored, candidates need to be efficient, especially on 1 mark questions.
	(c)(iii)	Explaining is not a strong point for many candidates, with some responses rather dubiously correct. The best responses refer to the quicker method being the 'squaring and add' rather than the '(lots of) repeated addition' method.
12	(a)(i)	Many candidates incorrectly thought there were 100g in one kilogram.
	(a)(ii)	Those who managed to write a ratio using their answer from (i) were able to score the M1 here. If they had the correct ratio, and simplified it, they went on to score the A1 as well.
	(b)	There were a lot of correct responses, and many that were not. Marks were scored from correctly calculating the two fractions of amounts, or at least showing the intent to do so. If their answers added up to the correct total they were usually correct.

13	(a)(b) (c)	All three parts of this question were well answered.
14	(a)	The question stated 'You must show all your working', therefore those who did not were penalised. The common error here was to write $\frac{5}{9}$ as '0.5' instead of '0.55...'. Those who mastered $\frac{5}{9}$ usually went on to order the numbers correctly.
	(b)	Like the earlier % of amount question, many candidates attempted a non-calculator method that often went wrong due to its many parts. Candidates should be encouraged to use calculators efficiently when calculating percentages.
	(c)	A real context problem, deciding whether a car/trailer combination is safe, using percentages. Many calculated 85% of the mass of the car correctly. Some then interpreted this correctly as 'acceptable'.
15	(a)	Most candidates correctly identified (0,1), with a few reversing the coordinates.
	(b)(i)	Most candidates correctly plotted the three coordinates.
	(b)(ii)	The correct equation, $y=5$, was rarely seen. Occasionally the incorrect response of ' $x=5$ ' was given.
	(c)	This part was not answered well. If any marks were awarded, it was usually B1 for two correct coordinates given.
16	(a)	Explaining, again, was not particularly strong. Candidates should limit reasons to something along the lines of '20 people is not enough' or 'teenagers are likely to be in school in the morning'.
	(b)	There were many candidates who were able to give at least one good reason why the question from the questionnaire was not suitable. Common good answers included '3 overlaps', 'doesn't include zero' or 'asks about pieces rather than hours'.
17	(a)	This question was a little disappointing. Candidates seemed to either get all 6 marks, or very little. Correct responses required accurate measuring.
	(b)(i)	Candidates need to learn the names of quadrilaterals.
	(b)(ii)	There were two opportunities to score 1 mark here – from drawing a parallelogram, or from drawing another quadrilateral with an area of 12cm^2 . Some were able to do both and score B2.
18	(a)	Whilst many were able to add the given probabilities up, the first method mark comes from subtracting the total from 1. This then needs dividing by 2 to give the required answer. This second m1 mark is dependent on gaining the first M1.
	(b)	Many correct answers of 0.51 (or equivalent) with occasional slips giving the answer as 0.49.
	(c)	Many candidates took the given hint that the expected number of outcomes is more than 100. Others need to learn the method here and multiply the probability by the number of trials to calculate the expected number.
19		If any of the two bounds were to be given, it was '93.5'. The other correct answer '94.5' was much rarer, with '94.4' being the common wrong answer.
20*	(a)	This is the first of the common questions between higher and foundation. There were a number of correct responses where candidates gave a 3 part ratio equivalent to 1:1:3. Some did not give a 3 part ratio.
	(b)	The correct answer of $\frac{3}{5}$ was sometimes seen, or candidates could gain a follow through mark from their 3 part ratio in (a).
21*	(a)	Some were able to manipulate this formula correctly.

	(b)	For this part of the question, it was common for candidates to score the first B1 mark for dealing with the bracket, then often no further marks to follow this.
22*		It was common for candidates to score M1 for sight of '55000' but they were unable to convert to kilometres as requested.
23*	(a)	Many candidates calculated the area instead of the circumference.
	(b)	This question was well answered. There were occasional slips in finding the LCM and hence the number of packs of spoons & forks required, but more candidates completed the response box correctly as not. It was relatively rare to score no marks on this part question.
24*		Many candidates managed to gain E1 on this question for giving one correct explanation, usually that the data used has been rounded and is therefore inaccurate. It was rarer to see explanations about insufficient data.
25*		This question was not always well answered. Candidates need to learn and use the process of calculating either the cost per ml (or the ml per pence) so that they can compare the best value for money. Some candidates used a scaling method to find the cost of the same number of ml using each tube size. This was rather inefficient for the numbers involved here. There were a number of candidates who incorrectly started by subtracting the ml and pence.
26	(a)(b)	This question was testing candidates on two simple versions of trigonometry. Whilst some were able to score full marks here, many were not able to apply the methods correctly. Incorrect attempts involved the use of Pythagoras' Theorem.
27*	(a)	The first part, answer '3' was often the only mark gained on this question.
	(b)	The correct answer '-12' was very rarely seen.
	(c)	The correct answer, (0,4) was rarely seen. Candidates should learn that the gradient is zero on a quadratic at the turning point.
	(d)	It was rare for candidates to score either of the two available marks here for giving the coordinates where the graph crosses the x -axis.
28*		There were 22 years to calculate compound interest for. Some candidates were able to work out the value of the loan after 1 year, but not then apply this further.

MATHEMATICS
GCSE
November 2018
COMPONENT 2 - HIGHER

The November series was a resit opportunity only, so as anticipated the number of entries was low.

The paper differentiated well, with different styles of questions and a graduation in the level of difficulty for the abilities of candidates who sat this examination. It is very difficult to generalise from performance seen in the questions with so few candidates. Therefore, it is not possible to have a detailed report.

Item level data is available to all centres, by centre and for individual candidates with comparison of all candidates sitting these examinations.

A few general points of weaknesses noted:

- When changing the subject of the formula, it is important to focus on the subject. As there was evidence of manipulation leading back to the formula given in the question. Question 2(a).
- Candidates should be able to find the length of the side of a square from its area. Question 4(a)(ii).
- Candidates should be able to recognise that triangles drawn between two parallel lines have equal height. Question 6.
- Candidates do not have secure knowledge of straight line graphs. Question 7.
- It is important to read the question carefully when forming an equation from a diagram. The requirement was an equation for the perimeter. An error working with area, made the question far more demanding, involving a quadratic equation. Question 10.
- When working with compound interest it is important to think carefully about the number of years involved. Question 11(b).
- Modelling games involving prizes is not well understood. With some candidates not realising the probability of a black ball is 0.1, from total probability being 1. Question 12.
- Candidates did not display good knowledge of trigonometry. Questions 13 and 20.
- Calculating an estimate of the mean from a frequency diagram was not well answered, with most of the few candidates entered having no strategy to start to answer the question. Question 15(b)(i).
- In problem solving questions candidates need to consider which measurements they require, then think about strategies to find any missing measurements. Question 16(a).
- Similar volume considering scale factor or ratios is not well understood.
- Candidates did not demonstrate techniques to solve simultaneous equations, including a quadratic. Question 18.
- No tangents were seen in working towards calculating the acceleration for a velocity / time graph. Question 19.



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