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Principal Examiner Feedback

November 2010

GCSE

GCSE Mathematics 1380

Higher Non-Calculator Paper (3H)

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Publications Code UG025822

Edexcel GCSE Mathematics November 2010.

1. PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 3

1.1 GENERAL COMMENTS

1.1.1 The paper appeared to allow candidates of all abilities to show positive achievement. Good answers were seen to all questions on the paper.

1.1.2 The majority of candidates were able to make an attempt at virtually all questions on the paper. Working out was shown in most cases although this wasn't always easy to follow through. Candidates need to take more care in setting out their methods, working and calculations.

1.1.3 There was clear evidence of some very poor arithmetic from candidates of all abilities. This was evident throughout the paper and particularly in questions 1, 5, 7, 11, 16, 18, 21, 23 and 25

1.1.4 Candidates would do well to consider the appropriateness of their answers this may help to omit careless errors such as forgetting about the decimal point in question 7. Some questions, such as q11, can be easily checked by candidates – this was rarely seen.

1.2 REPORT ON INDIVIDUAL QUESTIONS

1.2.1 Question 1

This, the first question on the paper, was disappointingly done. The majority of errors arose from the failure to read the question carefully. Many students worked out the correct number of dark chocolates but then gave this as their answer rather than the total number of chocolates. The other very frequently seen error was to divide 24 in the ratio 2 : 1 which was not the technique required.

1.2.2 Question 2

The majority of students were able to cope successfully with the simplification required. The most popular incorrect answers to part (a) was $4p$.

1.2.3 Question 3

Parts (a) and (b) were well understood and generally completed correctly. The most common error in (b) was to assume that, for example, both (7, 4) and (4, 7) were possible pairs. Students were slightly less successful in the final part of the question but the majority were able to obtain full marks. It was, however, encouraging to see very few instances of incorrect notation (such as 3 out of 20) for the answer to part (c).

1.2.4 Question 4

The two most popular answer given were $4n - 2$ (correct) and $n + 4$ (incorrect) Many students realised that 4 and 2 had to figure in their answer somehow but often combined these incorrectly with $2n - 4$ being the most common incorrect variation. Answers of $4n$ and $4n + 2$ were seen reasonably frequently; both of these were awarded one mark.

1.2.5 Question 5

The majority of students were able to recall correctly and apply the formula for the area of a circle. Disappointingly, a number of candidates were able to give the correct calculation of 3.14×100 but then unable to evaluate this correctly. Other errors included using the formula for the circumference, giving 10^2 as 20 and evaluating $(\pi \times 10)^2$.

1.2.6 Question 6

A number of students failed to pick up on the word 'estimate' in the question and therefore wasted time by trying to work out the accurate answer. Students should be encouraged to round all numbers to 1 significant figure when working out estimates.

1.2.7 Question 7

Many correct answers were seen using a variety of methods. Common errors included forgetting to use place value in the 'traditional' method of long multiplication and incorrect partitioning. There were many multiplication errors seen, giving 7×7 as 14 was probably the most common of these. Students who carried out the multiplication correctly frequently then made addition errors. A significant number of candidates failed to place a decimal point in their answers in which case £6475 scored 2 out of the 3 available marks. Those candidates who used a partitioning method often had the most difficulty with 70×37. Many using a 'scaling up' or repeated addition type of approach but failed to keep count properly. It was, in many cases, very difficult to follow candidate's working as presentation was poor.

1.2.8 Question 8

The usual error of forgetting to join plotted points with a straight line was once more in evidence. A significant number of candidates plotted all the correct points for the given range of x but then failed to draw a straight line through these to complete their graph. Some candidates were able to draw the graph correctly for positive values for x but then had the wrong points in the second quadrant. Candidates should be encouraged to draw up a table of values for this type of unstructured questions. Lines should also be drawn for the full range of x specified in the question.

1.2.9 Question 9

This question was generally very well done. Some candidates did, however, assume that the triangle had a right angle and so gave an incorrect answer of 135^{o} for their answer. Reasons were, on the whole, appropriately given although a very few candidates persist in writing out their working rather than giving a reason.

1.2.10 Question 10

The majority of candidates were able to produce a correct stem and leaf diagram. The key was not, however, always properly completed. The mode was given correctly in the majority of cases although the common error was to give just an answer of 7 rather than 77 or to give the range or median.

