



GCSE EXAMINERS' REPORTS

**MATHEMATICS
GCSE**

SUMMER 2018

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MATHEMATICS

GCSE

Summer 2018

COMPONENT 1 - FOUNDATION

To succeed in this examination, candidates need to present their solutions in a clear and logical way. Full method should always be shown for any solution that has more than one step. Candidates who carry out parts of the solution mentally and make an error, without giving any indication of what they are trying to work out, cannot be credited. Presentation is important. Candidates whose work is presented poorly often miscopy their own writing, resulting in an unnecessary loss of accuracy and marks. Where it is possible, checking answers is sensible. Candidates should check to see if their answer is reasonable using logic and/or estimation. For example, it is not reasonable to suggest that someone can work more than 24 hours a day and it is unlikely that a garden centre worker earns £500 per hour. Candidates should be encouraged to re-read a question once they think they have finished, as often some part of the solution has been left out. Some candidates are identifying key information in the question by underlining key words and instructions. This seems to be helpful. When being asked to 'Show that' a given result is true, candidates need to understand that all key method steps must be stated and clear and nothing should be assumed. The marks are awarded for the method and not the answer alone, in this case.

Question		Comments
1		A good proportion of candidates scored well in this question.
	(a)	This was usually correctly answered. Any errors seen were usually arithmetic, rather than an incorrect order of operations.
	(b) (i)&(ii)	Both parts were usually correctly answered. Occasionally either the fraction or decimal was incorrect but it was unusual for both to be incorrect. Common incorrect answers were $\frac{1}{10}$ for part (i) and 0.1 for part (ii).
	(c)	Candidates who divided by 10 and then by 2 were the most successful. Some candidates incorrectly divided by 100 and then by 2. Candidates using build up methods would do better if they showed what they were trying to do. For example, here, method would be clear if candidates wrote $10\% \rightarrow 32 \div 10 = 3.2$, $5\% \rightarrow 3.2 \div 2 = 1.6$ Other candidates incorrectly found 50% rather than 5%. Candidates who used the more 'calculator friendly' method of $\frac{5}{100} \times 32$ usually earned the first mark for a correct method but rarely found the correct answer.
	(d)	This was well answered with many candidates seeming to understand that, as the numerators were the same for each fraction, the larger the denominator, the smaller the fraction. These candidates simply wrote down the fractions in the correct order as intended. Some candidates attempted to convert to decimals with mixed success. Other candidates attempted to draw diagrams to represent the fractions and these did not seem particularly helpful in this case.

	(e)	A reasonable number of correct answers were seen. Candidates who struggled with place value in their answer to part (b)(ii) often did so here. Very weak candidates offered the answer 1.09800.
2	(a)(i)	A reasonable number of candidates were able to answer this part correctly. Many of these made a correct sketch of the 3D shape described. Not all of those who made a sketch were able to give the correct name, cuboid. Some candidates referred to it as a rectangular prism. This was not accepted. Weaker candidates offered the names of 2D shapes e.g. rectangle.
	(a)(ii)	Candidates who had made a correct sketch were commonly correct here. Some candidates did not seem to understand the term 'vertices' and very many gave the answer 12.
	(b)	This part was well answered with a good proportion of candidates able to identify the 3D shape as a cone.
3		Candidates usually communicated their money amounts in an acceptable form. Occasionally answers of 11.84p and 5.41p were seen and these were not accepted.
	(a)	Very many correct answers were seen. Candidates commonly found the correct cost of the Art eraser and most were sufficiently accurate with their summation to find the correct total. A few candidates ignored the special offer and these often earned M1 for a correct summation of the 3 given values. A few candidates misinterpreted what was needed and worked out the change Georgia had after buying these 3 items.
	(b)	Many candidates earned both marks here for finding the change using their total from part (a). A few arithmetic slips were seen. These were more commonly made in the subtraction from £20 rather than in the summation of £11.84 and £2.75. Candidates mentally subtracting 14.59 from 20 often gave answers of £6.41 or £5.51 or £5.49. Some candidates subtracted 2.75 from their answer to part (a), not thinking the question through.
4	(a)	A high proportion of correct answers were stated. The most common wrong answer was 11:32.
	(b)	Again a high proportion of candidates were able to find the correct answer. The most successful approach was a build-up method in two or three stages with the total being summed. Most candidates using this strategy were successful. Occasionally answers of 57 from $32 + 25$ were given. A few candidates understood that they needed to add on a whole hour but then added the 7 minutes difference instead of subtracting it. Some candidates attempted a formal subtraction but did this as $1125 - 1032$ in base 10 and gave the answer 93. These earned the method mark as they were at least <i>attempting</i> to do something valid. Incorrect answers without supporting method were not credited.

	(c) (i)&(ii)	The many candidates who continued the pattern that had been started for them earned a quick and simple 2 marks. Some candidates repeated or omitted rows. Other candidates seemed to be more 'hopeful' than logical in their approaches. These candidates often had illegal rows containing e.g. both A and B. Candidates who had the correct table were usually successful in part (ii) although some candidates were able to deduce the correct probability without the table.
5	(a)/(b)	A very high proportion of candidates earned full marks for both parts of this question. Occasionally, candidates made order of operation errors in part (b) and gave the answer 20. This was not accepted. Order of operations errors were occasionally also seen in (a) but this was much more unusual. Some candidates attempted to find the answer to part (b) using trials. Some were successful but the addition of the 25 seemed to confuse many using this approach.
6	(a) (b)	This part of the question was very well answered with many candidates earning full marks. Some candidates were unable to find 25% of 50 correctly but, provided they had made a genuine attempt to so do, were able to earn the remaining 2 marks available. Very few candidates made a choice without some supporting evidence of method. A good proportion of candidates knew that the correct calculation was $276 \div 12$. Not as many candidates were able to find the correct answer, £23. Candidates attempting traditional long division were often more successful than those who attempted build-up methods. Some candidates attempted to divide using a partitioning approach. Often the incorrect values 10 and 2 were chosen to do this. Candidates who choose to divide by breaking the divisor down into components need to know that the components they choose must multiply to give the original divisor not sum to give the divisor.
7	(a) (b)	Candidates were generally successful in this part. Those who were not often added $50 + 1$ and gave the answer 204. Good candidates gave a sensible calculation and concluded 'no' on the basis of it. A few candidates contradicted themselves, stating a correct calculation and then concluding 'yes' or stating a correct calculation but interpreting the result of it in a contradictory way such as 'no Chris has made the door too wide'.

