

# Examiners' Report November 2012

## GCSE Mathematics (Linear) 1MA0 Higher (Non-Calculator) Paper 1

## 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](http://www.edexcel.com) or [www.btec.co.uk](http://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](http://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](http://www.edexcel.com/teachingservices).

You can also use our online Ask the Expert service at [www.edexcel.com/ask](http://www.edexcel.com/ask). You will need an Edexcel username and password to access this service. See the ResultsPlus section below on how to get these details if you don't have them already.



## Using mock and exam data to improve teaching and learning

ResultsPlus is Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance, helping you to help them more effectively.

- See your students' scores for every exam question
- Spot topics, skills and types of question where they need to improve their learning
- Understand how your students' performance compares with Edexcel national averages
- Track progress against target grades and focus revision more effectively with NEW Mock Analysis

For more information on ResultsPlus, or to log in, visit [www.edexcel.com/resultsplus](http://www.edexcel.com/resultsplus).

Your exams officer will be able to set up your ResultsPlus account using Edexcel Online. Alternatively, call us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

## 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 raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk).

November 2012

Publications Code UG033847

All the material in this publication is copyright

© Pearson Education Limited 2012

## Introduction

Many candidates were able to make inroads into some of the unstructured questions, while still gaining marks on questions that had a more traditional style.

The inclusion of working out to support answers remains an issue for many candidates; it is extremely difficult to track the method used by some candidates who present a page of disorganised working spread across the answer space. Presentation of ordered method is key to gaining the many method marks that are available on this paper.

This is the non-calculator paper and many different ways of performing calculations were seen. Those candidates who attempted multiplication and division calculations by addition and subtraction respectively not only paid a time penalty, but rarely obtained the correct answer. Work with directed numbers was frequently poor and many candidates lost marks throughout the paper whenever they had to manipulate either numbers or algebra involving negative signs.

## Reports on individual questions

### *Question 1*

When candidates realised that 'add on half' was what was required they generally gained full marks. Some realised that they had to find out the ingredients for 8 cakes and then used these as their answers. A surprising number of candidates gave three answers correctly, but lost a mark through poor arithmetic.

### *Question 2*

Nearly all candidates gained the mark in part (a).

Part (b) was also well answered; the only candidates who did not gain marks were those who drew a line of best fit badly.

### *Question 3*

This question highlighted some considerable misunderstandings from candidates. Far too many either added the units, or simply gave the two amounts from multiplying each of the units by 15. Worst was a division of 15. Many candidates arrived at amounts of money of many thousands of pounds, and clearly did not see the significance of their errors. On a Higher Tier paper it was disappointing to see many final answers written in incorrect money notation (eg 9.0) and without monetary units. This was a QWC question (marked with an asterisk) and an incorrectly expressed answer lost the QWC mark. There were arithmetic errors associated with multiplication of 15.

### *Question 4*

This was well answered, with many candidates giving an unbiased question with a good selection of responses to pick from. Common errors included a failure to state a time frame for the question, a lack of units, or boxes that limited responses. In some cases, candidates did not read the question properly and instead gave questions such as 'How many books do you read?' Candidates who gave a frequency table or data collection sheet gained no marks.

### *Question 5*

Those candidates who attempted to obtain the answer through calculation and not rounding were awarded zero marks. Most candidates used numbers such as 30, 10 or 0.5 and gained a mark through realising that simplified numbers were needed. Having worked out a simplified numerator, many candidates then appeared to be confused as to what to do with their 0.5, many multiplying by 0.5 or dividing by 2 to get 150. It was unusual to see candidates stating that they wanted to calculate  $300 \div 50$ ; they more usually gave an incorrect answer arising from these two numbers.

### *Question 6*

Most candidates realised that the transformation was an enlargement and there were very few statements involving more than one transformation. A scale factor of 2.5 was the most common answer, but there were many examples of other scale factors stated. Many candidates failed to get the full 3 marks because they did not give the

three aspects of the necessary description; stating the centre of enlargement was the description that was most commonly missed.

### **Question 7**

Most candidates understood they needed to find an area, divide by 20, and round appropriately to find the number of bags, then lead on to a money calculation. Many fell at the first hurdle: there were some disappointing attempts at finding the area. Few used the formula for a trapezium provided at the front of the paper, preferring instead to make an attempt to divide up the shape which was frequently done very badly. This was another question in which poor arithmetic skills spoilt many solutions. Some candidates failed to work with full bags (eg 6.75 bags) and others tried to work out the number of bags needed for each section, which was not efficient.

### **Question 8**

In part (a), a significant number of candidates demonstrated problems with decimals, confusing 0.015, 0.1.1 and  $0.1\frac{1}{2}$ . Some added 0.5 and 0.2 and then divided by 2, but generally halving a decimal was a major weakness. Quite a few showed 0.3 in their working but then failed to give 0.15 as their answer.

In part (b), the most common error was dividing 240 by 0.2 rather than multiplying. 12 was a common incorrect answer which was arrived at from  $240 \div 2$ , then a division of 10. Some divided 240 by 4 because there were 4 colours.

### **Question 9**

Those candidates who calculated areas in order to find a surface area did not receive any marks. Equally, there was a significant minority of candidates who attempted to find the perimeter of the cross section and then multiplied by 10. There were many incorrect divisions of the cross-sectional area, the most common being  $(9 \times 2 + 7 \times 4)$ . Poor arithmetic affected even the simplest calculation:  $9 - 4$  was not uncommonly stated as 4. However, having said this, the majority of candidates gained full marks.

### **Question 10**

This was usually answered well, by those with the correct equipment. Common errors included drawing the circles with an incorrect radius, and failing to indicate the region by shading. There were some candidates who drew alternative lines, or attempted to shade a region without drawing arcs. These attempts did not usually receive any credit.

### **Question 11**

Part (a) was usually well answered, with  $12x + 5$  being the most common incorrect answer.

This error was commonly replicated in part (b), where both  $2x - 4$  and  $3x + 5$  were seen. Many candidates could not resolve  $-8 + 15$  into a single number correctly, thereby losing the second mark. An answer of 23 was common when the negative sign was ignored.

In part (c), some answers were spoilt by candidates adding together the  $x$  and  $x^2$  terms. A common error was in giving 10 as the number term rather than 24, or

writing  $x \times x$  as  $2x$ . Although there were no negative signs in the question, some candidates included them in their solution.

### **Question 12**

The majority of candidates recalled and used the correct area of a circle formula; in nearly all these cases the correct radius was also used. Many forgot to divide by 4 near to the end. Some candidates failed to realise they were asked to work in terms of  $\pi$  and attempted numerical calculation. However, those who were working in terms of  $\pi$  also made many errors, particularly in over-simplifying their answer:  $144 - 36\pi = 108\pi$  was not uncommon.

### **Question 13**

This was a good differentiator. There were some good attempts at the question, but all too often candidates lost themselves in random calculations, frequently confusing what they wanted with how much they had. Most tackled the question by dividing 180 by 9, then arriving at the amounts 20, 60, 100 though, for some, poor arithmetic of  $1 + 3 + 5 = 8$  spoilt their solution. It was disappointing when a minority then gave the wrong conclusion, believing these were the amounts that Talil actually had. A number of candidates divided the sum of the quantities Talil had (200kg) by 9; there were also some issues in adding the parts of the ratio, with answers of 6 and 8 being used.

### **Question 14**

Some candidates attempted this question with a diagram, either a sketch or scaled. In very few cases did this approach help them, since there was clearly little understanding of bearings as drawn clockwise from a north line. It was also common to see reflex angles drawn as obtuse, and vice versa. The most common incorrect answer was  $310^\circ$ , from  $360^\circ - 50^\circ$ . Other common errors involved confusion of the relative location of the ship and the lighthouse.

Overall, this was a poorly answered question showing bearings as a general weakness.

### **Question 15**

Most candidates earned the mark in part (a). The only common error was where candidates added the indices rather than taking them away.

In part (b), there was a general understanding as to what to do with the individual number and algebra terms.  $y^3$  and  $y$  sometimes ended up as just  $y^3$  and the 5 sometimes became a 6. However, by far the most common error was in writing the answer with an operation embedded,  $5x^6 + y^4$  and  $5x^6 \times y^4$  being the most usual.

### **Question 16**

Most candidates demonstrated an understanding of perimeter by attempting to sum the three expressions, but there were many examples of incorrect algebraic manipulation as part of that process. The majority arrived at  $x = 8$ , but there were few who could then correctly substitute this value in order to find the area, with many typically forgetting the division of 2 in finding the area of the triangle.

### **Question 17**

Many candidates failed to attempt this question, and of those who did, it was most common to see a plethora of crosses, usually well away from the desired region. Many ignored the line  $x = 3$ .

### **Question 18**

Candidates drew on a number of different methods in making progress with this question. Those who gained the most marks generally worked on, and with, the diagram, making clear which angles were being found. When calculating angles, it was not always clear whether it was an internal or external angle that was being found. Sometimes an angle was calculated in the working but then shown to be a different angle on the diagram; in these cases there was a penalty since it was not clear the candidate understood what they were finding.

### **Question 19**

In part (a), the main error in drawing the box plot was in misreading the scale, resulting in a box plot that was drawn at all the wrong places.

In part (b), comments were too general. Sometimes the comment was a false statement, using incorrect values read from the box plot. Some candidates were also confused by the context: for example, stating that the girls were quicker when in fact they meant that the girls' times were greater. Some candidates listed figures without making any comparison. Few candidates used the IQR in their comparisons; the median was used far more often.

### **Question 20**

This was a well-answered question. Some candidates deduced the correct order by considering the power of ten associated with the number, while others converted the standard form numbers into ordinary numbers before comparing them. Some confused  $10^2$  with  $10^{-2}$ . It was often the case that  $3800 \times 10^{-4}$  was in the wrong place, with candidates either thinking the 3800 made it the biggest number, or that the  $-4$  index power made it the smallest.

### **Question 21**

Parts (a) and (b) were usually well answered. There were a few candidates who failed to accumulate the numbers in part (a), or who plotted at the mid-points of the intervals in part (b), but these were the minority.

However, part (c) was poorly answered with many candidates not gaining any marks. Some gained only 1 mark for reading from the graph, or failing to subtract from 100.

### **Question 22**

There were many instances where arithmetic errors spoilt otherwise sound method. Rearrangement usually led to error, but there were very few trial and improvement approaches. The elimination method was used by nearly all candidates, though  $7x = 14$  was the common error.

### **Question 23**

Few candidates gained many marks in this question. Some demonstrated some knowledge relating parallel to perpendicular lines and an association with gradients, but few realised that this was what the question was about. Some tried drawing accurate diagrams, which rarely assisted them in working towards a solution; similar attempts to use Pythagoras on OAD did not help. Some gained credit through recognising the length of OD and OA from the information given, but many chose not to attempt this question.

### **Question 24**

This question was poorly completed, with few candidates managing to gain more than one mark for an intention to multiply through by  $4 + t$ . Often the bracket was missing and  $p(4 + t)$  became  $4p + t$ . Candidates did appear to realise that they needed to find ' $t = \text{something}$ ' but lacked the ability to achieve this. Of those who did successfully isolate the term  $\sin t$ , only the most able went on to factorise correctly.

### **Question 25**

Correct answers were rare in this question, with most candidates incorrectly assuming a scale factor of 2 and giving the answers 160 and 80. Attempts to work out the surface area or the volume frequently led nowhere.

### **Question 26**

In part (a), common errors included candidates squaring the numerator and denominator or just multiplying 5 by  $\sqrt{2}$ , but many of those who attempted it did get the correct answer.

Part (b) was attempted far less frequently. There were some marks given for correct expansion of brackets, but in only a few cases were candidates then able to simplify their expressions correctly. It was disappointing to find many who missed the middle terms in the expansion. There were many errors with signs. Very few candidates recognised this as the difference of two squares.

### **Question 27**

Many candidates failed to attempt this question, and there were quite a number of attempts that failed to score any marks.

In part (a), many tried to draw a quadratic curve or a straight line. Some managed to draw part of a circle, or a circle with a radius of 4.

In part (b), many candidates ended up drawing a variant of the curve  $y = \sin x$ . Some credit was given where it was clearly a cosine curve that was being attempted, but there were frequent errors in either amplitude or period.

### **Question 28**

Although many candidates gained the mark in part (a), in part (b) few understood what was needed to show that NMC was a straight line. Those who did make an attempt found expressions for some of NM, MC or NC but rarely knew how to use their values to make a correct deduction. Some tried reasoning in words, but these failed to



gain any credit without direct reference to vectors. Once again, negative signs caused problems for some candidates, spoiling their route to a solution.

## Summary

Based on the performance in this paper, candidates should ensure that they:

- read the questions carefully before they answer them
- use money notation correctly in appropriate questions
- are confident making calculations using negative signs
- know how to work out surface areas and volumes
- practise taking bearings.

## **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](mailto:publication.orders@edexcel.com)

Order Code UG033847 November 2012

For more information on Edexcel qualifications, please visit

[www.edexcel.com/quals](http://www.edexcel.com/quals)

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

**Ofqual**  
■■■■■■■■■■



Llywodraeth Cymru  
Welsh Government

