Principal Examiner Feedback

Summer 2012

GCSE Mathematics (2MB01)
Paper 5MB2H_01 (Calculator)

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk for our BTEC qualifications.
Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson.
Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

Pearson: helping people progress, everywhere
Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2012
Publications Code UG032659

GCSE Mathematics 2MB01
Principal Examiner Feedback – Higher Paper Unit 2

Introduction

This paper was comparable to recent papers. Few questions presented any major problems for candidates who had been well prepared. Question 17 was the only question that proved to be very demanding for all levels of ability.

Reports on Individual Questions

Question 1

This question was answered well by those candidates showing an understanding of angles on parallel lines, and most were able to pick up at least three marks. Many failed to get full marks by their inability to accurately express the reasons for the geometric theory used. On many occasions "Z", "F" and sometimes "C" angles were quoted. Also 'interior' angles were referred to instead of 'co-interior'. Centres should be aware that on these new specifications, these abbreviated forms are not acceptable and 'interior' and 'co-interior' are totally different types of angle.

A significant number of candidates failed to score any marks by assuming that angles *ABD* and *DBE* were equal in size. Some recognising triangle *BDE* to be isosceles took angles *BDE* and *BED* to be the equal base angles. Frequently the equal length dashes on *DB* and *DE* were taken to mean parallel. It should also be noted that since this was a 'starred' question assessing quality of written communication, candidates failing to explicitly state $x = 44^{o}$ or even showing the 44^{o} clearly in the diagram failed to receive credit even when 44^{o} was seen and clearly intended to be the correct angle. It was common, throughout the working, for three letter angle notation to be absent or incorrect.

Question 2

The majority of candidates were able to score at least one mark, and often two marks, on this question. $4n - 2$, $4n + 6$, $n = 4n + 2$ and $4n$ were all common responses each gaining one mark. The most common incorrect answers seen gaining no credit were $n + 4$ and $2n \pm 4$. Some candidates wrote 22, the next term of the sequence, as their final answer.

Question 3

The correct answer of £25 was the modal answer here. However $35 \div 5 = 7$ followed by nonsense was a common error. Some candidates found both 25 and 10 but then failed to identify to which person each belonged.

Question 4

Although the incorrect answer of $\frac{5}{13}$ was seen often, most candidates did try to use a correct method identifying 40 as a common denominator. However unless at least one numerator was correct, no credit was given. Simple arithmetical errors in the addition of 16 and 15 (eg = 21) prevented a significant number of candidates from gaining full marks. Several candidates tried to cancel the correct answer of $\frac{31}{40}$ or even convert it to a mixed number. Such additional work was not penalised.

Question 5

Whilst the majority of candidates fully understood the need to subtract the deposit of £60 to work out the balance to be paid, many either added to get an answer of £460 or simply left £60 as their final answer through not carefully reading the question. There were a considerable number of candidates who could not calculate 15% correctly even when they had a correct starting value for 10%. Other errors were generally of an arithmetical nature; 40 + 20 = 80 was not uncommon.

Question 6

Candidates understanding the concept of factorisation usually answered part (a) correctly. In part (b), many candidates read more into the question than was required and often tried to multiply the two bracketed terms together; in some cases this was after correct expansion of the bracketed terms.

Incorrect expansions such as $5x + 7$ and $3x - 2$ were common errors. Also $8x - 29$ was seen on many occasions. In part (c), partial factorisation was common, particularly numeric only factorisation which scored no marks. Some candidates also tried to combine all variables and constants to one term, often from a correct answer, resulting in the loss of one mark where previously earned.

Question 7

Many candidates failed to score full marks simply for not writing their answer in correct monetary notation. Methods of long multiplication were very varied. They were mostly applied correctly only to be spoiled by simple multiplication or addition errors. A significant number of candidates misunderstood the actual bill and read it as 2792 units used in Jan, 3307 units used in April and 515 units used in, usually, May. Credit was still given here for methods of long multiplication applied correctly.

Question 8

A great many candidates, even at this level, still do not know how to find the area of a triangle; $12 \times 5 = 60$ cm^2 was often seen, and candidates would repeat this for the second triangular end. Many candidates again did not read the question carefully and attempted to find volume. Some candidates who did correctly work out the area of the front triangular end at 30 cm^2 then worked out $\frac{1}{2} \times 13 \times 5$ for the triangular end at the back. Other errors were often made by candidates not attempting to find the area of all of the 5 faces. Many candidates made the incorrect assumption that all three of the rectangular faces were identical, usually 20cm by 13cm.

Question 9

Many correct straight line graphs were seen, usually by candidates working out the coordinates of 5 points (3 for the more able) and often by applying $y = mx + c$. Although candidates using the latter method often misread the scale and just counted one square across and two squares up to get their gradient of 2. . Candidates lost marks if they did not fully draw their line from (–2,–7) to (2, 1). Weaker candidates, drawing tables of values, often made arithmetic errors in their calculations, particularly with the negative x values.
For example: 6.5 – 2.8 = 3.7 or calculating $\frac{1}{5}$ or $\frac{1}{3}$ of 60.

