Examiners' Report
Principal Examiner Feedback

June 2025

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Calculator) Paper 2F

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by 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 learners at: www.pearson.com/uk

Summer 2025
Publications Code 1MA1_2F_2506_ER

GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 2

Introduction

This paper had a wide range of questions that gave learners of all abilities the opportunity to demonstrate their mathematical knowledge and understanding and was generally accessible to learners. Many learners appeared well prepared for the paper, particularly in the first half, and were able to select appropriate methods to solve problems, and displayed an ability to apply techniques to more straightforward questions. Many questions were well attempted, especially those of a type regularly seen on papers in the past.

The topics with the most success in the first half of the paper were averages and range, angle facts, two-way tables, solving simple linear equations and drawing pie charts in the first half of the paper. The topics with the most success in the second half of the paper included working with percentages in a small problem in Q17, interpreting and showing inequalities on number lines in Q19, writing a number as a product of prime factors in Q20(a), sharing an amount in a given ratio in Q21 and making a good start at solving a problem involving the area of circles and triangles in Q22(a).

In many questions on this calculator paper, traditional non-calculator methods were seen in the responses and these allow more chances for error. These methods are also time-consuming which means less time for learners on other questions. Build-up and build-down methods were often used when division was required or when calculating with percentages and this approach is often far less successful than a more direct approach using a calculator method.

Where questions state that working must be shown, such as Q15, learners should be made aware that in questions where this instruction is given it is likely that they will receive no credit for an answer that is unsupported by workings. It is wise to write down all calculations in every question, including showing work that has been done on the calculator. Working out not only needs to be shown, it also needs to be shown in a clear and logical way, demonstrating the processes of calculation that are used. Learners should also be reminded to ensure their presentation is clear and their handwriting is easy to read, with figures written clearly to avoid ambiguity and a possible loss of marks, particularly in problem solving questions or where a decision is required and there is no answer line given such as in Q11(a). In some cases, it was difficult to distinguish between certain numbers within the learner's working, such as 3 and 5 or 4 and 9. Contradictory work also remains a common cause of lost marks due to a range of approaches being attempted and the method intended to be marked not always being clearly identified.

REPORT ON INDIVIDUAL QUESTONS

Question 1

Learners seemed very able to convert between weeks and days in this opening question.

Question 2

Simplifying an algebraic expression using multiplication was well answered.

Question 3

Learners were generally very able to write a decimal as a percentage. The most common error was to write as a fraction instead.

Question 4

It was pleasing to see that ordering a list of both positive and negative numbers was well answered by learners, with many correct responses seen.

Question 5

Both parts of this question required learners to write down a sensible metric unit that could be used to measure specific items.
Whilst many correct responses for a suitable unit for measuring the height of a mountain were seen in part (i), suggesting a suitable unit of measurement for the weight of a button in part (ii) seemed to be more challenging.
A common error in both parts was to write down an imperial unit such as miles for part (i) and either pounds or ounces for part (ii).

Question 6

Many learners showed good understanding of this question. It was common to see responses that began by subtracting 13 from 76, and the better responses then went on to divide the result by 3. If they did this accurately and reached 21, they were awarded full marks. Writing 21 on the answer line three times was accepted as being clear enough for full marks.

Where an accurate answer was not reached, seeing a sum of any three numbers with a total of 63 was enough evidence to award the first mark. Some responses included statements such as $13 + 3 \times 21 = 76$ followed by incorrectly selecting 13 or 76 as the final answer and such responses were awarded 2 marks but did not gain the final accuracy mark.

Question 7

This 2-mark question required learners to identify and carry out a one-step calculation, and both the method mark and the accuracy mark were often awarded for the correct answer of 6 usually coming from a division calculation.

Learners should be encouraged to use a calculator for this style of question, as it was common for responses to include a longer method of trying to count up in multiples of 55 to reach 330. This used up time and was more likely to result in arithmetic errors because of all the steps involved.

Question 8

The mode was regularly identified in part (a) to gain the mark available. Incorrect responses included finding the median or mean but both incorrect answers were rarely seen.

In part (b), the first mark was awarded for beginning to work with range, ideally for subtracting the maximum and minimum values, but also for identifying 5 and 14 and not incorrectly using these two values in operations such as 5 + 14 or 5 × 14, as these contradicted the correct method of finding the range.

Some responses showed a calculation of mean or median either in part (a) or in part (b) or showed the range in part (a) and the mode in part (b) which unfortunately scored no marks.

Question 9

This question required learners to use knowledge of angle facts and provide a reason. Learners set out their work in a variety of ways, but the most common was to add the two given angles before subtracting the total from 180. A complete method was required in order to award the first mark, so simply adding 85 and 30 was not sufficient and was the most common reason for responses not gaining credit along with subtracting from 360 rather than 180. However, it was pleasing to see a number of learners successfully attempting to answer the question by considering the sum of the angles around the point and including the 180º below the line as part of their calculations.

A wide variety of attempts at stating the reason in part (ii) were seen, with the mark scheme showing the underlined words that were needed as a minimum requirement for the mark to be awarded, namely angles and line. Learners should be encouraged to learn and be able to recall angle facts and be aware of key words to include as part of a reason as calculations alone are not enough when a reason is required. Very few responses contained a contradiction such as angles on a straight line total 360, but when a contradiction was seen within the reason, the mark was not awarded as per general marking guidance for C marks.

Question 10

Learners responded well to this familiar question of writing two variables as a ratio, with the first mark being awarded for 20 : 80 or any equivalent ratio, and full marks being given if this was correctly simplified to either 1 : 4 or 0.25 : 1 and condoning 1% : 4% but not 0.01 : 0.04 as shown in the additional guidance part of the mark scheme.

Responses with the ratio written the wrong way round scored a maximum of 1 mark but only if cancelled down correctly to reach 4 : 1 or 1 : 0.25. Weaker responses showed confusion by not subtracting the 20% from the total and using ratios such as 20 : 100 which scored no marks. Unfortunately, responses that used equivalent fractions such as $\frac{1}{5}$ or $\frac{1}{4}$, or decimal numbers gained no credit without using a colon to represent ratio notation.

Question 11

There were several ways of answering part (a), with credit being given for showing a correct first step of either converting a time or adding two required times, which could be via showing a relevant calculation or any of the accurate figures shown on the mark scheme. Units of time were not required, but if included, they had to be correct to avoid contradiction. While many candidates received the method mark for attempting a time conversion, this step often led to confusion. A common error was misinterpreting 1.25 hours as 1 hour 25 minutes, or 3.75 hours as 3 hours 75 minutes. These mistakes meant the final accuracy mark (C mark) could not be awarded, as the incorrect conversion affected the final answer.

The most successful responses used minutes throughout, working with 150 minutes and 75 minutes, and converting 4 hours into minutes. This approach required only one conversion and reduced the risk of errors at the final stage.

In part (b) a mark was often given for the correct method of 2×65, and if this was correctly evaluated to reach 130 then 2 marks were awarded. Some learners converted the time to 120 minutes, and this gained the first mark for showing an understanding of speed, distance and time relationships. These did not gain the accuracy mark unless then converted back to give a correct final answer.

Question 12

Responses to this two-way table question were very good, with many gaining full marks for a fully correct table or partial marks for a partially correct table. Learners were usually able to correctly place the information given in the question in the table, and where mistakes were made it was often when calculating the missing values. Centres should encourage learners to check their work in these questions, as it is relatively easy to check that the additions in a two-way table work both vertically and horizontally to determine whether mistakes have been made.

Question 13

In part (a), the mark was awarded for n^3 and there were many incorrect responses seen. Common incorrect responses that were seen included $3n$ or $n3$ or giving a choice of both the correct answer and an incorrect answer. It is important for learners to practice writing indices correctly as it was frequent for the index of 3 to not be clearly written as a power and shown as a normal number.

Part (b) required an equation to be rearranged. A correct first step was required for the M mark and many learners demonstrated this by adding 4. However, this had to be carried out on both sides of the equation, meaning that the first mark was not awarded for just showing +4 next to both sides of the original equation with no attempt to evaluate or for showing only $26 + 4 = 30$. Arithmetic errors were allowed as shown in the additional guidance of the mark scheme. It was possible to begin this question by dividing through by 5, and again the mark was only awarded if it was carried out, but this approach was seldom seen. Some responses used a ‘function machine’ approach such as $26 + 4 \div 5$ and was often correctly evaluated, but on occasion, the order of operations was not used correctly leading to an incorrect final answer, which was condoned for the first mark only.

Question 14

n part (a), many candidates demonstrated the necessary skills to calculate angles and draw the pie chart accurately. However, a significant number showed no working and only received marks if the angles were drawn correctly; otherwise, they scored zero. Some charts with correct angles earned only two marks because they lacked proper labels—Spanish and Mandarin needed to be written on the correct sectors, not just indicated by angle size. When more than two sectors were drawn, only the method mark could be awarded, as both accuracy marks were unavailable according to the additional guidance.

In part (b), a statement relating to a lack of information about population size was required to gain credit, with the mark scheme showing many acceptable examples of suitable responses. Responses that did not refer to the total populations did not gain the mark. Whilst it was possible to give a valid explanation with a decision of yes, a common incorrect response was to say that the statement was correct because the angle is bigger.

Question 15

Responses to this problem-solving question involving probability varied in the level of success. Whilst some responses were fully correct, the question asked learners to show all their working, therefore, when 10 was given as an answer without working, no marks were awarded. The first mark was awarded for finding the total number of buttons by adding 12 to 20, but was not always shown, and the second for working with probability, which was usually shown as 32 ÷ 4 or less commonly as a fraction. After this, some responses showed good processes for working towards the number of extra red buttons, while others showed confusion and made no further progress. The most successful responses showed clear labelling of what figures meant and appeared to help learners to keep track of their work, so centres should encourage learners to do this. A commonly seen incorrect answer was 8 coming from finding one quarter of the additional 12 buttons and adding the 5 original red buttons rather than using probability with the new total number of buttons.

Question 16

Both parts of this question required learners to use a travel graph. In part (a) the first mark was often awarded for showing a method to work with distance and time after reading from the graph. Many responses found an accurate answer of 70, but a range of values was accepted to allow for the use of 1.16 or 1.17 due to early rounding or truncation after dividing 35 by 30 before multiplying by 60. A common misconception was for learners to not attempt to convert between minutes and hours, for example reaching 1.16…. and stopping there rather than giving their answer in miles per hour as asked in the question. Other responses converted incorrectly, for example by using 100 instead of 60.

In part (b), learners were required to complete the travel graph to show the period of time that the train was at the train station via a straight-line segment between (30, 35) and (45, 35). Some learners then wanted to show us further motion of the train after the stop in Sheffield, commonly by drawing diagonal lines continuing up or down from (45, 35), which was condoned provided the horizontal line segment was otherwise correct.

Question 17

Whilst many fully correct responses were seen, a wide variety of different approaches were used for this percentage decrease question with varying levels of success. The valid method to find 85% or 15% of 9000 is to divide by 100 and multiply by 85 or 15 or use a correct multiplier, and learners should be encouraged to work in this way on their calculator and to also write the calculation down. However, a large number of learners chose instead to use non-calculator approaches, often by building up to 85% in multiples of 10%. When this approach is used, there are multiple stages to show, with many chances of avoidable errors and is the most common cause of marks not being awarded. If using this method, marks can only be awarded if the full method is written down with accurate partitioning values or if the final answer is accurate. It should also be noted that writing down 85% of 9000 or 9000 × 85%, possibly trying to show use of the percentage button on the calculator, is not considered to be valid unless carried out accurately.

Whilst answers of 7650 were often seen, learners should be encouraged to read back through the question when they think they have finished, to check that they have not forgotten to do a necessary stage of work, in this case subtracting to find the percentage required. A few responses included correct work leading to 1350 in the working space but put 7650 on the answer line, which gained both process marks only.

Question 18

This small problem involving volume and surface area proved to be challenging for most learners. It was necessary in this question to find the cube root of the volume to establish the side length of the cube, but many learners did not do this and instead divided the given volume by the 6 faces as a first step which gained no credit. Whilst some learners established that the side length was 8 very few could proceed further, either leaving the 8 as their final answer or using it in incorrect further work such as multiplying 6 and not squaring to find the area of each face first, therefore only scoring 1 mark. Successful responses often drew a diagram and labelled this to aid their subsequent calculations.

Question 19

In part (a) a correct answer of −2 was required to gain the mark. It was common to see an incorrect answer of −3 due to not understanding that the solid circle meant that −2 was included or to give an answer of 5 because this was the largest number on the number line.

