Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International GCSE
Mathematics A (4MA1) Paper 1F

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Students who were well prepared for this paper were able to make a good attempt at all questions.

Standard form is a topic new to this specification, students were generally successful in this question although numbers were often taken out of standard form rather than entering numbers in standard form directly into a calculator. The withdrawal of some of the formulas that used to be present on the formula sheet means that students do now need to ensure that they learn the formulae for the area and circumference of a circle as well as those for the three trigonometric ratios.

On the whole, working was shown and easy to follow through. There were some instances where students failed to read the question properly.

1 The answer to part (a) was invariably correct. Only a few incorrect answers were seen in (b), the most common of these was 2008. When there was an incorrect answer in part (c) it tended to be 'four thousand and nine'. Incorrect answers were few and far between in part (d). Part (e) was very well answered the only error seen occasionally was 280. The majority of students were also able to provide a correct answer to part (f); when an error was seen it was usually students finding $\frac{5}{4}$ rather than $\frac{4}{5}$ of 185 or a numerical error from attempting the division without using a calculator.

2 The whole of this question was well answered with few incorrect answers seen. When an answer was incorrect it tended to be part (bi) but, even when this answer was incorrect, students were frequently able to recover and provide the correct answers to parts (bii) and (biii).

3 Whilst the vast majority of answers were correct for part (ai) there were a surprising number of incorrect answers. The description given in (aii) was usually correct although some descriptions were not precise enough. For example, descriptions like 'add 2 columns of 2' and 'counted the pentagons and added on' were not clear enough. A few had the misconception that $n + 4$ could be used to describe the term-to-term rule. Students struggled more with part (b) with some very large answer given. The usual method of approach in part (c) was use the rule and reverse the operations although some students continued the sequence from part (b). One error was to use 59 as the pattern number and thus work out the number of hexagons for pattern number 59 rather than the pattern number of the pattern containing 59 hexagons. Some students correctly substituted 12 into the rule but then incorrectly put 59 on answer line. Many who attempted to generate the sequence increased each term by 4 rather than by 5.

4 It was relatively rare to see an incorrect answer in part (a). Occasionally, students would subtract the cost of the carrot cake and then forget to divide by 2. Other errors usually

arose from either careless arithmetic or the miscopying of numbers. Many students failed to show any recognisable method in part (b); it was not uncommon to see a mass of unidentifiable working. Students who carried out some form of systematic trial and improvement had more success. Careless errors or the failure to remember to use twice as many apples as oranges sometimes led to inaccurate results. It was rare to see the more formal method of the addition of the cost of one orange and two apples and then £5 divided by this total. Some almost got the correct answer and then said 6, again usually from a mass of mixed up working

5 The majority of answers given in part (a) were correct. However, some students did give the answer as 9 to 46 or 9 – 46 or 46 – 9 rather than 37. When the answer was not correct in part (b), the common error was to either give two numbers (17 and 19) as the median rather than finding the mean of these or to try to find the median of the unordered frequencies in the table. There was evidence of careless arithmetic in part (c); a handful of students forgot to either use brackets or obtain the sum of the numbers before dividing by eight; providing the method was shown then the lack of brackets was condoned and the method mark awarded. There was evidence throughout this question of students confusing the definitions of range, median and mean.

6 The common incorrect answers in part (a) were 09:30 and 21:30pm. Whilst a good number of correct answers of 9 hours 20 minutes were seen very common incorrect answers were 10 hours 20 minutes and 8 hours 20 minutes. As ever, the need in part (c) to convert into hours (or minutes) led to a number of conceptual errors. The most common of these was to use the time as 5.3 rather than the correct 5.5. Students who converted to 330 minutes then frequently forgot to multiply by 60 to remain in the correct units. There were also a significant number of students who multiplied the time by the distance or divided the time by the distance and so gained no marks.

7 Whilst 97 was seen very frequently, the common incorrect answers were the other odd numbers between 90 and 100. Students had more success in (b) with the vast majority of responses being correct. Success was less evident in (c) with many students evaluating the square root of the given number rather than the cube root. A good number of incorrect answers were seen in (di); one common error was to put the square root sign over the whole fraction rather than just the numerator giving the incorrect 6.089… but a number of other incorrect answers were seen as well. If working was shown in (i) then a mark was frequently awarded but, more often than not, an incorrect answer was not supported by working. Those who made an error in (i) were frequently able to go on and gain the mark in (ii) for correctly rounding their answer to (i).