	(c)	Some candidates were successful in this part, showing a correct unit conversion and division. Those candidates who were not correct often converted 2m 50cm to 2050cm and then divided by 50. Other candidates divided each of 2m and 50cm by 50 but were unable to sum their parts correctly, often giving an answer of 4.1. Some candidates converted 2m 50cm correctly to cm but made no further attempt at a solution. These candidates may have improved if they had reread the question before moving on. Some candidates thought that dividing by 100 and then dividing by 2 was equivalent to dividing by 50. Candidates are expected to be able to count in 50s at this level and so this was an unnecessary error. Candidates who choose to divide by breaking the divisor down into components need to know that the components they choose must multiply to give the original divisor not sum to give the divisor.
8		Almost all candidates were successful. The common wrong answer stated by those few who were not was 0.2.
9	(a)	Candidates who wrote that $\frac{1}{3} = 33.333\ldots\%$ and $\frac{2}{5} = 40\%$ were usually successful. Commonly these candidates gave an answer of 35%. A common wrong answer was simply stating 40% or 33%. Some candidates gave a fractional answer rather than a percentage.
	(b)	This part of the question was better answered than part (a) with a good number of candidates earning at least 2 of the 3 marks available. Some candidates divided by 2 and multiplied by 3 but usually managed to earn the third mark for a correct final step. A few candidates unnecessarily converted the fractions to decimals and introduced inaccuracies into their values.
10		Only a few candidates earned full marks for this question. Most candidates omitted the calculation asked for to estimate the weight of the rabbits. Some candidates gave an estimate for the total mass without a calculation, misinterpreting what was required. Many candidates earned the remaining 3 marks with the majority summing the actual masses of the two rabbits and then adding on the estimate given for the guinea pigs. A few candidates did not show a correct 'grams to kilograms' or 'kilograms to grams' conversion and so were not awarded the final mark. Candidates should understand that when asked to 'Show how' they decided they should provide calculations to support their decision rather than write lines of narrative.
11		A good number of candidates found that the purse contained 8 coins worth a total of £10 and that the largest and smallest value coins were £2 and 50p. Most candidates who established these three points found a correct solution to the problem. Some candidates thought that 2^3 was 6 and these usually also stated $3^2 + 1^3$ to be $6 + 3 = 9$. Other candidates knew the values of 2^3 and 3^2 but still thought that 1^3 was 3. A few candidates did not seem familiar with UK coins of legal tender. Occasionally £5 coins or £3 coins or other odd valued coins, such as 88p, were suggested. Candidates who thought that the purse contained 200 coins needed to think about how reasonable that suggestion was.

12	(a)(i) (a)(ii) (a)(iii) (b)	Usually correctly answered, with only a few arithmetic slips. This was not as well answered as part (i). Common wrong answers were 1, 0 and -4 following a calculation '$-2 \div 2$' or -11 following '$-12 + 10 = -22 \div 2$'. Candidates were a little more successful in this part than in (ii). Commonly, candidates who were incorrect used 6.5 as the input instead of the output and gave the answer 8.25. A small number of candidates realised that the missing operation was to take a square root. A few candidates understood this but were unable to express it correctly and gave an unacceptable answer of 'divide by the output'. Most candidates stated that the operation was '$\div 4$'.
13	(a) (b)(i) (b)(ii)	Fully correct answers to this part were not common. Some candidates measured and marked points for the two bearings correctly but then, rather than drawing lines from L and P through their points to find the intersection, they joined these marks together to form a line to represent the 'boat'. Some candidates thought that the question was one about loci and attempted to find the perpendicular bisector of the line joining their two points. Other candidates made no attempt to mark the position of the boat. Several candidates measured their bearings anti-clockwise or used the inner scale of their protractor instead of the outer scale. Some good solutions were seen to this part, with examiners following through the position of the candidate's boat where possible. A few candidates were awarded special case marks for being able to find a number of litres following a stated number of cm. Some good candidates made comments that they had assumed something about the weather/sea conditions or that they had assumed the boat travelled straight to H. Usually, these candidates were able to state a valid impact based on that assumption. The majority of candidates either made no attempt to answer or restated something they were given in the question as their assumption. Examples of incorrect assumptions offered were 'the boat used 5 litres of fuel each time it travelled 1km' or that '1cm was 10km'. Others assumed that they had measured the distance in part (a) correctly or that the bearings in that part were correct.
14	(a)	A reasonable number of candidates interpreted the information in the question correctly. These candidates usually tried trials on different values to try to make 320 in the correct proportions of packets of bulbs. Many were successful some fully correct answers were seen. A small number of candidates gave a correct, algebraic solution. Some candidates misinterpreted the information in the question and tried to find values in the ratio 1 : 2 : 10. Other candidates tried to manipulate the numbers given in various ways, for example, dividing 320 by 2 and 5 and then adding the results and subtracting from 320 or dividing 320 by the sum of 6, 5 and 10.

	(b)(i)	A fair number of candidates gave the correct answer, 40. A good number of candidates found that Anna worked for 15 hours and then stopped. These candidates may have done better if they had reread the question before moving on, as they had not finished. Weaker candidates added $3 + 5$ and divided 25 by 8, producing answers based on that value.
	(b)(ii)	Many candidates understood that the correct calculation was $156 \div 15$. Many of these gave the answer as 10.60, most likely misinterpreting the 'remainder' of 6 as 0.6. Some candidates attempted to divide using a partitioning approach. Often the incorrect values 10 and 5 were chosen to do this. Candidates who choose to divide by breaking the divisor down into components need to know that the components they choose must multiply to give the original divisor not sum to give the divisor. A common wrong answer was an attempt to work out $156 \div 7$ and so find the amount per day not per hour.
	(b)(iii)	Again, some good solutions were seen to this part. Candidates who had struggled with the earlier parts of the question were often able to find the correct answer here without difficulty. A few candidates gave the answer £150. As the question required an amount per hour candidates should either have checked the reasonableness of their answer or read the question more carefully as the keywords 'per hour' had been missed.
15	(a)	Good candidates were able to find that $\frac{1}{7}$ of the pupils equated to 23. Some of these candidates then successfully multiplied by 7 to find the correct answer. Other candidates multiplied by 5 and then added 46, which was also successful. Some arithmetic slips were made when multiplying by 7, usually by those who carried out repeated addition. A few candidates multiplied by 5 but then omitted to add the 46. This method was incomplete. Weaker candidates usually attempted to find $\frac{2}{7}$ of 46 or $\frac{5}{7}$ of 46.
	(b)	Good candidates were often able to state a correct pair of fractions with a common denominator. Some candidates also stated a correct sum or difference and concluded the argument correctly. Candidates who stated a difference of fractions and reversed the order of the values were penalised as the values had all been given in the question. A few candidates omitted to state a sum or difference after stating a correct pair of fractions with a common denominator. As the question required calculations to be given, this was penalised, although a correct conclusion was allowed to be made from this. Some candidates said they walked the same distance and justified this with $\frac{7-2}{10-2} = \frac{5}{8}.$
16		There were a good number of correct solutions given for this question. Many candidates were able to find 3% of 1700 and multiply the answer by 4. Most of these candidates at least implied a comparison and earned all 3 marks. Some candidates found 1% of 1700 as 1.7 without indicating their method and were unable to score as the intention to divide by 100 had not been stated. Candidates would do well to realise that, in a multi-step solution, they should state their method as correct method cannot be implied from an incorrect value.

