edexcel

Principal Examiner Feedback

Summer 2013

GCSE Mathematics (Linear) 1MA0

Foundation (Calculator)

Paper 2F

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the UK's largest awarding body. 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. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. 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 2013
Publications Code UG036344

GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 2

Introduction

The vast majority of candidates completed their answers in the spaces provided and many showed the steps in their working.

It was pleasing to see so many candidates showing the intermediate stages in their calculations.

A significant number of candidates did not use a ruler to draw straight lines or a pair of compasses to draw a circle.

Some candidates used different colours to distinguish information in their diagrams and candidates should be reminded to use different shading or a different style of points instead.

A surprising number of candidates did not use a calculator to check their long hand calculations.

Candidates should also be reminded that, unless they are specifically asked to measure the length of a line or the size of angle in a diagram, they should not expect the diagrams to be accurately drawn.

Report on individual questions

Question 1

Most candidates were able to write the words in numbers in part (a). Common errors were 2058 and 2805.

Most candidates were also able to write the numbers in words in part (b). Common incorrect answers seen were ‘fifty one thousand and eight’ and ‘five thousand one hundred and eighty’.

Part (c) was not done well. Few candidates could write down the value of the 9 in the number. A common incorrect answer seen was 0.9

In part (d) most candidates could write down the number correct to the nearest 10. A common incorrect answer seen was 167

Question 2

Generally this question was not done well. Few candidates could write down a sensible imperial unit for centimetres, or a sensible metric unit for ounces. The most common incorrect answers here were ‘metres’ (for the imperial measure for centimetres) and ‘pounds’ (for the metric measure for ounces). Many candidates were able to write down a sensible metric unit for pints, usually ‘litres’.

Question 3

Parts (a)(i) and (a)(ii) were generally done well by candidates.

In part (a)(i) many candidates used the right-angle symbol or an angle arc as an additional marking to the letter R. Some labelled the angle on the corner rather than inside the shape. Incorrect answers were rare, with most of these identifying the obtuse angle above the right-angle.

It was more common for candidates not to do this part of the question than it was to see a response where the angle was labelled incorrectly

In part (a)(ii) many candidates were able to name the type of angle indicated. A common error seem was for candidates to measure the size of the angle.

Parts (a)(iii) and (b) of this question were not done well.

In part (a)(iii) few candidates could name the type of angle indicated. By far the most common incorrect answer here was ‘obtuse’.

In part (b) many candidates incorrectly drew a line parallel to the existing line or joined the point T to the ends of the line A and B. Few candidates used a construction method to find the perpendicular line, but most candidates that did use this method did it correctly. A significant number of candidates did not attempt the question.

Question 4

Part (a) of this question was generally done well. A common incorrect answer seen was $m5$.

Part (b) was done well. A common incorrect answer seen was $2p^2$.

Although part (c) of this question was generally done quite well some candidates did not remove all the multiplication signs from their simplified expression.

Candidates should be advised to use standard notation when writing algebraic expressions, ie with the number term at the beginning of the expression not at the end.

Question 5

This question was generally done well. The most common approach was to change the information in the pictogram to frequencies and gave the final answer as $\frac{40}{200}$, or $\frac{1}{5}$ after simplification. The most common incorrect answers seen were 40 on its own and $\frac{40}{160}$, where Tuesday's total had not been included in the denominator.

A significant number of candidates were unable to simplify the fraction correctly, but as this was not a requirement of the question and candidates were able to score full marks if a correct fraction had been seen. A final answer of 20% was relatively rare.

Question 6

Most candidates were able to draw a circle with the correct radius using a pair of compasses in part (a), but there were a significant number of free-hand attempts. A common error here was to use the middle of the letter *O* as the centre for the circle rather than the end of the line.

Part (b) of this question was not done well. Many candidates were unable to draw a suitable chord in the circle. The most common correct answer here was a diameter. The most common incorrect answers were tangents, sectors and radii.

Question 7

Most candidates were able to find the shortest route between Ambel and Ford. Many candidates attempted only one of the possible routes between the two towns often resulting in the common incorrect answer 120. Another common incorrect answer was 10, the shortest distance in the diagram. Some candidates, having calculated the three shortest routes between Ambel and Ford did not identify explicitly the shortest of these routes.