Responses to part (b) were much more successful though, with the correct line and circles frequently being shown to gain both of the marks available. When responses were not completely correct, 1 mark was often awarded for either a correct line from −4 to 2 or for one correct endpoint being indicated. Some learners used arrows instead of circles, which were not accepted for full marks in bounded inequalities. Another common cause of a mark not being awarded was often due to not showing a clear line between the two circles, often attempting to use the number line to show this which is not accepted. Although the line should be drawn as a straight line, learners who drew curved lines between −4 and 2 were not penalised.

Question 20

Responses to part (a) showed a variety of approaches of prime factor decomposition, including factor trees and 'ladders'. If learners are able to work accurately with their chosen method they can gain full marks, with many doing so. The use of factor trees was the most common and often most successful approach. When an incorrect final answer was given, the first mark was often earned for attempting to find prime factors, possibly containing one error which was allowed, but the method did have do go all the way to prime numbers, condoning the use of 1s, to gain this mark. After reaching 2, 5, 5, 5, learners needed to show these prime factors as a product to gain the accuracy mark, either as a full product or in a simplified form using indices. Those who left them as a list with commas or spaces or wrote as an addition only gained the method mark. Some arithmetic errors were seen but when no marks were awarded, it was often due to not showing a full method to find prime factors such as stopping at 25 and not continuing to find 5 and 5.

In part (b), a number of approaches to finding the lowest common multiple were seen such as building up in multiples of 25 and 30, which often led to the correct answer. When the method used was to write prime factors in a Venn diagram, learners did not always know how to deal with them to reach the answer. It seemed to be common for learners to have misinterpreted the question as asking for the highest common factor, with an answer of 5 regularly being seen, particularly when listing factor pairs which only gained credit if the common factors of 5, 5 and 6 were clearly identified as these could then be used to find the correct answer.

Question 21

Responses to this ratio question were generally very good, with the most successful approach being to divide 6900 by 10 and then to multiply by each of the parts of the ratio and this was commonly seen. Occasionally variations of this were shown, such as recognising that half of the money goes to Musa and then dividing the remainder into the ratio 2:3. These other approaches were given credit but were often contradicted by subsequent incorrect work such as dividing the 6900 by each of 2, 3 and 5 and assigning an amount to an incorrect person instead. This was evidence of incorrect ratio work which often gained no marks.

Question 22

In part (a), learners needed to work with two areas, proportion and round their answer up to find the number of bags required. The triangle area was often correctly calculated, but some learners who multiplied the base by height forgot to divide by 2 and thought that the area was 224 cm^2. A common error in the work with circle area was to multiply pi by the diameter squared rather than radius squared, suggesting confusion over radius and diameter, or use of the wrong circle formula, finding circumference instead of area. The full process for finding the correct area of gravel by subtracting the circle area from the triangle area was required to award the second mark but this was rarely seen if full marks were not awarded. However, the third mark was available for dividing any area by 12.5 and was regularly awarded either on its own, for example using 224 as area or use of other incorrect areas, or alongside the first mark.

Part (b) required a valid interpretation of how a reduction in area coverage per bag would affect the number of bags needed, such as stating that the bags needed would increase, and was answered well. It was sometimes reasonable to conclude that the number would not change, so if this was a correct statement for the work shown in (a) the mark was awarded.

Question 23

Many learners found identifying the mistake in this question particularly difficult, despite a number of valid reasons being acceptable. Whilst some excellent explanations were seen, it was a relatively common misconception to explain that the shaded region needed to be a square rather than a circle, to comment on point C being placed incorrectly or refer to point P not being shown. Learners often find explanation type responses to be challenging and whilst some explanations showed some evidence of understanding loci, they were not able to articulate this fully. A clear and complete explanation was needed, and it was very common for responses to be ambiguous or contradictory.

Question 24

In this question, learners needed to recognize that 8000 represented $\frac{4}{5}$ of last year's crop and needed to use this fact to work towards the correct answer of 10 000. For the first mark, a statement or equation linking 8000 to $\frac{4}{5}$ or 80% was required. It could also be earned by dividing 8000 by 4 (to find $\frac{1}{5}$) or by 80 (to find 1%) but each method was rarely seen but when a correct start was shown, the second mark was often given for a complete method, and full marks for the accurate answer. However, it was more common to see an incorrect approach of simply multiplying 8000 by 5 as the entire method, showing no recognition of what fraction was being represented initially. Dividing 8000 by 5 was also sometimes seen, with the resulting 1600 either being added to or subtracted from 8000, and this incorrect start also led to no marks being awarded.

