Version: 1.0: 08.12

General Certificate of Secondary Education
June 2012

Mathematics 43602H

(Specification 4360)

Unit 2: Number and Algebra (Higher)

Report on the Examination

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Unit 2: Higher Tier

General

Nearly all students completed the paper and there was no evidence of time constraints. Throughout, there was much evidence of a correct method being applied but, on this non-calculator paper, many marks were lost due to arithmetic errors. Many students scored well on the first half of the paper but few good answers were seen to the more challenging, later questions.

Topics that were well done included:

- distance-time graphical interpretation
- using approximations to estimate
- expand and factorise
- percentage increase
- fractions money problem.

Topics which students found difficult included:

- multiplication of directed numbers in a problem setting
- highest common factor
- inequalities
- problem solving using algebra
- number pattern problem
- change the subject of a formula
- equation of a straight line problem
- identity.

Question 1

This question was generally well done. In part (a) some students ignored the return journey and gave an answer of 24.

In part (b) most errors occurred in finding the time from B to C which was often 12 minutes instead of 14 minutes. Some omitted D to E and just calculated 14 + 10. Others counted squares to obtain the distances but the majority who used this method did not double their answer and gave an incorrect answer of 22 minutes. There was some evidence of poor arithmetic in adding correct values. A few students misread the scale and used a 1cm square as 30 minutes.

Part (c) was very well answered. The vast majority of students recognised that the fastest section was E to F and most indicated that this was the fastest section because it was the steepest part of the graph. Errors mainly occurred on the reason for E to F being the quickest section, with some attempting to calculate the speed rather than give a general statement. The other common error was to identify A to B as the fastest section, but even then these students usually indicated that 'steepest' meant 'fastest'.

Question 2

There were many correct answers. Almost all students worked out one or two of the amounts correctly or obtained the correct ratio between two of the components, for example giving Potatoes = 3 × Stock. A common error was to give 750g, 50g and 150ml, presumably from attempting to subtract 150 from two of the components.

Question 3

This question was well answered. The best method was to use the 1 significant figure approximations for all three values but many students did not do this, often using 402 or 403 in the numerator, or 38 or 39 in the denominator; consequently making it more difficult to cope with the intermediate arithmetic stages. A few who wrote 400 ÷ 80, then gave an answer of 50.

Question 4

This question was well answered. In part (a) there were a few instances of $w6$, instead of $6w$. In part (b), some only removed a common factor of 2 and some used a common factor of 8.

Question 5

This question was well answered with almost all answers in the correct form of £11.20. Answers presented incorrectly as 11.2 or £11.20p were rarely seen. Most students calculated the 40% increase and added on, those who used 1.4 × 8 were in the minority. Most of those who attempted 140/100 × 8 used a build-up method. This usually led to errors in the arithmetic.

Question 6

This question was not well answered. Some correct solutions were seen but also solutions giving a product of +10. Some clearly stated the options for the brackets as either 5 × –2 or –5 × 2 with 10 × –1 or –10 × 1 less common. Many students then used trial and improvement to find appropriate values for x and y or equated the individual brackets to their chosen pair and solved. Expansion of the brackets was not helpful and many who started with this approach made no further progress.

Question 7

Writing 126 as a product of prime factors in part (a) was well done with most students using a factor tree. Many gave the answer in index form even though this was not asked for. A few gave their answer using dots or commas instead of multiplication signs.

Part (b) was less well answered. A significant proportion of students attempted to work out the least common multiple. Most students constructed a prime factor tree and identified one pair of factors. Many gave 6 or 9 as their answer.

Question 8

This question was less well answered than many similar ones on previous examinations. There were errors multiplying out the bracket, $3x - 2$ and $3x - 5$ being the most common ones. Few students successfully collected the x terms on one side and the numbers on the other side. Many of those who reached $-2x = 14$ followed it with $x = 7$.

Question 9

This question was not well answered. Some students misinterpreted the inequality sign and included 2 and a few omitted 0. A very common incorrect answer seen was −1, 0, 1, 2, 3, 4.

Question 10

This question was well answered. Most of those who did not get the correct answer of 15 found £8 and many went on to get £12 but could not then work with the final fraction. Some worked out two-thirds of 8. Another common error was to find four-fifths of 12 for Chris's age. A few found 8 and then multiplied by 3 to get £24 for Chris but then used a correct method to give an answer of 30.

Question 11

Part (a) was well answered.

In part (b) many students were able to write the numbers given as ordinary numbers whilst others were able to reach 200, but many students did not complete the question by writing the answer in standard form.

Question 12

This question was generally poorly answered. Most students only went as far as writing one correct expression. Only able students formed an equation by equating the two expressions $2.2 + 1.6x$ and $4 + 1.4x$. Others just tried experimenting with multiples of 1.60 or 1.40 or calculated £2.20 + £1.60 and £4 + £1.40 and then stopped. Although the question stated 'set up and solve an equation in x', many students did not form an equation but worked out the journey distance of 9km using multiples of 1.60 and 1.40, taking into account the fixed charges of £2.20 and £4. Only a small number of students compared the three costs and reached a valid conclusion.

Question 13

Most students equated coefficients and successfully worked out a new equation. However, the elimination step was not always done correctly, there being many sign errors. Some students correctly obtained a first solution but failed to work out the second one. Some students showed no working but were able to give the correct answers, and some used a trial and improvement method to obtain the correct answers. There were a few, largely unsuccessful, attempts to use a substitution method.

Question 14

Some students spotted the repeating pattern of 5 immediately and usually extended the table for several more terms until they realised the implications for 3 to the power of 2012. Other successful solutions depended on working out the remainder when 2012 is divided by 5, or noticing that 2010 divides by 5 exactly, so the pattern must start again at 1 at that point. For many, however, this question proved to be inaccessible.

Question 15

This topic proved to be a challenge and many students made no progress. Whilst there were some very good answers, a number of students managed the first two steps but then made no attempt at rearranging and factorising.

Question 16

Part (a) of this question was answered well by some students but was inaccessible to many others. Those who were successful expressed $\sqrt{175}$ as $\sqrt{(25 \times 7)}$ and then usually managed to obtain the answer of $5\sqrt{7}$. The common incorrect start was to write $\sqrt{175}$ as $\sqrt{(35 \times 5)}$, which, although correct, does not then lead to an answer of the form $a\sqrt{b}$.

Part (b) was well answered by more able students. Many knew to multiply numerator and denominator by $\sqrt{3}$ but often then left their answer as $24\sqrt{3} / 3$, rather than simplifying further. There were many non-attempts on both parts of this question.

Question 17

Many students made little or no attempt at this question. Those who realised that they needed the coordinates of *C* were often unsuccessful due to frequent errors in the coordinates of *A* and/or *B*. Some found the values 3 and 6 for *A* and *B* but did not write the coordinates correctly, with (0, 3) and (6, 0) being common errors. Of the small number who found *C* correctly, few went on to find the gradient of *DC* correctly and even fewer reached the correct equation for *DC*. Some just wrote 3 and 6 at *A* and *B* on the diagram, but nothing more.

Question 18

Students found this question challenging. Those who attempted the question usually made some progress correctly expanding the pair of brackets on the left hand side of the identity, and some also realised that $c^2 = 16$, hence $c = 4$ with the negative solution often being omitted. Some students did see that the connection between c and d was $4c = -d$ but very few students scored more than 2 marks for the question.

Mark Range and Award of Grades

Grade boundaries are available on the Results statistics page of the AQA Website.

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