17		Good candidates made clear statements, using the correct conventions for describing angles, and stated valid reasons for the angles they found. Solutions were neat and logical. Good use was made of the diagram with many candidates marking their angles upon it which proved to be helpful. Other candidates simply attempted to find as many angles as they could, again usually marking these on the diagram. Some of these candidates were able to produce a correct solution from this approach – although often a correct reason was missing. A few candidates gave calculations using the values given in the question. These values were not attributed to any particular angle and nothing was marked on the diagram. These candidates were rarely awarded marks. Some candidates indicated that they had used a protractor to measure the angles. Candidates need to know that, when a diagram is labelled as being not drawn to scale they are expected to find or calculate the angles and that measuring them will not be rewarded.
18	(a)	A good number of candidates were able to recall and use the formula for the area of a triangle correctly. Some candidates were unable to correctly identify the height and base of the triangle. A few candidates attempted to find base $\times$ height and other candidates either found the perimeter or multiplied 21, 17 and 10 together.
	(b)	Some candidates were able to explain that PS was the shortest distance because it met QR at a right angle. Many candidates gave unacceptable comments usually suggesting that it was 'straight down and not sloping' or that it was 'a straight line'. Other candidates suggested that 8 was less than any of the other lengths and so was the shortest. These candidates had not taken notice of the key word 'possible'.
19	(a)	Here candidates needed to demonstrate that they understood the link between fractions and ratios. They needed to translate the ratio given into fractional form. A few candidates were able to do this. Many candidates tried, incorrectly, to complete the sentence with words such as 'smaller than'.
	(b)	This was not particularly well answered. Almost all the ratios suggested simplified to 4 : 9.
20		Few candidates attempted this question. Of those that did, a small number earned both marks. Occasionally a mark was awarded for $m = 3$ or for an value of n that was twice their value for m . Some candidates multiplied out correctly but were unable to make the connection between the left hand side and the right hand side. The most common wrong answer seen was $m = 2$, $n = 3$ using the numbers given in the identity.
21		Candidates either knew this value or did not. The majority did not. The most common wrong answers chosen were those containing surds.
22 *		This question was very well answered with a very good proportion of candidates understanding the relevance of the LCM and deducing the correct answer from it. There were a few arithmetic slips in listing multiples. Occasionally the answers were reversed.

23 *	(a) (b)(i) (b)(ii) (b)(iii)	This was a simple plot. Most candidates were sufficiently careful and earned the mark. Among those who were not, the most common mis-plot was the final point. A few candidates made no attempt at this part. Often well-answered. Some candidates were writing values on the graph which seemed to help. A common wrong answer was 2006. In this part, candidates needed to identify the years that marked the steepest section of the line graph. Some candidates did so successfully. Other candidates seemed to think that the 'middle' section was the appropriate answer as 2006 to 2010 was not uncommon amongst those who were incorrect. A good number of candidates were able to provide a sensible statement for this part. The candidates who did not tended either to make a contradiction or to misinterpret the data in the question in some way. For example, comments such as 'more people were composting than recycling by 2014' were incorrect, as the data given was about percentage of waste not numbers of people.
24 *	(a) (b)	Most candidates were able to make a sensible comment based on the overlapping groups or the widths of the groups. Some candidates thought that the information in the first column was about the age of the customers not the amount of money spent. This meant their comments were irrelevant. Candidates struggled with this part with the most common wrong answers being $\frac{2}{10}$ and $\frac{2}{20}$, often without any supporting work.
25 *	(a) (b)	Candidates struggled with this question, with only the best making any real progress in any part. There were a high number of 'no responses' for all parts of the question. Some candidates were able to access this question and a reasonable number of these earned 2 marks. A few candidates separated the x terms and constants and did not recombine them into an equation. This was not a good strategy and candidates need to understand that they are much more likely to be successful if they keep the structure of an equation. Some candidates found the correct value of x using trials. This was only successful as x was a positive integer and so the strategy is, generally, not particularly useful. Candidates who attempted this question almost always made an error in removing the second pair of brackets. Some were able to earn the next mark for a correct FT statement, having collected their terms. Candidates need to be confident that, when solving equations such as these, where no context is given, it is perfectly acceptable to write an answer as a fraction, proper or improper, as some candidates wasted time doing unnecessary conversions to decimals. The candidates who used trials in part (a) tried the same approach here without any success, the answer being a fraction. Weaker candidates collected unlike terms, for example, $x + 2$ became $2x$ and $2x - 9$ became $-7x$.

	(c) (i)&(ii)	A few candidates were successful here. A number of candidates replaced the inequality sign with $=$. These candidates usually stated their final answer as $x=1.5$, losing both marks. As a strategy, the use of $=$ in this way is not advisable. A common wrong answer in this part was $3x \leq 8$ from the incorrect combination of the terms on the left hand side of the inequality. In part (ii), a few candidates were able to represent the solution to (i) correctly. However, many candidates simply drew an arrow or vertical line indicating a single value.
	(d)	The best candidates were able to identify that Gracie was incorrect and state a valid reason. Most candidates determined that she was not correct but for an invalid reason. A commonly stated answer was that Gracie was incorrect as there should only be one value for x , not two.
26 *	(a)	A reasonable proportion of candidates demonstrated their skills in finding the position to term rule. Their working was clear and their answers often accurate. A few candidates added 5 instead of subtracting. Many candidates gave the answer $n + 8$ indicating confusion with the term to term rule. Other candidates gave the answer $-5n + 8$. This answer showed that candidates did not fully understand the method and therefore had not fully recalled the relevance of the 8 and -5 to the answer.
	(b)	Again, a few correct responses were seen. However, the most common answer came from the use of $8n + 3$, misinterpreting $2n^3 + 3$ as $2^3n + 3$ and stating the answer as 11, 19, 27.
27 *	(a)	This part was discriminatory, with only the best candidates usually managing a statement that was acceptable. Candidates were asked specifically to explain that correlation does not imply causation, in some way. Candidates who were most successful often identified a confounding variable such as the weather possibly causing the increase in both. The simplest way to earn the mark was a statement that correlation does not imply causation. Comments based on the number of drinks sold and the number of ski hats sold being independent did not sufficiently address the issue with the manager's statement to be credited. Some candidates considered the points on the scatter graph and identified points where the hot drinks had increased and the sale of hats had decreased. This again did not sufficiently address the issue with the manager's statement. Other candidates suggested that the correlation was, in fact, negative.
27 *	(b) (i)&(ii)	Most candidates drew an acceptable, ruled line of best fit. A few candidates did not use a ruler and some still joined each point to the next in a series of lines. A good proportion of candidates were able to correctly identify the number of hot drinks sold when it was 6°C . Some candidates misread their graph at 5.5°C .