1.2.11 Question 11

The majority of candidates knew how to approach this problem and showed a correct method of solution but were let down by their arithmetic skills. The calculation of 17½% proving the major stumbling block. Many started out incorrectly by stating 10% = 60 (instead of 600) thereby not showing their method. Other errors came in partitioning and adding up parts that totalled to some other amount, often 18½ %. A number of candidates subtracted rather than added the VAT. The final step of dividing 4050 by 10 also resulted in some errors with 40.50 and 450 being common incorrect final amounts. A common error was to find VAT of just the amount left to pay monthly rather than the total price of the van. Neat, well structured solutions were seen from a minority of candidates. All too often there was a jumble of working which wasn't structured so made it more difficult to award the marks.

1.2.12 Question 12

Many fully correct descriptions of the transformation were seen. The main cause of lost marks were to use the word 'turn' instead of rotation or to leave out one or more of the three required parts of the description. The word 'single' was ignored by some candidates who sometimes offered a description of a combined transformation, usually a rotation followed by a translation; this type of response scored no marks. Candidates were less successful in part (b) although many moved the triangle by 3 squares in was, more often than not, in the wrong direction.

1.2.13 Question 13

Very few fully correct solutions were seen to this question. Many candidates were unable to make a start. Those who carried out some correct algebra generally gained a mark for dealing with the +2. The most common error by far was to only multiply some of the terms in the equation by 5 leading to the commonly seen incorrect answers of $v = 5t - 2$ and $v = t - 10$

1.2.14 Question 14

It was pleasing to see many candidates showing their working for this question whether it was using the diagram, writing out a list of numbers or using a remembered method to work out the mid point. Common errors included errors in arithmetic, finding the mean of the coordinate pairs and subtracting the corresponding values of x and y. A small minority of candidates transposed the coordinates and so gave their answer as (5, 7) rather than (7, 5).

1.2.15 Question 15

The vast majority of candidates picked up at least one mark in this question. In general, B was the easier of the two possible nets to identify.

1.2.16 Question 16

Part (a) was generally answered well although many candidates expanded the brackets correctly and then couldn't cope with the arithmetic, $13x - 3$ being a common incorrect error. Other errors included writing $3x + 10x$ as $13x^2$ or then attempting to simplify the final answer of $13x + 3$ further. Some candidates treated this linear expansion as a quadratic expansion. The common error in part (b) was to just cancel either the 2 or 4 in the numerator rather than both. It was clear from responses to parts (c) and (d) that some students do not understand the meaning of the word 'factorise'. Unsurprisingly candidates found (d) to be the most demanding part of the question. A commonly seen incorrect answer was $x^3 + y^3$. Otherwise the most common mistake was to only remove one of the two factors. Candidates should be reminded that the phrase 'Factorise fully' signifies that there is more than one factor to be found.

1.2.17 Question 17

Many accurate constructions were seen. Students who failed to pick up on the word 'construction' frequently scored a mark for drawing in a perpendicular bisector. A number of candidates just drew one pair of arcs rather than the two needed for a construction.

1.2.18 Question 18

The correct method was frequently seen. This didn't always, however, lead to the correct answer due to errors made in either the multiplication of the numerators when finding equivalent fractions or in the eventual subtraction of the numerators. The most common error was for candidates to subtract the numerators and subtract the denominators.

In part (b) the incorrect answer of 2 ½ was very common where candidates did not appreciate the need to turn both mixed numbers into improper fractions. Again, even when candidates used the correct method final answers were incorrect due to multiplication errors. Another common error came from those candidates who thought that they had to find common denominators and then usually added rather than multiplied their fractions.

1.2.19 Question 19

Correct answers to this question were few and far between. The majority of students were unable to offer any correct method of solution as they failed to identify the two similar triangles. Those students who recognised these generally went on to gain full marks. Some candidates did manage to gain follow through marks in (b) by showing the full method even though (a) was incorrect. However, a significant number of candidates used an incorrect method in (b) or failed to show any method. Many candidates wasted time in part (a) trying to use Pythagoras' Theorem. Common incorrect answers were 10 for part (a) and 40 for part (b).

1.2.20 Question 20

Part (a) was well done with candidates showing a good understanding of how to find the median from a box plot. There was some evidence of inaccurate reading from the box plot in (a) and (b). In (b) those candidates who knew how to find the interquartile range generally gained at least one mark. However, a number of candidates either gave the range instead of the interquartile range or just listed the upper and lower quartile. Part (c) was a good discriminator; it was pleasing to see a number of candidates referring to outliers, extreme values or anomalous values. Common incorrect responses included 'it's more accurate' and 'most of the values are in the interquartile range' or candidates simply stated some facts about either range or IQR.

1.2.21 Question 21

There were disappointingly few fully correct solutions seen even from more able candidates. Those students who could multiply both equations appropriately and then chose the correct operation were frequently let down by their arithmetic. A commonly seen error was to follow the correct statement of, for example, $26x = 13$ with the incorrect solution of $x = 2$; this type of error was seen on numerous occasions. The incorrect subtraction of negative numbers was also frequently seen.

1.2.22 Question 22

Most candidates made an attempt at giving a reason in part (a), successful candidates mentioned both the tangent and radius. The most common error was to omit the radius and give an incorrect reason along the lines of 'where the tangent touches a circle the angle is 90^o' Many candidates were able to attempt part (b) with the majority of these working out the length of *OB*. Some candidates just stopped here, either not realising that they had to subtract the radius or not reading the question properly. Again, a number of candidates were hindered by their poor arithmetic with the answer to $6^2 + 8^2$ given incorrectly on a number of occasions.

1.2.23 Question 23

The most common errors in part (a) were failure to simplify the terms in x correctly and to give + 15 rather than – 15 as the last term in the expanded expression. Even candidates who obtained the correct 4 terms would give their final expression incorrectly as $x^2 - 8x - 15$ or $x^2 - 2x - 15$

In part (b) those candidates who realised that the best method of solution was to factorise the given expression generally went on to score full marks. However, a significant number of these candidates just gave the factorised equation as their final answer rather than the values of x. Some correct solutions were seen using the formula but, more often than not, the use of the formula did not give the correct solutions due either to incorrect substitution or poor arithmetic.

1.2.24 Question 24

Students who understood the concept of histograms were able to answer this question very successfully. Those who didn't just treated the histogram as they would a bar chart and so scored no marks. Interestingly, many candidates were unable to score any marks in part (a) as they just drew a bar of height 6 cm rather than 3 cm but were then able to go and interpret the last correctly and score full marks in part (b).

1.2.25 Question 25

This question was well done for a question so late in the paper. A significant number of students who wrote down the correct calculation then went onto make arithmetic errors and so couldn't be awarded the mark for accuracy.

1.2.26 Question 26

Those students who were able to write down the correct proportionality equation generally went on to score full marks for the question. The majority of students were unable to gain any credit. The most common errors seen were to give the incorrect equation of $P = V - 3$ or to use direct rather than inverse proportion.

1.2.27 Question 27

Fully correct solutions were few and far between. Candidates who understood the concept of vectors were frequently able to score full marks. However, lack of brackets in some cases led to candidates failing to gain full credit. For example, in part (a) the correct answer of $\frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{b}$ was frequently written incorrectly as $\frac{1}{2}\ \mathbf{a} + \mathbf{b}$ or $\mathbf{a} + \mathbf{b} \div 2$ Candidates generally displayed a poor knowledge of vectors.

1.2.28 Question 28

As would be expected at this stage in the paper, very few candidates were able to gain full marks. There were some very good solutions seen. Successful students were those who recognised the equation as that of a circle and so were able to use compasses to construct the circle. Students who attempted a table of values were unsuccessful in generating a complete circle. A number of students were able to pick up a mark in part (b) for drawing the correct straight line.

2. STATISTICS

2.1. MARK RANGES AND AWARD OF GRADE

Unit/Component	Maximum Mark	Mean Mark	Standard Deviation	% Contribution to Award
1380/1F	100	58.2	17.1	50
1380/2F	100	64.4	18.5	50
1380/3H	100	46.9	21.6	50
1380/4H	100	55	19.8	50

GCSE Mathematics Grade Boundaries 1380 – November 2010

	A*	A	B	C	D	E	F	G
1380_1F				70	56	43	30	17
1380_2F				77	63	49	36	23
1380_3H	83	65	47	29	16	9		
1380_4H	87	71	55	39	26	19		

	A*	A	B	C	D	E	F	G
1380F				147	120	93	66	39
1380H	170	136	102	68	42			

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