# Examiners' Report/
# Principal Examiner Feedback

January 2014

Pearson Edexcel International GCSE
Mathematics A (4MA0) Paper 3H

Pearson Edexcel Certificate
Mathematics A (KMA0) Paper 3H

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The paper performed well and provided questions that differentiated at each target grade. The algebraic demands of this paper showed that a significant number of candidates have a weakness in algebraic manipulation.

The most able candidates performed well throughout the paper, including the more challenging questions towards the end.

On questions where there is more than one step needed to get to the final solution, candidates would be well advised to keep full accuracy until the final answer, and only round their answers as required at the end.

## Question 1

The majority of candidates coped well with this question and gave correct answers to both parts. When any errors occurred, these were more likely to be in part (b).

## Question 2

The most common error in this question was to use 10.45 rather than 10.75 when writing 10 hours 45 minutes as a decimal number. Some candidates did convert 10 hour 45 minutes to 645 minutes and then used this correctly, but then at the end either failed to divide by 60 or divided by 100 rather than 60

## Question 3

Many fully correct solutions were seen to this question. Some candidates correctly selected sin43 but were unable to make further progress. Some candidates lost the final accuracy mark because they truncated instead of rounding.

## Question 4

In part (a), the question clearly stated that the answer was to be given as a single power of 2. Therefore, those candidates who gave the answer as 128 did not gain the mark. The majority of candidates realised that the indices have to be added, but a minority of candidates did multiply. 4 was a common incorrect answer to part (b) from candidates who failed to interpret $2^n$ correctly and used $2n$ instead. Some candidates who did understand the notation gave their final answer as "$2^3$" rather than "3" and so failed to gain the accuracy mark.

## Question 5

In part (a) the most common incorrect answers seen were $20c$ and $9c$. Part (b) was well answered. In part (c), a small number of candidates either substituted incorrectly to get $2^3 + 52$ or forgot to substitute in the second term, leaving their answer as $2^3 + 5y$.

**Question 6**

Some candidates assumed that triangle *OTP* was isosceles; if this had been the case then the relevant information would have been given either on the diagram or else in the text describing the diagram. Many did get the correct answer and some candidates gained a mark for identifying angle TOP as $58^o$ or angle OTP as $90^o$ either in the working space or on the diagram. Those who just wrote, for example, $58^o$ without linking it to the correct angle gained no credit.

**Question 7**

A correct answer in part (a) was provided by the majority of candidates. Incorrect answers such as lists of integers or numbers alone with inequality signs, such as $1 < 4$, were sometimes seen. Some candidates got the meaning of the open and closed circles the wrong way round. In (b), many candidates worked out 3.5 but not all could express the answer in the correct form; candidates must work with inequalities rather than equations in inequality questions if they are to score method marks.

**Question 8**

The most common error in part (a) was to attempt to find 80% of 52 rather than to write 52 as a percentage of 80. A few candidates misinterpreted the table and arrived at a total other than 52. Candidates generally produced good attempts in (b) with many calculating 251; unfortunately, some candidates went on to calculate the mean weight instead of the total weight. Some, however, still add the midpoints and divide by the number of groups. In part (c)(i) many candidates failed to read the question carefully or else misinterpreted the graph and gave a value in the range 68 – 70 as their answer, which is the number of tea bags that weighed **less** than 3.25 g. The final part to the question proved to be the most challenging, with many candidates unable to demonstrate a correct method to find the interquartile range. A popular incorrect method was to subtract the lower quartile from 3.4

**Question 9**

Those who gave more than one transformation in (a) or (c) scored no marks. When a question specifies a **single** transformation then this is what must be given for the answer. The element most commonly missing from good attempts at part (a) was the co-ordinates of the centre. In part (c), some candidates defined the transformation as a “shrink” or “reduction” or “disenlarge” or said it is “made smaller” rather than using the term ‘enlargement’. A further common error was in stating the scale factor as $-3$ rather than $\frac{1}{3}$

**Question 10**

The majority of candidates were able to demonstrate a correct method to find 15% of 16000. However, many candidates then went on to subtract multiply this by 3 (ie subtracting 45% of 16000) rather than using a depreciation method. Hence, a common incorrect answer was £8800. Incorrect methods included multiplying by 1.15 instead of 0.15, or dividing by 0.85 or 1.15.

**Question 11**

The negative sign before the second fraction caused many candidates to make an error ending up with $-4x$ rather than $+4x$ after multiplying by 2 (or equivalent) and removing the bracket. It was not uncommon to see candidates multiply the left hand side of the equation by, for example 8, but fail to apply this to the right hand side as well. Candidates are advised to show sufficient working so that their method is clear. The very small minority of candidates who gave an answer of 1.5 without any working were awarded no marks.

**Question 12**

The majority of candidates applied Pythagoras's Theorem correctly to find the diameter of the circle. Having got over this hurdle, it was then disappointing to see candidates using the diameter, rather than the radius, in the formula for the area of the circle, and to see candidates using the area of a full circle rather than the semi-circle. Many who carried out the full method correctly did lose the final accuracy mark for rounding prematurely. Candidates should be encouraged to maintain full accuracy throughout questions, and only round their answers to the required accuracy at the end as appropriate.

**Question 13**

Part (a) was, surprisingly, not well done with many candidates making errors in their answer to both (i) and (ii). In part (ii), an incorrect answer of $\frac{11}{20}$ was seen a number of times.

In part (b)(i), $\frac{1}{10}$ was a common incorrect answer from many candidates. A significant number of candidates indicated the correct method by stating $\frac{2}{20}\times\frac{2}{20}$ in the working space but then proceeded to get the wrong answer by adding the fractions. In the final part of the question, the most common error was to forget to use $\frac{8}{20}\times\frac{5}{20}$ as well as $\frac{5}{20}\times\frac{8}{20}$. It was very pleasing to see in (b)(ii) that only very few candidates worked 'without replacement'.

**Question 14**

Those who wrote down an equation expressing the correct relationship between $D$ and $t$ generally went onto gain full marks. However, a minority of candidates gave their equation with $t$ or $t^2$ as the subject rather than $D$. An error that occurred at times was to write down the correct $8 = k \times 16$ but then solve this incorrectly to get $k = 2$ rather than $k = 0.5$. Some worked only with proportionality and did not progress to an equation. In part (b), $50 = 0.5t^2$ frequently became $t^2 = 25$ rather than $t^2 = 100$

**Question 15**
59.63 was a very common incorrect answer where candidates simply multiplied the two given lengths together. Some candidates used the efficient method of $0.5ab\sin C$ whereas others worked out the perpendicular height and then used this. Some candidates did split the parallelogram up into a rectangle and two triangles and then sometimes used the incorrect value of 8.9 for the base of the rectangle.

**Question 16**
The majority of candidates were able to gain the first mark for correctly removing the square root sign. The concept of then isolating the terms in $y^2$ was problematic for most. Those who did isolate the terms in $y^2$ often went on to divide by $a$ or $y$ (incorrectly) rather than factorise.

**Question 17**
Those who were able to make a start to this question generally gained one mark for expanding the brackets correctly. Surprisingly, a number of candidates who were successful in finding the correct value for $x$ were then unable to complete the process and find the correct value for $y$.

**Question 18**
In part (a), some candidates occasionally gave the answer as $9 \times 10^m$, forgetting to square root the 9. In part (b), the answer was frequently left as $27 \times 10^{3n}$ rather than being given in standard form as demanded by the question.

**Question 19**
This question was a good discriminator and proved challenging to most. Very few candidates scored more than 1 mark, with the majority of candidates unable to score any marks. Only a very small minority of candidates spotted that using 'the difference of two squares' was the most efficient method to factorise the given expression. The most popular method employed was to start by expanding the brackets but unfortunately, this was rarely done without errors. Candidates who did manage to get the expansion correct then frequently left their final answer completely unfactorised as $128x^2 - y^2$ and thus gained no credit.

**Question 20**
Those candidates who understood functions generally got part (a) correct. Likewise, those candidates who understood the meaning of $f^{-1}(x)$ generally gained full marks in part (b). However, it was disappointing to see a significant number of candidates unable to deal with $(-3)^2$ correctly in part (c) as $-34$ was a common incorrect answer. The most common error in (d) was to multiply the two functions together rather than form the required composite function. Some candidates did get the correct expression in part (i) but then incorrectly simplified their expression by dividing both terms by 4. In part (ii) the solution $x = 0$ was sometimes not given alongside $x = -5$.

**Question 21**
Although many blank responses were seen, candidates who understood the concept of vectors generally scored full marks in part (a). Many then went onto score at least one mark in part (b). Various methods were seen to show that $BC$ and $AE$ were parallel, the most common being writing both vectors as a multiple of $\mathbf{b} + 2\mathbf{a}$ or showing that, for example, one vector could be written as a multiple of the other.

**Grade Boundaries**

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