	(b)(iii)	Candidates were more successful with this explanation, with the limitations of the use of the line of best fit beyond the given data often being identified. Comments based on there being no data, it being unsafe to extrapolate or that the graph would give negative values at that point were all acceptable and commonly stated. Comments suggesting that no one would buy hot drinks when it was that hot were common and incorrect.
28 *		Some candidates knew which step contained Nia's error but were often unable to explain it in an acceptable way. It was not sufficient to just identify the error as being in step 2 or as being with the area of the whole circle without some supporting evidence as to what the problem with that step actually was. Some candidates provided that evidence by going on to give a fully correct solution to the problem. Some candidates had difficulty in recalling the correct formula for finding the area of a circle and stated that Nia should have calculated $\pi \times 12$. A few candidates made extra work for themselves by reverting to $\frac{45}{360} \times \pi \times 144$ rather than using $\frac{144\pi}{8}$, as was intended. These candidates generally were unable to progress beyond this point. Some candidates needed to be clear that, as the answer was required as a multiple of π , they should not have been using the approximation $\pi = 3.14$ in this question.
29 *		A simple test of recognition. A good number of candidates indicated the correct graph. Some candidates wrote $y = \frac{1}{x}$ on the page, which clearly helped them. A few candidates indicated more than one graph even though the wording of the question indicated that just one graph should be ticked.

MATHEMATICS

GCSE

Summer 2018

COMPONENT 1 - HIGHER

To succeed in this examination, candidates need to present their solutions in a clear and logical way. Full method should always be shown for any multi-step solution. Candidates who carry out parts of the solution mentally and make an error, without giving any indication of what they are trying to work out, cannot be credited. Presentation is important as candidates whose work is presented poorly often miscopy their own writing, resulting in an unnecessary loss of accuracy and, therefore, marks. Where it is possible, checking answers is important. Candidates should check to see if their answer is reasonable using logic and/or estimation. For example, it is not reasonable to suggest that a waiter earns £25000 per week. Answers to equations can always be substituted back into the original equation to check that they are correct. Candidates should be encouraged to re-read a question once they believe they have finished, as often some element of the solution has been missed. Some candidates are showing that they are identifying key information in the question by underlining key words and instructions. This seems to be helpful. When being asked to 'Show that' a given result is true, candidates need to understand that all key method steps must be stated and nothing assumed as the marks are awarded for the method and not the answer alone, in this case.

Question		Comments
1*		Candidates found this to be an accessible start to the paper. Many scored 3 or 4 marks.
	(a)	This was a simple plot to start with. Most candidates were sufficiently careful and were credited. Among those who were not, the most common mis-plot was the final point. A few candidates made no attempt at this part.
	(b)(i)	Generally well-answered. Some candidates were writing values on the graph which seemed to help.
	(b)(ii)	In this part, candidates needed to identify the years that marked the steepest section of the line graph. Many candidates did so successfully. Other candidates seemed to think that the 'middle' section was the appropriate answer as 2006 to 2010 was not uncommon amongst those who were incorrect.
	b(iii)	Most candidates were able to provide a sensible statement for this part. The candidates who did not tended either to make a contradiction or to misinterpret the data in the question in some way. For example, comments such as 'more people were composting than recycling by 2014' were incorrect, as the data given was about percentage of waste not numbers of people.

2*	(a)	This part was well answered. Occasional sign slips were seen but the majority earned full marks. A few candidates needed to be aware that, when a fraction simplifies to an integer, they are expected to write their answers as integers. Thus an answer of $\frac{15}{5}$ did not earn full marks here.
	(b)	There were a good number of accurate and fully correct solutions offered. The most common error was to omit to change the sign of the 9 on the left hand side when removing the second set of brackets. Many candidates were able to follow through from this initial error and earn the remaining 2 marks. Candidates need to be confident that, when solving equations such as these, where no context is given in the question, it is perfectly acceptable to write an answer as a fraction, proper or improper. Some candidates wasted time doing unnecessary conversions to decimals.
	(c)	A good number of candidates were successful here. A number of candidates replaced the inequality sign with = and these candidates usually stated their final answer as $x = 1.5$, thereby losing both marks. As a strategy, the use of = in this way is not advisable. In part (ii), some good representations of the solution to (i) were seen. However, some candidates used an empty circle or a vertical line at 1.5 whilst others had terminators at both ends of their line. Some candidates who had the correct answer to (i) drew a representation of $x \geq -1.5$.
	(d)	Some excellent explanations were offered for this part of the question. Many candidates indicated she was incorrect and stated the correct values. This was the simplest way of earning the mark. Some candidates checked Gracie's answer but substituting one of her values in and showing it did not give 0. This was a good strategy but less successful as some slips in evaluation were seen.
3*	(a)	A very good proportion of candidates demonstrated their skills in finding the position to term rule. Their working was clear and their answers often accurate. A few candidates added 5 instead of subtracting.
	(b)	Again, well- answered, with a good number of candidates understanding that they needed to substitute $n = 1, 2, 3$ and evaluate. A few candidates made an order of operations errors, generally finding $(2n)^3 + 3$ or an arithmetic slip – often with the third value.
4	(a)*	Most candidates were able to make a sensible comment based on the overlapping groups or the widths of the groups.
	(b)(i)*	A good number of candidates found the correct probability. Some wrote the correct calculation, $\frac{1}{10} \times \frac{1}{10}$ but then added the fractions. Others wrote a correct decimal calculation 0.1×0.1 , but then gave the answer as 0.1. A few candidates did not recall the correct combination of probabilities and added rather than multiplying.

	(b)(ii)	This part of the question was discriminatory with only the very best candidates earning the mark. There were various offerings with £689 being the most common wrong one.
5*		A simple test of recognition. Many candidates indicated the correct graph. Some candidates wrote $y = \frac{1}{x}$ on the page, which clearly helped them.
6*	(a)	This part was, again, discriminatory. Candidates were asked specifically to explain that correlation does not imply causation in some way. Candidates who were most successful often identified a confounding variable such as the weather possibly causing the increase in both. Comments based on the number of drinks sold and the number of ski hats sold being independent did not sufficiently address the issue with the manager's statement to be credited. Some candidates considered the points on the scatter graph and identified points where the hot drinks had increased and the sale of hats had decreased. This again did not sufficiently address the issue with the manager's statement.
	(b)(i)	Most candidates drew an acceptable, ruled line of best fit. A very high proportion of candidates were able to correctly identify the number of hot drinks sold when it was 6°C. A few candidates misread their graph at 5.5°C.
	(b)(ii)	
	(b)(iii)	Candidates were more successful with this explanation, with the limitations of the use of the line of best fit beyond the given data being identified. Comments based on there being no data, it being unsafe to extrapolate or that the graph would give negative values at that point were all acceptable and commonly stated.
7*		Many candidates explained Nia's error in an acceptable way. It was not sufficient to identify the error as being in step 2 or as being with the area of the whole circle without some supporting evidence as to what the problem with that step actually was. Some candidates provided that evidence by giving a fully correct solution to the problem. A few candidates made extra work for themselves by reverting to $\frac{45}{360} \times \pi \times 144$ - with some of these unable to progress beyond this point – rather than using $\frac{144\pi}{8}$, as was intended. A small number of candidates had difficulty in recalling the correct formula for finding the area of a circle.
8	(a)*	This was very well answered with the majority of candidates earning both marks.
	(b)	Candidates found this part to be more challenging. Many candidates found that they required 12 packets of sausages. Some also wrote that a packet of sausages cost 0.75x. Not many candidates were able to connect these pieces of information in any meaningful way. Those that did worked with trials or algebraic methods in roughly equal numbers. A common wrong error was to divide 125 by 7 or by 28. Candidates' presentation of work was often poor in this question as they made several attempts to order their thoughts. Much use was made of the margins when it would, perhaps, have been better to have continued on the back page.

9	(a)	Many candidates were able to draw the two correct loci. Few were able to identify the correct line segment representing the positions where station <i>R</i> could be built, however. Some candidates stopped their line segment at the bottom intersection of their arcs for the perpendicular bisector. Some identified distinct points rather than a line segment (usually the points of intersection of the perpendicular bisector and the arc).
	(b)	This was an assessment of candidates' understanding that the shortest distance from a point to a line is the perpendicular distance. Candidates who drew the line from <i>A</i> to <i>B</i> were more successful at marking this point than those who did not, as some points were slightly too high or too low. A few candidates marked <i>S</i> on the left hand arc that they had drawn for their perpendicular bisector. Many candidates omitted this part.
10		As this question was a proof, candidates needed to be fully correct and justify each angle or calculation correctly to be awarded full marks. A small number of candidates did manage to do this successfully. Other candidates gave inaccurate reasons or did not sufficient complete their argument and were not awarded the final mark. It was common for candidates to state 'because the lines are parallel' rather than 'corresponding angles', for example. Most candidates were able to make at least some progress with the proof. Those who did not sometimes made the assumption that the triangles were isosceles or equilateral.
11	(a)	A very good proportion of candidates were able to find 1 part of the ratio as being 1600 and correctly complete the solution. A few candidates benefitted from the special case as they had divided 6400 by 5 rather than 4 but otherwise worked correctly. A few other candidates attempted to divide by 5 but then multiplied by 14 rather than 13. Arithmetic was commonly excellent.
	(b)	A few candidates were fully correct in this part. Many candidates earned 2 marks for finding 12000 as the new labour cost and then subtracting that with their 15000 from 30800. The common error was to multiply 6000 by 1.5 rather than 2.5. Another error seen on occasion was made by candidates unnecessarily converting $1\frac{2}{3}$ to 166.66...% rather than $\frac{5}{3}$ and attempting to find some rounded value. This was not condoned. Candidates who arrived at the answer 9800 and found it to be more than 8 times as much often did not seem to be concerned by this. However, it was clear that some candidates did realise that they had made an error because of this and successfully corrected their value for the cost of the materials as a consequence.
12	(a)(i)	This question was a straightforward assessment of powers and roots, although candidates did not seem to find it so. Better candidates were successful in this part. Some candidates had problems dealing with the negative in the power. A common wrong answer was $-\sqrt{3}$. Other candidates thought that, taking the reciprocal applied to the power as well and another common wrong answer was $\frac{1}{9^2} = \frac{1}{81}$.

	(a)(ii)	Again, only the best candidates were able to earn any credit in this part. The most successful approach was to find $\frac{625}{5^3} = \frac{625}{125} = 5$. A little thought needed to be applied as the working step 625×5^{-3} , although correct, was not sufficiently progressive towards the answer to be credited. This was seen many times and candidates very often made no progress beyond that step. Those who did try to work with it often incorrectly treated it as $625 \times 5 \times 10^{-3}$. Weak candidates often offered 625×1^{-3} .
	(b)	Candidates performed better in this part and a good many earned at least one of the 2 marks. Commonly either the 2 or the a was not raised to the power 4.
	(c)	Candidates who interpreted the power correctly and knew their cube numbers were most successful in this part. The second mark was awarded for understanding that, as 76 is nearer to 64 than it is to 125, the answer will be nearer to 16 than it is to 25. Weaker candidates tended to try to find $\frac{2}{3}$ of 76.
13		A few candidates demonstrated their excellent algebraic skills when answering this question and provided neat, clear and accurate solutions. Other candidates understood that the relevant first step was to square both sides but in squaring the left hand side, omitted the cross terms. Sign errors were also not uncommon when simplifying after that point. Weaker candidates tended to separate the sum under the square root as two (or more) radical terms and then continued to move elements from under these square roots, carrying out spurious cancelling along the way.
14		Candidates who used the grid to good effect were the most successful in this question. Drawing a scalene right-angled triangle was the simplest starting point. Whilst many were able to rotate their triangle successfully, often their translation was parallel to the y-axis, not the x-axis – sometimes this was because they had drawn a large triangle and their translation would not fit. A re-drawing would have been the sensible outcome in this case. Many were able to identify a rotation had occurred but were unable to add anything further. Some candidates were describing more than one transformation. This did not score.
15		Candidates who understood the nature of vectors and wrote down a correct vector route as a starting point were the most successful. Some candidates did not understand that CD is not the same vector as DC . A few candidates correctly indicated that AD was $3\mathbf{q}$. Other candidates simply added the given vectors and made no attempt to find AD . Some candidates thought that DC was the same as AB – confusing vectors and line length and assuming an isosceles trapezium. These candidates made no use of most of the information in the question and should have questioned their solution in the light of that.
16	(a)	Very well answered with a large majority of candidates producing a fully correct box plot. The few candidates who were incorrect generally had the lower quartile as 2 (or occasionally 3) rather than 2.5, using the median (or occasionally the maximum) rather than the upper quartile.

	(b)	Candidates who were most successful made comments such as 'Box plots are only a summary of the data and contain no individual data points'. Some candidates were side-tracked by the box plot representing time in hours not days and said no because of this. This did not address what was being asked and was not credited. Comments such as 'No because there is no table to show this information' again did not address the question as to whether the information could be found from the box plot itself.												
17	(a)	Many candidates had no difficulty in writing down the correct relationship in a general form. Some candidates clearly implied a correct form in their working. Most of these went on to provide a correct calculation of the value of the weight. Some evaluation errors were seen. Many candidates did not complete the question, omitting to write down a correct form of the final equation. Re-reading the question once it is 'complete' may have helped these candidates.												
	(b)	Fewer candidates were successful in this part. Some interpretation was required and candidates needed to understand how their answer to (a) was relevant here. Once they had established that, the relationship needed to be rearranged to find the area. Many candidates multiplied the values 80 and their 2.4, other candidates divided 80 by their 2.4.												
18	(a)	Some excellent solutions were seen to this part. Mostly candidates worked with 3 columns and successfully manipulated the values to find e.g. the amount earned by 1 waiter for 1 week, 6 waiters for 1 week, 6 waiters for 3 weeks. Those few candidates using $2500 \times \frac{6}{5} \times \frac{3}{2}$ were less successful as they sometimes inverted the fractions.												
	(b)(i)/ (ii)	These parts were not as well answered. Some candidates gave correct unsimplified expressions such as $\frac{m \div 5}{x}$, which were allowed. Candidates often offered equations as their answer rather than expressions. For part (i) a 3 column approach such as that used in (a) would have been useful, as it was an algebraic example of a similar type: <table border="1" data-bbox="544 1339 957 1563"> <thead> <tr> <th>Chefs</th><th>Pay</th><th>Hours</th></tr> </thead> <tbody> <tr> <td>x</td><td>m</td><td>5</td></tr> <tr> <td>1</td><td>$\frac{m}{x}$</td><td>5</td></tr> <tr> <td>1</td><td>$\frac{1}{5}\left(\frac{m}{x}\right)$</td><td>1</td></tr> </tbody> </table> Very few candidates were able to make progress with part (ii). It was not uncommon to replace the 5 with 7 in their answer to part (i) and for the y to either be ignored or added on afterwards. Some candidates added y to m and then multiplied by 7.	Chefs	Pay	Hours	x	m	5	1	$\frac{m}{x}$	5	1	$\frac{1}{5}\left(\frac{m}{x}\right)$	1
Chefs	Pay	Hours												
x	m	5												
1	$\frac{m}{x}$	5												
1	$\frac{1}{5}\left(\frac{m}{x}\right)$	1												

19		A reasonable number of candidates were able to provide fully correct solutions to this problem. Some candidates were unable to recall how to find the area of a triangle and were consequently penalised. Some candidates were able to find a correct expression with an irrational denominator but made no progress beyond that. Those who did attempt to progress sometimes did not multiply all the terms in the numerator by $\sqrt{5}$, if they were using the approach of multiplying by $\frac{\sqrt{5}}{\sqrt{5}}$. There was some incorrect cancelling by candidates simplifying $\frac{20\sqrt{5}-15}{5}$ and the answers $4\sqrt{5}-15$ and $20\sqrt{5}-3$ were both seen.
20	(a)	This part was poorly answered and correct answers were not common. The answer 0.22 was very common with candidates seeming not to understand the fraction as an alternative way of representing division. Candidates attempting the division often stopped after the 3rd digit and gave the answer as 0.045 or 0.45.
	(b)	More candidates were successful with this part of the question and a good number of correct answers were seen. Some candidates had clearly learned that 3 recurring places means a denominator of 999. These candidates sometimes omitted to subtract 5 from 5258 and as no method had been shown, no marks could be awarded. Candidates who used this approach were more successful if they worked mentally with $5 + 0.\dot{2}5\dot{8}$ and gave the answer as a mixed number. Candidates sometimes multiplied the given recurring decimal by 10, 100, 1000 and did not choose the correct values to subtract. This extra work sometimes resulted in errors in writing down the recurring values with one of the digits being omitted. More efficient thinking, resulting in only 1000 times the decimal being used, generally resulted in a correct answer.
21	(a)	Few candidates were able to find the correct number of arrangements. Common wrong answers were 216, 36 and 30. Few candidates stated a correct product or factorial, using the product rule for counting.
	(b)	Many candidates were awarded both marks in this part for the understanding that this answer would be one third of the answer they had found in part (a).
22	(a)	Very few candidates were able to sketch a sufficiently accurate tangent graph. Many had more than 2 asymptotes. Some curves has 3 sections with incorrect curvature. Some curves clearly crossed the asymptotes.
	(b)	To answer this part, candidates needed to recall that $\tan 45 = 1$ and use the tangent curve to establish the second values as being $180 + 45$. Only the best candidates were able to do this.

MATHEMATICS

GCSE

Summer 2018

COMPONENT 2 - FOUNDATION

Question	Part	Comments
1.		Most candidates found this an accessible entry to the paper and were able to score all 4 marks. There were occasional slips in the 'boxes of rulers' and a few benefited from the follow-through mark to find the total cost when the exercise book total was incorrect. Some candidates need to be encouraged to write money correctly with 2d.p. although they did not lose marks for this.
2.		Many candidates found this an accessible basic algebra question. Some benefited from the follow-through for a total based on an incorrect A or B calculated earlier.
3.	a	This part of the question was answered reasonably well. Most candidates realised that the length and width must add to 9 for the perimeter to be 18cm.
	b	There were some issues here in candidates not showing their areas for all shapes in order to demonstrate how they decided which area was the greatest. This is a shame when they have clearly engaged with the question and selected the correct rectangle and in many cases worked out its area correctly.
4.	a	There were very many correct answers here of 3 hours 15 minutes. The most common wrong answer was for leaving the answer as 3 hours 25 minutes – so for not converting 3.25 into time correctly. They were able to score an M1 mark for this case.
	b	The assumption question. This does need to refer to the time it takes to iron each shirt – so 'each shirt takes the same time' is a good answer. Other acceptable assumptions include 'the shirts are the same size' or 'the shirts are the same type'. Some candidates refer to the total time to iron all 26 shirts – which is only repeating what they calculated in (a) so does not get a mark.
	c	The impact statement must match the assumption. It should be noted that the time could increase or decrease in this case, and their impact statement should say this. 'The time would increase' or 'the time would decrease' are not enough if they do not match what their assumption said in (b).