Question 10

Again, many candidates demonstrated their inability to find the area of a triangle. Area of triangle = $3 \times 2 = 6$ was common. This was often followed by 18 (6×3) – 6 = 12. Even though the formula for the area of a trapezium is now on the Higher tier formula sheet, its use was scarce and often inaccurate. Many candidates correctly found the base of the trapezium as 4 cm but then multiplied it by 6. Some correctly found the area of the trapezium but then went on to subtract the area of the triangle.

The vast majority of candidates scored one mark, irrespective of their answer, by quoting the correct units of cm^2.

Question 11

Many candidates did not fully understand the 'compound' nature of the depreciation in this question and merely subtracted 20% (£2000) and 10% (£1000) of the original cost of £10000 giving an answer of £7000. This did gain one mark only for the implied subtraction of £2000 from the cost for the first year. Some candidates merely gave £3000 as their answer. This scored no marks. Again arithmetic errors were in abundance and it was not uncommon to see 20% of 10000 as 200, etc.

Question 12

Multiplication, by whatever method, of the two bracketed expressions in part (a) was often executed correctly, however poor 'collecting of terms' prevented the award of full marks on many occasions; $x^2 + 3x - 40$ and $x^2 \pm 13x - 40$ were common errors. Sometimes the 5 and -8 were added instead of multiplied together. In part (b), $(x - 4)^2$, $(x - 8)(x + 8)$ and $(x \pm 2)(x \pm 8)$ were the most common incorrect answers offered, with many candidates failing to recognise the 'difference of two squares' format.

Question 13

Although the correct answer in part (a) was seen often, many times when it was not, candidates showed an understanding of midpoint theory to enable them to gain some credit in part (b). Weaker candidates often gave the same coordinates for the point *R* as the given point *N* in part (a) and simply halved each value to give (3, 1, 2) as their answer in part (b).

Question 14

Part (a) was well answered and most candidates at the higher levels were able to find two recurring decimals which could be used for their purpose. Many candidates assumed that both the two tenths and 5 hundredths were recurring, writing 0.252525… resulting in a fraction of $\frac{25}{99}$. This did gain some credit. Weaker candidates simply gave ¼ as their answer and scored no marks.

In part (b) it was clear that many candidates knew that they had to do something with √6. Often this was correctly used but often not. $\frac{12}{\sqrt{6}} = \frac{\sqrt{6}}{\sqrt{6}}$ and $\frac{12}{\sqrt{6}} + \frac{\sqrt{6}}{\sqrt{6}}$ were seen on many occasions. Many failed to fully simplify their answers and left an answer of $\frac{12\sqrt{6}}{6}$. These candidates lost the final accuracy mark.

Question 15

Most candidates were able to score at least one mark by recognising that angles *OTP* and *ORP* were right angles, although very few were able to give a correct reason as to why. 'tangent' and '90º' were often seen written, but candidates failed to relate this to the radius. The correct identification of the 90º was usually followed by the correct use of either angles in a triangle = 180^0 or angles in a quadrilateral = 360^0. Once again, since this was a 'starred' question assessing quality of written communication, candidates failing to explicitly state (angle) *TOR* = 140° or even showing the 140° clearly in the diagram failed to receive credit even when 140° was correctly calculated. A number of candidates found the 'correct' answer of 140° by incorrect methods, often making the assumption that *ROTP* was a cyclic quadrilateral, without proof. This gained no credit. In a great many cases though, candidates failed to score full marks by their failure again to express their geometric reasoning in a satisfactory way. Failure to use correct three letter notation to identify angles during working was again common.

Centres are advised to look carefully at the requirements of the mark scheme in this respect with its demand for the inclusion of key words.

Question 16

Many candidates were relatively comfortable in the use of a correct conversion factor between kilometres and miles (8 km = 5 miles). Loss of marks tended to reflect candidates inability to deal with 2 hours 45 minutes as an expression in hours only (2.75), many multiplying their converted distance in miles by 165 minutes or more alarmingly 2.45 hours. Again arithmetic errors cost many candidates dearly. A lot of candidates only seemed to want to calculate part of the solution and final answers of 50 or 220 were common.

Question 17

Very few candidates showed real understanding of the concepts involved in this problem. Many tried to rearrange the given equation $x + 2y = 5$, very rarely was $y = -\frac{1}{2}x + 2.5$ the outcome. Some candidates did however realise the need to divide their gradient from their rearranged equation into -1 to get the gradient of a perpendicular, but again very few were then able to relate this to the given point through which the required perpendicular passed. Attempts at drawing the original line and then the perpendicular were seen but were very often of no help to the answer. Many students attempted to find an answer by substituting (3, 7) into the original equation.

Question 18

Many candidates tried to simplify this expression by cancelling anything they saw in the numerator with similar terms in the denominator. Those candidates who realised the need to factorise the numerator and denominator often failed because of the greater demand posed by a quadratic with non-unitary coefficient of the first term in the numerator and the need to fully factorise the denominator.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com
Order Code UG032659 June 2012

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning