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Examiners' Report

February 2017

Pearson Edexcel Functional Skills Mathematics Level 2 (FSM02)

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Introduction

This level 2 paper included the contexts of an activity holiday, organic produce and frozen foods. Some of the questions required careful reading to understand the connections between the given data. This was demonstrated in question 1a, where a significant number of learners, despite correctly extracting 94 from the table, did not engage with this as a percentage and progress to perform the required calculation.

General comments

Many learners were able to successfully access this paper and gain marks in the majority of the questions. However, there was evidence from the number of blank answers throughout the paper that some learners found the more complex questions inaccessible. Centres should ensure that learners entered for this qualification are working at the level of mathematics required to successfully attempt a functional skills level 2 mathematics examination.

A substantial number of learners appeared not to have the use of a calculator for this paper which was a distinct disadvantage. Learners should be reminded of the importance of taking their calculators to the examination and should be prepared in their effective use. Many of the scripts contained lengthy arithmetic calculations; for example, 'build up' methods were seen and often calculated incorrectly. The additional time these learners devote to working out can often result in them being unable to complete the paper in the allocated time.

Learners should be encouraged to read the questions carefully and check they have provided a full answer to the question. In this paper, having completed the correct calculations, many learners failed to write a conclusion thus losing a mark. They should understand that when they are asked to explain their answer, it is important to provide a decision and a reason for it. It is also worth pointing out to learners that the number of marks allocated for a question reflects the amount of work needed for a full solution, so, for example, a question worth 6 marks needs more than 1 line of working.

Learners should be encouraged to check all their working as well as consider whether their answers make sense. Questions 2, 5 and 9 asked learners to show a check of their working. It was pleasing to see that many learners gained marks for producing a valid check. They should be reminded that a repeat of the initial calculation does not constitute a check. Learners can provide evidence of checking any part of their working. The following can be sufficient evidence of a check:

- a reverse calculation e.g. a multiplication following a division
- a different method for performing a calculation e.g. in a percentage question multiplying by 1.2 instead of finding 20% and adding it on
- an estimation, for example by rounding

Section A

Question 1a

This question was about finding the number of solar panels needed to produce 8 kilowatts of electricity and comparing with 33. The most common omission within this question was the recognition of the percentage decrease in power production. Many learners failed to engage with the use of percentage in their working for they answer and were only able to access 2 of the 4 marks. Centres need to ensure learners understand that, when making comparisons leading to a decision, they must ensure they compare figures in consistent units. In this question, stating 7755 watts is less than 8 kilowatts is not a valid comparison.

Question 1b

This question was about completing a staff rota based on availability. The majority of learners performed well with this question and achieved 2 or 3 out of the 3 marks available. The staffing for the 7-8pm and 8-9pm slots was problematic for some learners; a substantial number had one hour block with 4 staff and one block with 2 staff working instead of 3 staff each hour within the 5pm to 9pm time frame. Some learners only entered the first hour of working for staff, rather than complete 2, 3, 4 or 5 boxes and showed lots of crossings out. Learners need to clearly show their final answer and take care in the presentation of their solutions.

One thing for centres to remember and to encourage in tackling timetabling questions, is that learners return to the wording of the question the and information given to ensure they have considered and included all of the constraints.

Question 1c

This question presented a slightly different approach to the standard mean calculation as learners needed to recognise that the profit was the difference between the income and costs. There were many examples of learners adding all 12 values in the table and dividing by 12. Of those learners that did subtract the values for each week, a significant number used +£500 instead of −£500, representing a loss in week 1.

Question 2

Learners approached this speed, distance, time question in many different ways, with a substantial number arriving at the correct solution of 47 minutes for the total time taken to complete the course, although many of these learners missed the final mark for a valid check, often by just repeating their answer of 47 minutes.

The most common obstacle in the question was finding the reduction of the speed by a fraction on muddy ground, with many learners unable to find $\frac{3}{4}$ of 80. Other common errors were adding all 5 distances together, ignoring the final stretch of the race from E to A, or dividing the muddy distance of 1320 m by 80 before taking the three quarters off the speed. However, overall this was one of the best answered questions with a considerable number gaining full marks and also giving a valid check of their calculations.

Section B

Question 3

In this practical problem to work out the number of potato plants that can be planted in a field, learners needed to find the number of plants in a row and the number of rows, multiply these to find the number of plants then multiply by 1.5 to work out the weight in kilograms and divide by 1000 to change to metric tonnes. Finally, they had to give their answer to 1 decimal place.

There were many good solutions, but the main errors were

- not using consistent units – cm and m
- finding the area of the plot 21×27 in m^2, multiplying this by 100 instead of 10 000 and dividing by 45 x 75 in cm^2
- adding their values for the number in each column and each row instead of multiplying them
- confusion with kg and metric tonnes - some multiplied by 1500 not 1.5
- a few simply did 9 x 1.5 presumably because there were 9 plants shown on the diagram.

Understanding this type of question can be helped by considering real-life examples, such as using patterns of smarties or lego bricks in a given rectangle. Teachers can then highlight how to correctly round-off in a practical situation.

Question 4

Many learners completed this ratio question about fertiliser and plants successfully, with the 2 main methods- comparing the number of plants or comparing the number of ml, being used well. However, errors sometimes occurred with arithmetic on build up methods; some learners also mistakenly multiplied 12 plants by 10 litres.

The majority of learners gained the first mark getting to 15 and 16 but did not progress beyond this point. However, some learners qualified these answers in writing, saying that they could make 16 lots of fertiliser but only needed 15 lots of fertiliser, demonstrating a mathematical understanding of the relationship between concentrate, fertiliser and plants.

Question 5

Typically learners gained full or no marks on this straightforward volume calculation question. Where marks were lost, it was mainly because the incorrect final units had been used, m or m^2 rather than the correct m^3, or where the check had not been completed. Most learners were able to work with the fractions although some added rather than multiplied the 3 numbers. A substantial number of learners incorrectly worked out the surface area, or the total lengths of the sides.

Centres should ensure learners understand the difference between units of volume, area and length and their calculations.

Question 6

The scale question within this paper required learners to determine the scaled dimensions of a greenhouse to draw on a grid given the area of the actual greenhouse. They were asked to draw 3 greenhouses on the grid given constraints on their positioning.

A significant number of learners did not attempt this question. Of those who did, many did not interpret the scale correctly. Many of the learners worked out the possible dimensions of a greenhouse but then used a scale of 1 cm to 1 m to draw them on the grid. Centres should encourage learners to practise interpretation of scale and scale drawing questions.

Section C

Question 7

Many learners struggled with this question on the paper. Some learners thought that the values given in the table were percentages and compared, for example, 16 with 28 which was the raw number of men and women respectively that recorded an opinion of 'good', with no attempt to compare percentages.

Common errors included showing 16 + 24 = 40% and 28 + 14 = 42%, or 50/110 and 60/110. Some learners wasted a lot of time working with ' like' as meaning 'good' as well as 'good and satisfactory' giving differing outcomes and not writing a conclusion.

Question 8a

Many learners were able to access marks in this multi-step wage calculation question; but only a significant minority gained full marks. Many of them found the increase in the weekly wage bill for the existing staff, however some learners stopped there and did not go on to consider the wage bill for the new staff.

Perhaps the simplest way to find the increase in the total amount of money paid each week is to find original total wage bill and the total wage bill after the increase in pay and increase in staff and then subtract. Most learners managed to gain the first mark and a substantial number gained marks 1, 2 and 4. These 3 marks did not depend on finding 8% of 125 and thus avoided the common pitfalls in percentage calculations. A few learners truncated their answers so they worked in whole £s, this approach lost the final accuracy mark.

Question 8b

Learners could use several different methods to compare the cost of a similar meal in the UK and France, but all involved a comparison in the same currency. Those who chose to compare the price of 1 meal in the UK with 1 meal in France, needed to convert one of the prices from pounds to euros or euros to pounds in order to make a comparison. The same could be done when comparing using the other most common options, which were the price of 20 meals or the price of 24 meals.

The most common errors were not converting the currencies at all and comparing a price in pounds with a price in euros; and converting incorrectly i.e. multiplying by 1.22 instead of dividing and vice versa.

Centres should encourage learners, when using conversions, to decide whether the numerical answer should be higher or lower than the one they are starting with. For example, as £1 = 1.22 euros then when converting £5.50 to euros the answer must be greater than 5.50 euros, so the conversion involves multiplication.

Question 9

This formula question posed some problems for learners with limited knowledge of negative numbers and algebraic formulae. Some simply ignored the 1.8 and worked out −20 + 32, others divided by 1.8 and some just used +20. Using +20 produced an answer of 68 degrees F, which is not a realistic answer for the temperature of a freezer.

In teaching the topic of formula substitution at this level, centres must ensure that learners recognise the principles needed to approach this type of question. The Celsius to Fahrenheit formula is a good starting point in the classroom as it allows for teachers to utilise negative numbers in a functional way. In addition, learners should be encouraged to consider whether their answers make sense in real-life contexts.