5.	a	Candidates still need to learn the meaning of the terms 'prime' and 'sum'. The marks here are independent of each other, so they were able to pick up a mark for adding two numbers, as long as one of them was a prime number from the list.
	b	In this part, many were able to select two numbers that gave them a large product, but this was not enough because they needed a product that was not a multiple of 10. The common wrong answer of 75 and 50 was then added and lost the second B1 mark as well.
6.	a	Many candidates were able to correctly name the equilateral triangle, although there were some interesting variations on the spelling. As long as the 'equilateral' was recognisable, it was accepted.
	b	Calculating the perimeter of the pattern was well answered by many, though some candidates also worked out the inside perimeters.
	c	The fraction that one tile makes from the total was well answered.
7.	a	This was an algebraic simplification involving one letter that many candidates were able to do correctly. There were some incorrect responses that had a final answer of $23a^2$ instead of $23a$, so losing the mark.
	b	This part required candidates to identify the error, which is in the simplification of the 'b' part of the expression. This was done correctly in many cases, although some candidates benefited from the B1 available for working the 'a' term correctly with an error in the 'b' term. This B1 is not available if their 'b' term comes to '-3' as in the question, and some candidates fell into this trap.
8.	a	Many candidates were able to work with the given conversions, which was encouraging. There were some, however, that despite the 'show that the quantity needed is 672g' managed to show that it is a different value.
	b	There were many correct responses, although some candidates needed to use the unitary method a little more routinely or convert the recipe to make enough for 2 people before scaling up to 8 people correctly.
	c	There were many correct responses of '12 people' for this part of the question.
9.	a	This was a well answered question.
	b	Those who did not gain full marks here were often awarded the B1 for giving an unsimplified ratio.

	c	This part of the question was worth 4 marks, and a pleasing number of candidates did manage to score all of these. Common reasons for them not getting full marks included not showing more of their working out. Many candidates scored the first method mark for a calculation leading to the cost of postage in at least one of the requested years. To get the second method mark, unless the correct answer was seen, they needed to demonstrate that a subtraction is required. "136" is a correct answer only, so some place value errors led to candidates losing marks here. Finally, candidates need to carefully follow the instruction in the question and give the year that the accountant spent the most money AND the amount.
	d	For a 'show that' question, candidates need to clearly show the method – in this case, a full method for increasing 50p by 20% and showing that the answer is 60p. Too many candidates do not show enough working out, particularly when using a calculator.
10.	a	This was a basic '% of an amount' question, where the percentage was greater than 100%. There are a few who think this is not possible, and there are many who do this using a 'non-calculator' method of 100%, $1\% \times 4$ and adding. This is acceptable if they manage to show all the parts that lead to a correct answer if there are numerical errors. Candidates need to be encouraged to use a more efficient calculator method for this type of question.
	b	This was another 'show that' question. This time, reasonably well answered, but again, an efficient calculator method would make their work easier.
	c	Many candidates were able to convert the 75% into a mark out of 24, or the 19/24 into a percentage in order to compare which of the two people scored a higher mark. With this type of question, some candidates do the work, but forget the important thing – the decision – that in this case Seren did better.
11.	a	Circumference of a circle in a bicycle context was reasonably well answered in many cases.
	b	In this question candidates were expected to realise that the distance between marks made by a wheel is the circumference. Whilst some did, many did not. They then needed to convert their answer into metres from millimetres, which gave them a chance of scoring at least one mark if the earlier marks were lost.
12.	a	The method for drawing a pie chart where the numbers are not obvious is something that many candidates found difficult. Mistakes in calculating the angles could be gained back by drawing their version of the angles correctly. There are also problems for many candidates in drawing angles using a protractor accurately. Candidates should be encouraged to draw the angles in the order they are given in the table, though they will not lose marks if they draw in any order.

	b(i)	An explain question with a tick box. Some candidates tried the default answer of 'we don't know the number of children in the school'. However, for this part, it is just that the angle in the Grange School pie chart is doubled, therefore twice as many in that school study German.
	b(ii)	For this part, there were some good responses of 'we cannot tell' because 'we don't know how many are in the schools' Here we are comparing the two pie charts.
	b(iii)	This is just finding the fraction of an amount in a pie chart context.
13.		There were a number of approaches taken by candidates in attempting this question. The most common one was to find 12% of 280 and add it on, though some didn't get this far, so did not score the first mark. This could be followed through if their total is divided by 8. They could also get the E1 mark at the end for a statement that matched their working. Like earlier questions involving a decision, clear working out is required to show that their decision is correct for the numbers they have calculated.
14.	a	There were very few candidates who remembered to describe the transformation as a 'translation'. This is a shame, because many of them referred to 'moving', using a column vector or description in words such as 'right 3, down 2'. Candidates should note that it is not enough to describe this as 'across 3' without giving the direction.
	b	The reflection part was better answered, though the difficulty here was correctly identifying the line $y=4$. There were many who reflected in the line $y=5$ (the base of the triangle), which gained only one mark.
15.	a	Average speed from a graph was reasonably well attempted, with many fully correct answers. The common error here was to omit to divide by 2 (hours).
	b	Many candidates know that a horizontal line on a distance-time graph represents 'stopped' or equivalent, such as 'he is taking a rest'.
	c(i)	Candidates were willing to attempt identifying the part of the graph with greatest speed, although they were not always accurate.
	c(ii)	The steepest gradient represents the greatest speed – and there were many variations on this theme.
	d	Completing the graph was less successful with candidates missing out on one or sometimes both marks. Many candidates did not use a ruler. Single lines would neaten up work and provide more accurate graphs.
16.		There was an interesting mixture of responses here, with many getting a completely reversed answer for no marks, or confusing the two quadratic graphs, but getting the straight-line graphs correctly matched for one mark.