Question 25

This was the largest question in terms of marks available, and as such it required several stages of workings to reach the correct answer. The usual start was to begin by working with the mean of List A, ideally by adding the given numbers and dividing the total by 4. If carried out correctly this scored the first mark, but occasionally incorrect order of operations as seen but condoned. For learners who had made a slip in finding the mean of List A, the award of the subsequent three process marks was looked for, with learners being allowed to use what they believed to be the mean for A in the ratio work to gain the second and third marks, and in the calculation to find the total in List B for the fourth mark. Therefore, working with the total of the numbers in List A, often 972 or 867.75, was acceptable for use as [A] on the mark scheme in the following P marks, as were the median, range or any value in List A with the second and third marks often being awarded for correct use of ratio. The alternative process involving the use of algebra to set up and solve an equation for the missing element of List B was equally acceptable. This approach was very seldom seen on the Foundation paper and was typically incorrectly, often due to omitting x or any other letter to represent the missing value which was needed for this approach to gain credit.

Whilst the first mark was often awarded, this was usually the only correct process seen as many learners did not know how to work correctly with the ratio and tried to divide by 8 instead.

Question 26

This question required the use of trigonometry to find the size of an angle and a correct trigonometric statement was needed for the M mark to be awarded. An answer between 60.2 and 60.42 allowed for both marks to be awarded to reward responses that were substantially correct other than a small amount of premature rounding. Incorrect or incomplete attempts included work with Pythagoras' Theorem, or measurement of the angle using a protractor, and gained no marks, as did incorrect trigonometry work using tan, often muddling the 7 and 4 using $4 \div 7$ rather than $7 \div 4$. Some responses showed addition or multiplication of the given lengths of the triangle, sometimes seen in calculations that also involved 90 or 180, and these also gained no credit.

Question 27

There were very few successful responses to this question involving density, mass and volume. The two process marks were independent of each other and could be awarded in either order. The first mark was for working correctly with density, which was often seen before a conversion. This mark could also be awarded for [density] multiplied by 1500 if they had converted the 8 in the question incorrectly but used a power of 10. The second mark was for a conversion, such as multiplying a mass in kg by 1000, dividing a mass in grams by 1000 or for dividing the given value 8 by 1000 to convert the density units. As with the first mark, learners were allowed to use what they thought was a mass to gain this mark and it was more common for the mark for converting to be awarded than the mark for correct use of the density relationship. Some responses showed an uncertainty of how to work with density with incorrect working such as dividing 1500 by 8 rather than multiplying. The most common errors seen in the attempts at conversion involved the use of 100 instead of 1000.

Question 28

Two marks were available in this question for being able to use knowledge of equations to sketch a quadratic graph with the y-intercept labelled. Whilst a mark was sometimes awarded for the correct shape with the right orientation or for any graph with a y-intercept of 2, it was rare to award both marks for including both elements in the sketch. Of the responses that showed the correct shape and orientation of the curve, many only showed a table of values which was not acceptable for a mark unless this was transferred to their sketch with 2 clearly marked either by showing a numbered scale or including the intercept as a coordinate.

Question 29

Responses to the final question suggest learners were not very familiar with Fibonacci sequences or how they are formed. The first step was to continue the sequence as far as the fifth term, which should have been $11a$. Some responses show a range of incorrect attempts to carry on the sequence such as alternating additions of $2a$ and a, or simply by writing $4a$ followed by $5a$. Of the responses that correctly continued the sequence and found $11a$, some continued and gained the second mark for equating the fifth term with 286 in some way, with many then finding the correct final answer, but some were unable to show how this linked to 286 in a correct way and gained no further credit. Blank responses were also commonly seen.

Summary

Based on their performance on this paper, learners should:

- ensure they are well-practised in efficient use of their calculator
- read questions carefully, including checking whether the magnitude of an answer is sensible, units are appropriate, and the level of accuracy required is shown
- show every stage of working, particularly if the question specifically requests this
- improve knowledge of formulae for area and volume
- when working with percentages, show and use calculations rather than written statements such as 15% of 9000 = …
- be able to work with both familiar and unfamiliar situations
- remember to cross out incorrect work or positively identify their chosen method when using a range of approaches to avoid losing marks due to choice.

Pearson Education Limited. Registered company number 872828 with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom