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**Edexcel Functional Skills Qualification in
Mathematics at Level 2**

Principal Examiner Feedback

PMAT2 SET 1

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Introduction

Learners have demonstrated an ability to apply many of the required skills from this specification but have often struggled to engage with the new content.

Centres are encouraged to ensure that learners have a secure working knowledge of the Level 1 skills to ensure that they are ready to learn how to apply the more advanced skills listed on the Level 2 specification, including working with multi-step problems that require a combination of skills and connections between content areas.

Working was often shown but was not always written in a sensible or cohesive way, with calculations seeming to be disorganised and often unclear. Learners often made good use of the answer boxes provided to clearly identify decisions or final figures. However, some learners did not indicate their final answer and showed multiple methods, some correct and some incorrect. In such instances, learners will not always gain credit for working shown unless they indicate their chosen method. Learners should also be encouraged to write down all stages of their calculations even when a calculator is used. When calculators are used, learners should be reminded to retain accuracy by not rounding or truncating any figures resulting from intermediate steps. This is particularly important when using equivalent values for fractions such as a third, where the common misconception that 0.3 is the decimal equivalent is still apparent.

Learners should be given plenty of opportunities to practice non-calculator methods to ensure that they have the best possible preparation for the non-calculator section. Such practice should include methods for performing long multiplication and paying particular attention to place value when setting out calculations of any type. Some learners appeared to not have the correct equipment needed for the examination, particularly calculators for section B. The learners who appeared to have calculators, seemed to be unfamiliar with how to efficiently use functions beyond the four basic operators.

Section A (Non – Calculator)

Question 1

The first part of the opening question required learners to show a suitable written method for multiplying a decimal number by a decimal number, with many learners successfully demonstrating the ability to apply this skill with accuracy. Successful learners used either a traditional column method or a grid method, with only a few arriving at a slightly inaccurate answer which was often due to an arithmetic error or the misplacement of the decimal point. A larger than expected number of learners used a chunking method that only considered a partial calculation such as 5×9 and 2×6 . Centres should encourage learners to practice various written methods for multiplication.

The second part of this question required learners to be able to accurately follow the order of precedence of operators. This skill was not performed well, with many either not able to work with indices correctly or not using the order of operations correctly.

Question 2

It was very pleasing to note the high volume of learners that were able to demonstrate the ability to perform calculations with negative numbers in this problem-solving question. When full marks were not awarded, partial marks were often gained for correctly interpreting the information given and deciding when to add or subtract, with only an arithmetic error leading to the loss of a mark. Although working was often set out clearly, mistakes made frequently included not aligning place value correctly within calculations or omitting the negative sign when calculating with the starting balance of the bank account.

Question 3

This question required learners to combine knowledge of working with perimeter of composite shapes with estimation. Many learners were able to partially engage with this problem and were able to work with a partial perimeter to gain partial marks, with a large number of learners also using rounded values. However, the majority of learners struggled to recall the correct formula to use for the circumference and either used the formula for area or provided an overestimate for the outer perimeter by using a rectangle to model a solution to the problem, which was not deemed to be sensible and was one of the most common causes of lost marks alongside not using rounded values. A small number of learners gained no credit at all due to only considering the labelled dimensions on the diagram. Learners should be encouraged to label diagrams as this seemed to be a successful strategy.

Question 4

The final question on the non-calculator paper required learners to compare the median and range of a data set with the given values for the median and range for another data set. Comparing averages and range is new to the specification, with the majority of learners often gaining 2 or 3 marks for finding the median and making a valid comparison. Some also gained further marks for calculating the range accurately but very few gained full marks due to a lack of reasoning when making comparisons. Marks were often lost due to arithmetic errors, for omitting a value when ordering data to find the median or not considering the range at all. A small minority of learners showed a lack of understanding that range was the measure to use to be able to compare consistency, instead linking consistency to the median.