17.	a	Many candidates correctly identified '12000000' and '7 million' as not in standard form, but often omitted ' 12.5×10^7 ' which is also not standard form.
	b	The calculation, appearing as it does on a calculator paper was well attempted, though it was common for candidates to leave their answer in a non-standard form, so only getting one of the two marks.
18.	a	For a late-foundation question, this Venn diagram was well attempted, with many getting both marks .
	b	Some candidates did not notice that there are only 8 numbers in the universal set, therefore the probability fraction has 8 as a denominator.
19*.	a	This is the first of the common questions. There were many responses where the candidate implied that there were 8 or 9 numbers on a dice, rather than a number appearing 8 or 9 times.
	b	Some of the candidates were able to gain a mark here for $11/\dots$ but very few were able to get the full marks for the correct answer.
	c	Even fewer candidates scored marks on this part of the question.
20*.	a	This was an accessible question for candidates on the foundation tier. Most had a go at factorising and many were able to do this part correctly. There were a few slips in the signs.
	b	The difference of two squares is something that candidates can and need to learn the form of.
	c	There was more success with this part of the question. Many were able to get at least the first mark for clearing the '2' from the left hand side. There were then a mixture of slips with a common one being to divide by 5 instead of multiplying.
21*.		Many candidates found this question accessible and were able to score two if not three marks for the question. The most common slip was not explaining that quarter of a tonne is 250kg, so the crane could not lift 264kg.
22*.	a	This is now a regular feature of these examinations, but candidates still have trouble following the steps required to calculate an estimate of the mean. There are still many candidates making the error that to find the mean we divide by 5 (the number of groups) rather than 31 (the total number of days).
	b	This proved to be difficult for foundation candidates, and very few were able to explain this correctly.

23*.	a	This was a relatively accessible Pythagoras followed by trigonometry question. The difficulty level was raised by having two triangles joined together. In part (a) many candidates were able to spot the method and use at least the first part of Pythagoras Theorem correctly to gain a mark with a good proportion gaining all three marks.
	b	Many candidates were not able to apply trigonometry correctly. Calculating an angle is something that they find difficult.
24*.		Candidates found this question difficult, though some were able to get a method mark for working with the density formula correctly to start with.
25*.		A wordy simultaneous equation question that most candidates found hard to get started. Often, it was only the first B1 mark that was gained for writing the cost statements in an algebraic form. Candidates were not able to produce enough algebraic method to score many of the other marks available.
26*.		A single mark question that many candidates felt they could have a go at. There were many incorrect statements that stated 'there are 1000cm in a metre' instead of the correct response that 100cm x 100cm gives the correct conversion between m^2 and cm^2 .

MATHEMATICS

GCSE

Summer 2018

COMPONENT 2 - HIGHER

Weaker candidates did find the questions towards the end of the paper more demanding as expected.

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 whether each question was well answered or not.

Question	Comments
1*	Although many candidates were of the opinion that the dice was not fair, many were unable to explain how they had decided this. A number of candidates were unsure which values from the table should be used in order to best estimate the probability of scoring a 2 and to calculate the number of times a score greater than 4 would occur. Making a decision on the denominator seemingly appeared to be the more demanding issue for candidates. A number of candidates did not give the number of times in part (c), instead giving an answer as a fraction, $148/480$.
2*	Question 2 was well answered, although there were a number of common errors, such as $(b - 5)^2$ and an incorrect initial step of $d/5 = 12 + 2$.
3	A number of candidates did not meet the full requirements for the answer to this question, giving an answer in standard form and correct to 2 significant figures. A few candidates did not start with the appropriate calculation.
4	Question 4 was reasonably well answered. However a number of candidates did not simplify their ratio in part (a).
5*	Although many candidates were able to calculate an estimate of the mean, many candidates found part (b) difficult to answer. A number of candidates answered to say why midpoints were used, but did not answer the actual question that asked why the estimate for the mean may still be fairly accurate.
6*	This question was generally well answered, by candidates with knowledge of Pythagoras' Theorem and right angle triangle trigonometry.
7*	Many candidates correctly formed simultaneous equations, with many candidates having appropriate techniques to apply to solve these equations. Errors were seen in calculation. Few candidates omitted to give the change, prompted by the answer space.

8	Although there were errors in calculating the volumes, in general candidates used the appropriate formula to calculate volumes correctly. Although, errors did include the use of an incorrect formula for the volume of a cylinder. The majority of candidates attempted to give an assumption and consider if this assumption was not true what the impact would be.
9*	Many candidates were able to apply knowledge of density to answer this question.
10	The main errors seen were writing time in minutes instead of in hours and also omitting brackets in forming an expression.
11	A few candidates ignored the fact they were told that Maria is correct! A number of candidates calculated the mean depth to use to answer this question, with some errors in calculation. However, the main difficulty was in working with consistent units or omitting units completely and then not knowing the order of the final answer.
12	Candidates either can work with reverse percentage correctly, or they do not have the required knowledge of what the amounts represent in percentage terms.
13	This question was generally well answered.
14	Many candidates attempted to find the gradient of the graph, but not always accompanied by appropriate units. The point at (0, 60) was often correctly plotted, but errors were made in calculating other points, although many candidates did show a straight line. The scales on the graph were generally read accurately. If errors were seen they were generally in reading the horizontal scale.
15	A common error was to work with 21% rather than 2.1%. Although many candidates did work correctly with the interest rate and calculated the amount of money. Part (b) was not well answered, with few candidates being able to generalise the solution to the problem.
16	Many candidates made errors in working to find <i>B</i> . The manipulation of the square root caused difficulties for many candidates.
17	Many candidates did realise that the sequence was quadratic, by finding a constant second difference.
18	Candidates with appropriate knowledge and understanding of working with iteration answered this question reasonably well. Other candidates did not demonstrate knowledge of iteration. Common errors were premature approximation, not proceeding far enough to be sure of their answer and not rounding eventually to 2 decimal places.
19	Unfortunately many candidates did not consider the impact of a linear scale factor on volume. Consequently, a common incorrect response came from multiplication by the linear scale factor.

20	The first stage was to find the missing length, 5 cm. Many candidates were successful in answering part (a) correctly, although many candidates did not consider an appropriate first step. In part (b), there were many substitution slips and on occasion use of incorrect formulae. Some candidates did not make good progress to answer part (c).
21	Candidates with knowledge of completing the square generally answered this question reasonably well. However, some candidates clearly did not have the required knowledge.
22	Although many candidates appeared to have understanding of histograms, there were a number of candidates who did not work with frequency density. Many candidates were able to express answers as percentages.
23	A number of candidates did not have a fully correct strategy to calculate missing lengths or angles. However, there were many candidates who did make a correct start to answering this question. Incorrect initial work included applying 'opposite angles of a cyclic quadrilateral' or considering AC as bisecting 86°.



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