8 $2e + 4f$ or $-2e - 4f$ (or the sight of one of these incorrect terms) were common incorrect answers in (a) from those who associated the wrong signs with the terms. Occasionally a student would get to the correct answer of $6e - 10f$ and then go on to incorrectly simplify this to $-4ef$ and therefore lose the accuracy mark. Answers must be fully simplified; $6e + -10f$ gained one mark only. In part (b) a significant number of students multiplied the terms in **both** brackets by 5; it appeared that the absence of a number in front of the second pair of brackets caused some confusion. Thus, 0 marks was a common score in

this question. Those who just multiplied the first brackets by 5 frequently failed to deal correctly with the negative sign in front of the second pair of brackets and ended up with the incorrect answer of $17x + 14$. In part (c) the correct fully simplified expression was seen but so was a correct partially factorised expression. A relatively common incorrect answer was $10p^2q$ (or a variation on this) from those who presumably did not understand the term 'factorise'.

9 Whilst a good number of correct responses was seen it was disappointing to see so many students struggling with both parts of this question. In part (a) it was not uncommon to see the substitution carried out incorrectly with the sum $6\times3 - 2 - 5$ seen rather than the correct $6\times3 - 2\times-5$, Despite having the use of a calculator, the sight of the correct calculation frequently led to the wrong answer with students struggling to cope with both the subtraction and a negative number. $18 - 10$ and an answer of 8 was a common incorrect answer. In part (b), the presence of p on the right hand side of the equation meant that many students failed to deal correctly with rearranging the equation. The correct equation $2 = 15 + 2p$ was frequently followed by the incorrect $2p = 15 - 2$ which resulted in no marks being awarded.

10 A good number of incorrect responses were seen in part (a); $\frac{3}{13}$ and 3 : 16 were the most common. Part (b) was more often correct than not. A common incorrect answer was 28 which occurred when students found the difference between 18 and 3 and then added this onto 13 rather than trying to find and use a scale factor.

11 A common error in this question was to work out $\frac{2}{7}$, $\frac{1}{5}$ and $\frac{4}{9}$ of 70 and then add these quantities together. Other students used just the first two fractions correctly, subtracted these from 70 and then gave the answer as either 36 or $\frac{36}{70}$. Those who went further and got to 16 often gave this as the answer rather than giving the fraction required by the question. Students should be advised to read the question carefully to ensure that their answer fulfils the requirements of the question.

12 Students frequently scored either full marks or no marks for this question. On occasion, students would plot all the points with integer values but then omit to complete the graph by drawing a straight line through all the points. There was some evidence of students using the gradient and y intercept; this was sometimes successful but, at other times, students failed to notice that the scale on the x axis was not the same as the scale on the y axis.

13 Students who understand the technique needed to expand two brackets usually gained at least one mark in part (a). For these students, errors in associating the correct sign with the correct term or failing to simplify $3e - 5e$ correctly were the main source of errors. There were a significant number of students who failed to gain any marks; it was not uncommon to see just two terms given as an answer, frequently $e^2 + 2$ or $e^2 - 2$. In part

(b) the inability to carry out a correct first step meant that a significant number of students failed to score on this question. It was not uncommon to see the incorrect $y + 5 = 2y + 1$ or $5y = 10y + 5$ from students who failed to use a correct method to clear the fraction. Some students who successfully reached the correct $3y = 1$ then gave the incorrect answer of $y = 3$. Some lost the final mark by putting 0.3 or even 0.33 rather than use a correct recurring notation. Part (c) assessed a topic new to the foundation tier for this specification. It was clear that this was had not been well covered as the vast majority of students appeared unaware of the need to factorise in order to solve the given quadratic equation. Some of those who did successfully factorise the quadratic left that as their answer, seemingly unaware of the need to then extrapolate the solutions. Only a small number gained full marks on this part of the question.

14 A score of one mark in part (a) for working out the correct increase in price was fairly common. For those that went on to find the percentage increase, the common error was to then use the price in March rather than February as the denominator. 109 was sometimes seen as the answer from those students who reached 109.76% and failed to realise the necessity to subtract 100% from their answer. A significant number of students tried build up methods to find what percentage of 1126.50 that was represented by 110. These methods are inefficient and often ended up with close, but uncreditworthy amounts, eg 9.8% or 9.77%. In situations where calculators are permitted students should be encouraged to use these efficiently. There was generally more success in part (b) than in part (a) with a good number of correct answers seen although there were a surprising number of blank responses. Those who failed to gain full marks sometimes gained one mark for a correct method to find 19%.

15 Whilst many correct answers were seen in part(a), the incorrect answers of $\frac{1}{5}$ and $\frac{2}{5}$ were both seen relatively frequently. Some students showed 0.41, but then expressed an answer of 2/5 as there were 5 options of which red and blue were 2. A number of students correctly found 0.41 but then gave an answer of 0.41/2 or 0.41/5. In part (b), the need to add the given probabilities and then subtract from 1 as the first step was usually realised but, having reached 0.26, many students were then unable to use a correct method to use the information in the question correctly to find that the probability of the spinner landing on yellow was 0.1. A common incorrect approach was to simply divide 0.26 by 2 or else to subtract 0.06 from 0.26÷2. However most realised they need to multiply a probability by 150 so gained the independent mark available for this.

16 Common errors in part (a) were to omit one or more of the vital components from the description (most often clockwise) or to write the centre using vector notation rather than coordinates or to give more than one transformation – usually combining a translation with a rotation. Students need to be aware that centres of rotation are not always one of the vertices of the shape being rotated. There was a varying degree in success in part (b); it was clear that some students did not read the question carefully enough and attempted to translate triangle B rather than triangle A. Despite the scale factor of 0.5 in part (c) it was very common to see students draw a triangle bigger in size than triangle D. Many gained one mark for a correct size and orientation but usually attached to the centre of

enlargement. Also a few gained one mark for a correct enlargement of the wrong scale factor but using the correct centre. The triangle was often the correct size and in the correct orientation but positioned on top of the centre of enlargement.

17 There were a disappointing number of blank responses to this question. Those students who gained part marks usually did so for showing the correct method to find either the area of the complete circle or the area of the semi-circle. Finding the correct height of the triangle proved more of a challenge with $12 – 1 = 11$ seen more frequently then the correct $6 – 1 = 5$. Students often showed that they knew how to find the area of a triangle in general, but used the wrong dimensions. Some who made an attempt at the question used the formula for the circumference of a circle rather than the area.

18 It was rare to see an incorrect answer for part (a). The vast majority of students realised, in part (b), that the correct method was to add all the numbers in the table. however, some were unable to do this accurately with errors frequently appearing when the first step was to take all numbers out of standard form rather than enter them into the calculator in standard form. Whilst part (c) was more often answered correctly than not, a minority of students appeared to believe that only one decimal place should be included in their number when written in standard form and thus gave 9.8×10^6 as their answer; this was an incorrect answer and therefore could not be awarded the mark.

19 Not surprisingly at this stage in the paper, there were a good number of blank responses. Students who made an attempt at the question generally appeared to realise that they had to find the lengths of *AB* and *BD*. Surprisingly, the method to find *AB* using trigonometry was correct more often the method to find *BC*. The use of Pythagoras's Theorem to find *BC* was frequently seen but values were incorrectly substituted (the usual error was to add rather than subtract). Another error was to assume that triangle *ADC* was right-angled. Some students had difficulty setting up their trig equations correctly, and therefore were unable to carry out the correct operations.

20 There were some, but not many, correct answers seen in this question. Whilst some students were able to find a correct scale factor, it proved more difficult to apply this to the correct length in triangle *ABC* to find the length of *CE* with many students coming to the incorrect conclusion that *CE* was of length 12cm from using 4.8 rather than 6.4 in their calculation. A number of students gave the length of *BE*, rather than *CE*, as 16 cm.

Summary

Based on their performance in this paper, students should:

- practice converting times in hours and minutes into hours
- double check their arithmetic, particularly when adding a column of numbers
- learn and be able to recall the formulae for the area and circumference of a circle and recognise when to use each

- read the question carefully and review their answer to ensure that the question set is the one that has been answered
- practice carrying out calculations on their calculator with numbers in standard form
- show all working in a logical and ordered manner

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