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Edexcel Functional Skills

**Qualification in Mathematics at
Level 2**

Principal Examiner Feedback

PMAT2 SET 2

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Introduction

The second Level 2 paper of the new specification assessed a wide range of skills in a variety of contexts and were generally tackled well by learners. It has been pleasing to see that the majority of learners attempted nearly all questions, with very few blank responses seen. However, questions involving skills new to the specification seemed to be the most challenging for learners. Further practise of using these skills would be beneficial and would help learners achieve a greater level of success.

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 set out in a logical or cohesive way, particularly in the non-calculator section, with calculations seeming to be disorganised and often unclear. It was disappointing to note that a larger than expected number of learners appeared not to have access to a calculator for the second section, with many showing written methods, often with arithmetic errors. Practice should also be given on the use of more complex calculator functions such as power and fraction buttons.

For the majority of questions, learners made good use of the answer boxes provided to clearly identify decisions or final figures. However, a choice of methods was seen for a very small number of questions, with no use of the answer box to indicate which method the learner intended to use. Interpretation of results obtained is a requirement of the specification and so this, along with failing to make a decision at all, occasionally led to valuable marks being lost. Learners should be reminded to use the answer box to clearly identify their final answer for all questions and to cross out any work that they do not intend to use if a range of approaches are attempted.

Learners should also be encouraged to write down all stages of their calculations even when a calculator is used and to retain accuracy by not rounding or truncating any figures resulting from intermediate steps as this can lead to the final mark being lost.

Report on Individual Questions

Section A (Non – Calculator)

Question 1

This underpinning knowledge question required learners to find the median in part (a) and the mode in part (b), with both parts being answered correctly by the majority of learners. A small minority calculated the mean instead of the median for part (a) but often gained the mark in part (b) for correctly identifying the mode. Common errors when attempting to find the median were to either not order the data or not adding the two middle values and dividing by 2. Learners should be encouraged to count the number of pieces of data either side of their middle values when using a ticking off or crossing out method as well be aware that sometimes there may not be a singular middle value. A very small number of learners gave a choice of answers for part (b) which gained no marks.

Question 2

Learner success when tackling this use of formulae question varied considerably. The majority of learners knew how to substitute the given values into the formula correctly and demonstrated a broad understanding of knowing the order of operations they needed to follow. However, more learners than expected were not able to square before subtracting and only a small minority were able to successfully square root their final value. The most common error was to double in place of squaring and, of those who could correctly square and subtract to find 36, many did not complete the calculation at all. The use of indices and roots is an area that requires further practice.

Question 3

This 4 mark question required learners to find fractions of an amount in a mini problem. Nearly all learners gained the first mark for correctly finding one third or one eighth, with many continuing correctly to find a correct solution or show a full process with occasional arithmetic errors. When learners gained no more than the first mark, it was often due to either not multiplying one eighth by 3 before subtraction or subtracting one third and then finding three eighths of the remainder.

Question 4

The final question in this section was a multi-step problem involving surface area and proportion. Learners appeared to find this question challenging but it was pleasing to see that blank responses were rare and that the majority attempted to find a solution. A mark was often awarded for working with consistent units and a second was often also awarded for finding the area of one of the rectangular faces or for working with the amount of paint available, with some learners gaining all three of these marks. However, many learners incorrectly assumed that all three rectangular faces were identical, with many also attempting to find the area of the triangular face using the base and the slanted side length despite the area being given. Learners should therefore be encouraged to carefully read the information provided in the question.

Section B (Calculator)

Question 1

The first question in the calculator section involved converting between metric and imperial units and was very well attempted by almost all learners, with many gaining at least 2 of the 3 marks available or full marks. It was very pleasing to see that the majority knew which operator to use when converting values and a wide range of approaches were demonstrated with confidence. When full marks were not awarded, it was often due to making the wrong selection of a suitable fridge to fit the gap available or for deciding that none of the three fridges would fit due to not fully understanding the functionality that the dimensions found did not have to be exactly the same.

It is important to note that learners were given the instruction that they **must** show working for this question. Learners should be encouraged to show full working and full answers from their calculator when this instruction is seen as learners that rounded or truncated their converted dimensions and did not show the calculations used and those that showed no working to support their final selection gained no credit.

Question 2

The mark available in part (a) for writing down the coordinates of the point was often awarded. Common errors seen were to reverse the coordinates or to write $x = 1$ and/or $y = -1$ which is not condoned.

Part (b) required learners to apply properties of shapes knowledge on a coordinate grid to plot the missing point of a parallelogram. The correct point, using conventional (lettering) notation for shapes, of $(-3, -4)$ was rarely seen but credit was awarded for other points that formed a parallelogram, such as $ABDC$, ignoring the letter order of $ABCD$ required.

A large number of learners could not recall the sum of the angles in a parallelogram in part (c), giving 90° or 180° as the answer or leaving a blank response. A very small minority chose to write coordinates for the four points down or chose to measure the angles after joining their points, with this method occasionally being successful if part (b) was answered correctly.

Question 3

Learners were required to use different averages to show how two statements could be true in this data handling question. Again, working was required to be shown for marks to be gained and learners showed clear working, with many gaining at least 2 marks for finding the mean accurately and a small number realising that they also needed to find the median. Only the more able were awarded full marks for correctly interpreting the mean and median values. Learners need to be aware of the different types of average that can be used and understand that average does not always imply finding the mean. A very small number of learners tried to justify the statements by looking at how many builders were above or below £153 and not engaging with calculating any type of average.

Question 4

A number of valid approaches were used to solve this question involving the interpretation of percentage increases, with many gaining at least a mark for a correct first step but not making a decision or comparing the wrong values. The most common incorrect approach seen was to add the 27 extra students to 123 and then find 24% of 150. Learners should also be encouraged to show a valid process when calculating with percentages as there are many instances when the responses given is to simply write $24\% = \dots$ rather than a process and when the answer is not accurate, marks are not awarded.

Part (b) required learners to use a reverse calculation to check their answer, with this mark often being awarded even when incorrect calculations were used in part (a). When this mark was not awarded, it was often due to not evaluating their reverse calculation. An answer to a check must be provided to gain the mark available.

Question 5

It was very pleasing to note that learners were very successful when completing the two-way table in part (a), with at least 2 of the 3 marks available often being awarded. The most common errors were to only use addition to find missing values or to correctly find the total for two missing values in a row or column but then dividing by 2 rather than using the other information in the table to help find correct values. This was particularly common when finding the number of males that gave shops or free parking as their reason.

In part (b) two marks were available for using the table to find a probability. A mark was often awarded for either a correct numerator or denominator, but the correct answer was rarely seen, often due to using a sub total rather than 400 as the denominator.

Question 6

Finding an estimate of the mean is a new skill for this specification and disappointingly, learners were unable to attempt this question using correct processes. Whilst some were able to gain a mark for finding the midpoint and multiplying by the frequency, sadly it was rare to award any further credit due to the common misconception of dividing by the 4 frequency groups rather than the total number of weeks. Other common approaches regularly seen were to either add the frequencies and divide by 4, adding the endpoints of the groups and multiplying by the frequency or finding the difference between the group endpoints and multiplying by the frequency. Learner understanding of this content area of the specification requires further development.

Question 7

The use of elevations is also new to this specification and in part (a), learners were required to calculate the volume by interpreting the front and side elevations. Learners appeared to find this mini problem challenging, with many identifying the correct dimensions to use but then calculating surface area rather than volume. However, when learners attempted to use volume rather than surface area the calculations were often carried out successfully.

Part (b) of the question required learners to draw the plan of the cuboid, again by using the given front and side elevations to determine the dimensions of the plan view. A mark was often awarded for drawing a rectangle with one correct side length but only the more able gained both of the marks available. When no marks were awarded, it was often due to copying the elevations already given or drawing a net or 3D sketch of a cuboid.

Question 8

It was very pleasing to see that nearly all students could successfully solve this ratio problem in part (a) and gain full marks. When full marks were not awarded, partial marks were often gained for showing the correct processes with arithmetic errors or for finding the number of footballs ordered for only one or two of the different sizes. Common errors seen included dividing by individual parts of the ratio rather than the total number of parts or using the size of the football rather than the ratio.

Part (b) was a small money budgeting problem where learners were required to find the cost of 23 packets of plasters using individual packets or boxes of 5 packets to decide

whether Mina had enough money. A mark was often awarded for finding the cost of individual packets, leading to a decision of no, but many did not continue and attempt to also find the cost of buying boxes which would have led to a decision of yes. Using a combination of boxes and packets was also a valid method but rarely seen. Learners should be encouraged to work with all offers provided before making a final decision.

Question 9

Part (a) was an underpinning knowledge question that required learners to use angle facts of triangles and straight lines to find the size of a missing angle. Success with this question was varied and whilst some learners gained full marks, a small minority gained no marks due to making the assumption that the triangle was isosceles or using 360° rather than 180° as the sum of the angles in the triangle. Of the learners who were able to find the missing angle inside the triangle correctly, many showed incomplete calculations and omitted using the angles on a straight line fact to find the correct answer.

A check using estimation needed to be shown in part (b) and it was pleasing to see so many learners using rounded figures in their calculations. Some learners used a combination of estimation and reverse calculations to check their answers which was acceptable. Learners who only used a reverse calculation gained no credit. Learners should be reminded that they need to show a check using the specified method rather than defaulting to a reverse calculation.

Question 10

A wide range of approaches to this question involving working with speed, distance and time were seen with varying levels of success. Using the standard approach of dividing distance by time was commonly seen and allowed learners to gain the first mark but only the more able continued to multiply by 60 to find a comparable figure using consistent units of time. Success was less common when a proportion based approach was used such as finding the number of miles per minute or the minutes taken to travel a mile. Learners who used these alternative approaches successfully often noted down the units being represented by their calculations, demonstrating a deeper level of understanding, and centres should encourage learners to do this when working with compound measures. It is also worth noting that a considerable number of learners gained no marks due to showing a variety of methods, with some correct and some incorrect used. In instances of a choice of methods being used, learners must make clear which method they are intending to be marked, either by using the answer box provided or by unambiguously indicating their chosen method (circling, underlining, ticking), as marks will not be awarded otherwise. Or better still, crossing out incorrect methods.

Question 11

This multi-step problem involved calculating the circumference of a circle, where no formula is given, addition of lengths and proportion. The use of circle formulae was rarely seen and of those who were able to recall a formula for circles, area was often used in place of circumference. Despite this, learners were still able to gain marks for working with the length of wire needed for the star shape inside the circular earring or for working with the amount of wire available on three rolls, with some gaining both marks. Whilst learners were able to demonstrate a broad understanding of the processes needed to solve the problem, full marks were often not awarded because of the lack of recall of the formula for the circumference of the circle. The use of circle formulae is new content on this specification, and it would be beneficial for centres to practice problem solving questions involving circles or part circles.

Question 12

The final question in this section draws upon all three content areas of Mathematics combined into a multi-step problem. The skills of interpreting a scatter diagram, calculating a percentage increase, and working with proportion to find a monthly instalment needed to be demonstrated to gain the marks available. Whilst the majority of learners gained partial marks for beginning to work with the percentage increase and the monthly instalment, only the more able learners could combine all three content areas to an acceptable level of accuracy when interpreting the scatter diagram. However, when a sensible value outside of the acceptable range was used correctly with the other skills being assessed in this question, marks were awarded accordingly. The most common incorrect value used from the scatter graph appeared to come from drawing a line of best fit that joined the corners of the axes rather than following the trend of the data or from joining the first and last plotted points. Learners should be discouraged from using these methods when interpreting scatter diagrams. As with other questions involving the use of percentages, marks were often lost due to not showing any valid processes.

Multi-step problems combining different skills from all three content areas of the specification is required by OFQUAL and centres are advised to prepare learners for longer questions that require connections to be made.

Pass mark for FS Level 2 Maths set 2

Maximum mark	64
Pass mark	35

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