Section B (Calculator)

Question 1

A great number of learners were able to successfully engage with the opening question on the calculator paper, demonstrating an ability to work with fractional rates of pay. Many began by working with 6 hours of normal pay before finding a third and adding to find the total amount earned, with those choosing to increase the hourly rate by a third before multiplying occasionally losing accuracy due to early rounding. The most common approaches that were not credit worthy was to either find a third of the hourly rate and not multiplying this by 6 before adding to 6 hours of pay or to multiply the hourly rate by 0.3 before multiplying by 6. Learners commonly use an incorrect equivalency for a third and this common misconception should be addressed and reinforced regularly.

Question 2

Calculating the volume of more complex 3-D shapes using given formulae is new to the specification but did not seem to phase the majority of learners. At least one mark was often awarded for engaging with part of the formula, usually calculating with one third of the height, or fully with the formula with some arithmetic errors. Again, the use of 0.3 in place of multiplying by a third or division by 3 was a frequent cause of lost marks. Similarly, confusing area with perimeter when finding the area of the base was also a frequently seen error.

Question 3

Understanding and calculating using inverse proportion is a new skill in the reformed specification that appears to have been well understood by learners in this problem-solving question set in a money context. It was very pleasing to note that the majority engaged well with this part of the content, with many gaining all but the accuracy mark and this mark often being lost due to truncating to either £116 or £116.6 rather than giving the answer to 2 decimal places which is required for a money answer with no decision. The check by reverse calculation was also regularly performed, but a small number of learners were not awarded the mark available due to not evaluating their reverse calculation. All calculations used for checks must be evaluated.

Question 4

Knowledge and use of angle facts to calculate the value of angles is also new content on the reformed specification. Attempts at this question were mixed, with some learners being awarded full marks, some gaining at least one mark for working partially with angles but a great number gaining no marks at all. Whilst the majority of learners recalled that the angles of an equilateral triangle were 60° and that a right-angle contained 90° , often by indicating this on the diagram, many did not use the 60° as part of their calculations and proceeded to subtract 90° from 180° before dividing by 2. A very small number of learners measured the angle required and therefore gained no marks. Centres should remind learners that diagrams are not accurately drawn unless it is stated next to the diagram and also provide learners with opportunities to apply the angle facts that learners are expected to be able to use, a selection of which can be found in the exemplification support document.

Question 5

The first multi-step problem solving question on the calculator paper was tackled very well by a great number of learners, with many gaining either full marks or 3 marks for engaging with the number of packs needed and the cost for their calculated area. The most common error leading to the loss of marks was to not divide by two when calculating the area of the triangular faces, but such learners still gained marks for engaging with the other skill requirements of the question. When marks were not awarded at all, it was often for not engaging with area and multiplying the base length by 4 and the height by 4 before adding. Another common error was to ignore the information about packs of tiles being sold in whole packs and then not working with a whole number of packs when calculating costs. Learners should be reminded and encouraged to thoroughly read and re-read the information given in the question.

Question 6

This question involving calculating with percentages was tackled by learners in a variety of ways with varying levels of success. A mark was almost always awarded for finding the amount that would be saved if the saving was in fact 46% but only the more able continued to find a comparable figure such as subtracting the saving to find what the sale price should be or comparing the amount that would be saved to the actual saving. It was pleasing though to note that the majority of learners did provide a decision to accompany the figures calculated. Learners should also be encouraged to use the answer box to show their final decision and figures to support their decision as many learners showed multiple methods to answer this question, with some incorrect methods being shown alongside correct methods and therefore creating an element of choice which resulted in lost marks.

Question 7

Part (a) of this question was answered very well, with nearly all learners being awarded with at least one mark for engaging with scale correctly and drawing a partially correct diagram on the grid and many being awarded full marks for a fully correct diagram. The most successful learners labelled the diagram with the number of squares on the grid that each side needed to be drawn to. The most common error that led to the loss of a mark was to draw one or both of the lines AB or DC half a centimetre too short.

Learners were less successful with part (b), with very few learners identifying that they needed to use their diagram to measure the length of the line required. The most common response to this part of the question was to give an answer of 120 cm from subtracting 220 from 340 and not engaging with measuring or the scale at all. More able students used Pythagoras' theorem to find their answer and although this is not a skill expected on this specification, credit was still given for the use of this valid method.

Question 8

This question required learners to combine skills from all three content areas of the specification in order to solve a multi-step problem. Many learners were able to demonstrate the ability to make connections and apply a percentage increase, the number element, use an imperial to metric conversion factor, the measures, shape and space element and fulfil the handling data element by drawing a scatter graph and providing a written description about the correlation. Partial marks were often awarded for addressing two of the three content areas, although some arithmetic errors leading to inaccuracy, inaccurate plotting or omitting a comment about correlation were often causes of lost marks. When engaging with the percentage increase, some learners successfully found the required value but did not add this to complete the increase required. A number of learners

rounded 19.6 to 19 when calculating the percentage and although the question required learners to round the land area to the nearest 10 000 and the population to the nearest million, it was not appropriate or functional to round the percentage to be found. Learners should be reminded that accuracy is key until calculations are completed and that rounding should only take place as a final step when required. Only a small number of learners used the wrong operator when using the conversion factor provided which was very pleasing to see. Nearly all learners appeared to be confident when drawing the scatter diagram, but some were less confident when commenting about the correlation. Learners should be encouraged to develop their understanding of correlation to include a brief understanding of varying strengths of correlation.

Question 9

Demonstrating the ability to use a formula proved to be challenging for a greater than expected number of learners in this question. Whilst some were able to partially substitute one given value correctly, often the population divided by 2.59, and gain one of the available marks, many either did not substitute both values or did not use the correct operators to evaluate the formula fully. Centres should be encouraged to give learners plenty of opportunities to practice using a variety of presentations of formulae to include brackets, fractions and indices.

Question 10

Part (a) of this question required learners to be able to calculate with mixed numbers and improper fractions in a straightforward underpinning question. Responses to this question were varied in approach, with very few appearing to make use of specific fraction functions on their calculators. However, some learners attempted to find a solution by converting each fraction to a decimal, with most using this method gaining full marks and only a few losing the accuracy mark for not writing their final answer as a mixed number as required. It was disappointing to note that learners who approached this question using a written method were unable to change the mixed number into an improper fraction correctly and this was often the cause of lost marks. Learners should be encouraged to use more functions available on calculators.

Part (b) required learners to use estimation to show a check of their answer but learners either used a reverse calculation method or the working box was often left blank and not attempted. Learners should be reminded to read the question carefully as the type of check to use may be clearly specified.

Question 11

This multi-step problem required learners to use ratio when one amount is known to find a solution, with many finding this style of ratio question very challenging. The majority of learners often only gained one mark for working with the total length of the horizontal pieces. Many did not identify that the two tall pieces of metal was represented by 9 in the given ratio and began to solve the problem by adding the parts of the ratio together and dividing the length of a tall piece, 1.44 m, by 24. A small number of learners were able to engage with the ratio element correctly to find the length of the short and medium length pieces of metal, with some successfully continuing to find the total length accurately. Of these students, some lost a mark due to inaccurate figures or omitting the length of the three horizontal pieces.

Question 12

The final question of the paper consisted of three parts, each offering 2 available marks for working with probability. Part (a) required learners to complete a two-way table, with nearly all learners gaining full marks. When a mark was lost, it was often due to an arithmetic error. Of the very few learners who gained no credit for only having 2 correct values in the table, it appeared that a correct calculation may have been used due to values being so close to the correct value, but no evidence was seen to support the figures and learners should be encouraged to show calculations used even when a calculator has been used. One of the two marks in part (b) were often awarded for the correct denominator of 60 being used, but there were many instances of the numerator chosen being 32 which represented all of the all-inclusive holidays rather than just those bought by couples. Of the many learners who successfully identified the correct values to use from the table to represent the probability, some were not awarded full marks due to not writing their fraction in its simplest form.

Part (c) required learners to compare probabilities in a small problem and it was rare to award full marks. The majority of learners were not able to interpret the table correctly to select the figures to use in their comparison and of those who gained a mark for selecting the correct figures, very few made a complete comparison.

Pass mark for FS Level 2 Maths set 1

Maximum mark	64
Pass mark	36

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