Question 8

Both parts of this question were generally done well though some candidates added the 4 and 3 rather than multiplied them in part (a).

In part (b) most candidates were able to substitute $d = 2$ into the formula and calculate the value for P.

A significant number of candidates wrote an answer on the answer line without showing the substitution stage of the calculation.

There was a surprising number of candidates who simply replaced the d in the formula with a 2 which resulted in the common incorrect answer 39, obtained from 42 – 3. Another common incorrect answer here was 3, obtained from 4 + 2 – 3

Question 9

This question was done quite well. Many candidates were able to find the difference between $\frac{1}{4}$ and 30%, usually by first changing $\frac{1}{4}$ to 25%.

A common incomplete answer for this was to omit the % sign. Most candidates attempting to find the difference of decimal numbers were able to change 30% to 0.3, but many of these were unable to find the difference correctly, giving their final answer as (0.30 – 0.25 =) 0.5

Few candidates attempted to find the difference as fractions.

Question 10

Most candidates were able to draw a suitable diagram to compare the numbers of cars sold by Kitty and George. The most popular diagram used was a comparative bar chart, usually with the bars for each month drawn together, but also with a separate bar chart for each person.

It was equally common for candidates to identify the individual bars with a name as to use shading and a key. Most candidates were able to draw a suitable linear axis for the frequencies and plot the correct values for at least one of Kitty and George.

By far the most common omission in these diagrams was the labelling of the vertical axis. A different approach to drawing a comparative bar chart was to represent the frequencies as points.

In many of these diagrams the distinction between Kitty's frequencies and George's frequencies was not always clear as the candidates had used different colours to represent each person, and the scanning of their scripts rendered the colours poorly.

Candidates should be advised to use different shading, or a different style of points, to distinguish information in their diagrams and **not** different colours.

Question 11

Generally few candidates were able to score all 3 marks of this question.

A common incorrect answer for part (a) was 18.

In part (b) writing down the multiple of 7 from the list was done best.

In part (c) a significant number of candidates were unable to write down the square number from the list. A common incorrect answer seen was 11.

Question 12

Some candidates got confused between the various statistical measures in this question and correct calculations were often seen in the wrong places.

Most candidates were able to order the given data in part (i) and use the middle values to work out the median. Common incorrect answers seen were 3, 4 (both the middle terms) and 3, 5 (both the middle terms of the unordered data).

In part (ii) most candidates were able to work out the range of the numbers. A small number of candidates gave their final answer as 2, 6.

Part (iii) of this question was done quite well but a significant number of candidates did not show any working. When working was present it frequently lacked a final division by 10.

Question 13

This question was not done well. Many candidates had difficulty interpreting the scale. A common mistake seen was 14 pounds = 6.2 kg (instead of 6.4 kg).

The most common approach to this question was to change 9 stone 6 pounds to pounds (132 pounds) and then divide this total into two or more parts, eg 130 + 2 and use the conversion graph for each part.

A significant number of candidates changed 14 pounds into kg, multiplied this by 9 and then added 6 (pounds), ie forget to change the 6 pounds to kg.

A small number of candidates thought that 9 stones 6 pounds was 9.6 stones, and consequently multiplied this by their possibly correct conversion of 14 pounds to kg to arrive at an incorrect number of kg.

Question 14

Most candidates were able to work out the total amount of money that Angela and Michelle got and state clearly which of these got the greater amount.

Some candidates simply stated the totals without showing how these were obtained. Candidates should be reminded to show all stages of their work and to write their conclusions in words, not just circle their choice.

A common error seen was for candidates to show the correct working for Michelle as 6.5×7 + 15 but then write the answer to this as 60.05

The majority of candidates gave their answers with the £ sign included.

Question 15

Most candidates were able to use tallies to record the numbers of coins and complete the frequency column. Some candidates wrote the frequencies in the tally column and used the frequency column to record the total amount of money for each coin, and some gave their frequencies as sixteenths or with money notation.

Question 16

In part (a) of this question many candidates had difficulty writing down the number of vertices on a cube. A common incorrect answer seen was 12, the number of edges of a cube.

Most candidates were able to draw a correct net for a closed box in part (b), usually cross-shaped. A common incorrect answer seen was for candidates to draw a net for an open box.

A significant number of candidates started drawing their nets using 2×2 cm squares for each face. This resulted in difficulties with fitting all six faces on the grid. As a result some candidates extended the grid, some reduced the size of one or two faces and some omitted to include the sixth face altogether.

In part (c) few candidates were able to work out the surface area of the cube. By far the most common incorrect answer ssen was 27, ie the volume of the cube.

Other common incorrect answers were 5×9 (the surface area for an incorrect number of faces, 36 (from 12×3 the total length of the edges) and 18 (usually from 6×3).

Question 17

Most candidates were able to use the information in the table to change £600 to Euros in part (a), usually by calculating 6×120.

It was perhaps surprising that a significant number of candidates chose to do this calculation by long addition.

A common error in this approach was to forget to carry the 1 from the tens column to the hundreds column to arrive at an answer of 620. Another common incorrect answer here was 72000 (from 120×600).

In part (b) many candidates had difficulty working out the difference in the cost of the laptop in consistent units. The most common approach here was not to use a conversion factor of 1.2 from the table, but to build up a combination of values from the table.

By far the most common incorrect answer seen was 80, where candidates simple subtracted the given amounts without any attempt to change currency.

A significant number of candidates converted both costs into the other currency before doing the subtraction.

Some candidates, having obtained the correct difference in a consistent currency, put the wrong currency symbol with their answer, whilst others did not attempt to include a currency symbol at all.

Question 18

Many candidates had difficulty working out the number of games won for both Caroline and Marc.

A common approach for Caroline was to find a quarter of 52 and either subtract it from 52 (common) or multiply it by 3 (rare).

Many candidates did not realise that the 120 degrees given in the pie chart represented a third of the total number of games won. Most simply calculated a quarter of the total and added a bit on.

A significant number of candidates did not use the information for the total numbers of games played and just added or subtracted the angles, eg 360 – 90 – 120

Question 19

Part (a) of this question was done quite well. The most common approach here was to divide the lengths in the picture by the corresponding lengths in the tile.

A significant number of candidates, having found correctly these lengths (5 and 8) then went on to add them together rather than multiply them. M

any of those candidates attempting to compare the areas of the two shapes were unable to calculate 100 × 120 correctly, typically giving this as 1200.

A relatively common incorrect method was to compare the perimeters of the two shapes.

The most common approach in part (b) of this question was to find 10% of 52 and then double it.

Few candidates used a multiplier of 0.2 or $\frac{20}{100}$. A significant number of candidates, having found correctly 20% of 52, then went on to add, or sometimes subtract, this from 52.

A surprising number of candidates did not give their final answer in correct monetary notation, typically 10.4 or 10.04 (often from 10.4 seen); however the use of correct money notation was not being tested in this question.

Another relatively common error here was 32, ie 52 reduced by 20

Question 20

This question had a mixed response. The most popular approach was to calculate the internal angles of the triangle.

A significant number of candidates thought that the triangle was isosceles (some thought that it was equilateral). A common incorrect approach here was to either calculate the angle *ACB* correctly as 45 degrees and then state the angle *ABC* as 45 degrees or to calculate both the angles *ACB* and *ABC* (ie the 'base angles') as 55 degrees.

Few candidates were able to state the reasons for their calculations correctly, often omitting to use the word angle, eg 'the triangle is 180 degrees'.

Candidates should be advised to state the reasons for their calculations with the calculation, not at the end when it is unclear which calculation is being justified by the reason.

Most candidates were able to identify their calculations clearly with the angles by simply labelling the diagram, but candidates not using this approach should be advised to use a suitable unambiguous notation, eg labelling the internal angles *a* and *b*, to identify the angles. Most candidates gave their final answer in the form $x = \ldots$

Question 21

Part (a) of this question was generally answered well. Most candidates could extract the various prices from the table and use these to find the total cost and the amount of change that should be given.

Errors in this question were often due to candidates extracting an incorrect price from the table or for simple numerical errors in the calculations.

As in previous questions it was evident that many candidates preferred to do the calculations without the use of a calculator.

Most candidates gave their final answer in the correct money notation.

In part (b), as in the previous percentage question, few candidates used a multiplier to calculate the percentage.

Most found 10% and then 5% and then added them together. A significant number of candidates did not subtract their calculated value from the original price and just gave their final answer as 0.39

Some candidates increased the original price rather than decreasing it. A popular incorrect answer here was 2.45, ie 2.60 reduced by 15, not 15%

Question 22

This question was done quite well. Most candidates were able to work out that they needed 2.5 times the quantities in the recipe and were able to scale these quantities accordingly.

A common approach was to add the quantities for 18 + 18 + 9 mince pies. Relatively few candidates used the unitary method to find the quantities. A significant number of candidates lost the accuracy mark because they rounded the amount of butter need to 562 or 563, or they omitted to calculate one of the ingredients, usually the eggs.

Those candidates attempting the unitary method often lost the accuracy mark due to premature rounding. Some candidates lost marks because they did not show how they got their answers.

Candidates should be reminded to show all the stages of their calculations- particularly in questions involving Quality of Written Communication (QWC).

Most candidates were able to identify a shortage in the mincemeat for the pies, but some just stated that there were not enough ingredients to make the mince pies and did not identify which ingredient was short.

Question 23

Most candidates were able to identify at least one thing wrong with the question in part (a), although some candidates had difficulty in stating precisely what they thought was wrong with the question.

Common unacceptable answers here were ‘there isn’t a full range’, ‘there needs to be more options’ and ‘there isn’t a box for don’t buy magazines’.

Those candidates that did well in part (a) generally did well in part (b), usually providing a suitable question with answer boxes to correct the errors they had identified in part (a).

A significant number of candidates either gave only a question or only the answer boxes, even if they had identified errors in both the question and the answer boxes in part (a).

In part (c) few candidates could state clearly why taking a sample of Mason’s friends at school would not give a good sample.

A significant number of candidates continued criticising the question rather than identifying a problem with the sampling method.

A common unacceptable reason here was ‘his friends might not tell the truth’.

Question 24

Many candidates were able to use a trial and improvement method to find an estimate to the equation giving their trials to an appropriate degree of accuracy.

A significant number of candidates compared the answers to their approximate roots at 4.6 and 4.7 rather than attempt a further approximation with an increased accuracy of the root to 2 decimal places.

A surprising number of candidates attempted approximate roots at 4.6 and 4.65 correctly but then gave their final answer as 4.65, ie forgetting to round this to 1 decimal place.

A common incorrect method here was to evaluate their trial solutions by adding 2 to their x^3 rather than by adding $2x$

Question 25

Few candidates made much progress with this question, though many were able to score at least one mark for $\frac{7}{10}$ or 70%

The most successful candidates were those who started with an amount of money, usually £100. Many of these attempts resulted in an amount of money being given as the final answer rather than as a fraction of the initial amount.

A common error here was to confuse the shares for Emma and Dave.

Question 26

Few candidates were able to score full marks on this question, though many were able to score at least one mark for expanding the brackets.

Many candidates had difficulty in isolating the terms on either side of the equation. Common errors were based on fundamental misunderstandings of algebraic processes, eg $x + 7$ written as $7x$ and incorrectly moving terms from one side of the equation to the other side, usually by not changing the sign of the term.

Most of those candidates who attempted to find the solution by trial and improvement were unsuccessful in their attempts.

Question 27

Few candidates were able to score full marks on this question, though many were able to score at least one mark for $1.35^2 + 3.25^2$. A significant number of candidates did not square and add the lengths of the sides but doubled and squared them.

Some candidates, having used the correct process to work out 12.385, rounded this to 12.4 before taking the square root.

Candidates should be advised to use all the figures on their calculator display rather than an approximation of these figures. A very common incorrect method here was to multiply the lengths of the sides, usually to work out the area of the triangle.

Summary

Based on their performance on this paper, candidates are offered the following advice. They should:

- use standard notation when writing algebraic expressions, ie with the number term at the beginning of the expression not at the end.
- use different shading, or a different style of points, to distinguish information in their diagrams and **not** different colours.
- show all stages of their work and to write their conclusions in words, not just circle their choice.
- state the reasons for their calculations with the calculation, not at the end when it is unclear which calculation is being justified by the reason.
- show all the stages of their calculations- particularly in questions involving Quality of Written Communication (QWC).
- use all the figures on their calculator display rather than an approximation of these figures.

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

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