



Examiners' Report

March 2017

Pearson Edexcel Functional Skills
Mathematics Level 2 (FSM02)

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Introduction

This Level 2 paper included the contexts of a getting to college, saving energy and managing a leisure centre. The types of question in this paper often required the learner to take a more thoughtful approach when interpreting and responding to the questions. On occasion learners needed to combine Level 1 skills to answer a multistage question and it was evident that some learners did not have the full range of knowledge and skills required to tackle such questions.

General comments

It has been pleasing to see that learners were able to access this paper, with many attempting most of the questions presented.

However, there was a small minority of learners who were reluctant to attempt questions where the context may have appeared unfamiliar to them. Some had not planned their time effectively enough to ensure they had time available to attempt the final questions.

The majority of learners presented their calculations throughout each question but there were a few instances where these were not clearly organised. Learners should be encouraged to structure their responses in a systematic way and ensure that they have made a final decision if required and that it is accompanied with accurate figures. Centres would do well to encourage learners not to round or truncate figures too early when the question requires multiple calculations to be performed. Similarly, learners should be encouraged to consider whether their numerical answers are sensible and realistic for the context of the question. For example, recognising that £19256 may be an excessive cost for one week of travel to college.

Although it was pleasing to see that many more learners had access to calculators than previous examination series, it was evident that a very small number of learners still had difficulty in performing lengthy calculations involving more complex numbers by using a written method. Centres should ensure that all learners have access to calculators so that arithmetic errors are avoidable and therefore does not disadvantage learners.

Learners engaged with a variety of contexts, some which may have been unfamiliar, and responded to tasks well in most cases. Learners should be encouraged to carefully consider the context, practise extracting essential information (highlighting key data is advisable) and focus on what the demand asks for when making their final decision. They should also develop knowledge on how to show a check of their calculations, especially when explicitly asked to do so.

Section A

Question 1a

This opening question was answered very successfully with the majority of learners being able to read value from a chart and interpret these correctly to state the ratio required correctly. Learners should be able to accurately interpret a chart or graph which was not always the case in this instance, with a very small number of learners not considering that the graph was representing people and so not realising that decimal readings were not sensible in this context. Considering males and females separately also led to learners not gaining full marks for this question as the total number of students who walked and those that used the bus was clearly stated in the question. Centres should encourage learners to practise adding extra information to the y-axis scale when they are required to read values that are between the scale labels.

Question 1b

The second part to this question also required learners to accurately interpret the graph given and to then use percentages to make a comparison. Learners often chose to calculate 18% of their total rather than use the alternative method of expressing car travellers as a percentage of the total. It was pleasing to see that many were able to correctly calculate the percentage for their figures and make a suitable comparison and decision. Inaccurate graph interpretation or not stating 16.666...% to a sufficient level of accuracy led to learner responses not achieving full marks for this question.

Question 2

Finding the median of a data set is well within the scope of a Level 2 learner and learners who identified that this question was asking for the median were able to do so with great success. However, many learners incorrectly calculated the mean journey time. This could be due to either not reading the question correctly or by not being able to recall the correct method for calculating the median value. The most common error for those that began to work with the median was to not include all data values when ordering numerically and therefore were only able to gain half of the marks available. Centres should encourage learners to tick each piece of data when they have used it and to then count the number of pieces of data in their list as a checking mechanism. To help learners to recall the method for each type of average, centres could use a nursery rhyme as a learning strategy, eg "Hey diddle diddle, the median's the middle...". There are many available on the internet and use of these considerably aids memory recall.

Question 3

This question gave learners the choice to either work with dimensions in a functional context or to work with an area method to decide whether an area of land was large enough to accommodate a number of bicycles with an allocated space size in a planned bicycle park. Both approaches were used by learners with great success and it was pleasing to see that both methods were used comfortably and positively. A very small minority found the concept of fitting smaller rectangles inside a larger rectangle a little challenging and would have benefited from using a diagram as a visual aid. This question also required learners to provide a check of their working by means of a reverse calculation or using an alternative method. Many learners picked up a mark for showing a reverse process for part or all of their calculation. However, there were still too many learners who simply repeated their previous calculations or ignored the check requirement completely.

Question 4

The final question in this section was a complex multi-step problem set in an unfamiliar context. Learners were required to convert between metric and imperial units and adapt their measures using proportion. The majority of learners were able to successfully begin to solve this problem by working with the conversion from miles to kilometres to establish how many kilometres would be travelled across a whole week and to also begin working with the additional cost of car parking for the week. Only a small number of learners were then equipped with the required knowledge and skills to progress further and use proportion to calculate the amount of fuel needed and the cost of the fuel for either a day or per week based on 7 litres of petrol consumption over a distance of 100 kilometres. Many learners used proportionality for 150 kilometres rather than the 160 kilometres to be travelled and led to marks being lost. However, it was pleasing to see that learners who successfully calculated the correct amount also presented their final answer in correct money notation.

Section B

Question 5a

The first question of this section required learners to solve a complex problem involving rolls of insulation needed to insulate a loft by using a combination of Level 1 skills, namely metric conversion and either area or by considering length. The most successful learners began by converting units so that consistent units were being used and then either calculating the total area of the loft and dividing this by the area that a single roll of insulation would cover or by using the diagram to sketch how many rolls of insulation were needed to cover the width of the loft and continuing to find how many rolls per length of the loft. Learners not achieving the full allocation of marks were either unable to use the correct conversion fact from mm to m or chose to calculate perimeter rather than area. To help learners better prepare for similar problems, centres could provide practical experiences of cutting lengths of string or card to fit inside a shape to aid the visualisation of working with dimensions. This would also work well for area if squared paper were used before introducing calculations involving area formulae.

Question 5b

This question required learners to use fractions to compare the cost of a new boiler with the annual cost of using the old boiler and to find the number of years it would take for the running cost savings to cover the initial cost of the new boiler. Whilst it was pleasing to see that nearly all learners were able to calculate the saving of one fifth of the cost of running the old boiler correctly, a small number chose to find one fifth of the cost of the new boiler instead and showed that they had not considered the question carefully enough. A larger than expected number of learners who calculated the correct fractional value unfortunately continued their calculations by dividing the cost of the new boiler by four fifths of the running cost rather than by the fifth saving they had previously found. Learners should be encouraged to add notes to explain their calculations to help guide them such as "£155 saved per year, how many of these until I reach £1850?"

Question 5c

The evaluative check in this paper asked learners to consider why their previous calculation may not be correct, assuming a more generalised and common sense evaluation. Whilst there were many realistic responses that considered the effects of other variables such as seasonal use of the boiler or fluctuations in the cost of fuel, a rather large number of learners offered a reverse calculation or checking method instead of an evaluative comment.

Question 6

Learners were generally very successful when responding to this question in which they were required to work with monthly payments and running costs for a new fridge. Learners who had not considered all of the information provided and only found the cost of electricity for one rather than the three years stated or who chose to use the cash price of the fridge instead of working with the monthly payment plan were unable to gain full marks. Another common error by the small minority was calculating the cost of electricity for one or three years in pence but not converting this to pounds and pence, therefore arriving at an elevated and unrealistic total cost of purchasing and running the fridge. Values of £13753.46 for three years of using the fridge should have sounded alarm bells for learners that this seemed an excessively high price. Learners should be given opportunities to work with costs in pence and be presented with possible solutions that include realistic and unrealistic values then asked to comment. This would also help learners to practise their evaluative checking skills. Early truncating of 15.39p occasionally occurred and resulted in marks for accuracy being lost.

Question 7

Learners responded very well to this final question of the section. Nearly all learners were able to achieve 2 out of the 3 marks available by demonstrating their ability to work with a fractional reduction of one sixth. The majority of learners chose to calculate the reduction in monthly payment and compare this correctly to one sixth of the original monthly payment. Learners who failed to gain full credit either forgot to state a decision or had inaccurate figures to compare due to rounding £6.43(333...) to £6.40. Of the small minority who chose to multiply the original monthly payment by the decimal equivalent of one sixth, a few also lost the required degree of accuracy due to multiplying by 0.16 rather than the minimally acceptable 0.166.. or better. As with most fractions that have a recurring decimal equivalent, more emphasis should be placed on the need to use at least 2 decimal places when converting between fractions and decimals. Tasks such as investigating profit loss when reducing prices by say 0.3 rather than 0.3333... for a large number of items could help learners.

Section C

Question 8a

It was encouraging to note the increased level of understanding of the concept of probability that learners demonstrated in this question compared to previous examination series. Many learners were able to correctly communicate the probability of a squash player completing the questionnaire, with the vast majority also writing this in the correct format of either a fraction, decimal or percentage which is the expectation for a Level 2 learner. Learners who chose to use phrases such as 8 out of 44 or 8 in 44 did not gain full credit. A very small minority still present their probability as a ratio or used the language of likelihood. Displays such as three ticks and a cross or "Stop" and "Go" road signs help to reinforce the specific rules of topics such as probability.

Question 8b

This question required learners to draw a graph to represent two distinct data sets with many learners providing almost perfect responses. The marks available for a graph question are easy to both gain and lose. Although the majority of learners labelled the horizontal axis and provided a key for male & female (with some decorative filling in of columns), many then omitted using the word 'number' in either a title or on the vertical axis or entirely omitted this label. Scale numbers should be clearly attached to the line of value they label; too often it is not obvious where the scale number is referring to. The scale must continue beyond the highest plotted point, but not go off the grid provided for full marks to be awarded.

Question 9

This question required learners to calculate the BMI of a person using the formula provided. Whilst most learners were generally able to demonstrate that they understood that they needed to substitute numerical values in place of the lettered variables, many were unable to engage with the squaring part of this formula. It was disappointing to note that far too many learners still assume that squaring is the same calculation as multiplying by 2. However, learners who correctly squared the height and completed the calculation occasionally lost the accuracy mark due to rounding their squared value before applying the division. Centres should encourage learners to use all decimal places for any calculation that contains multiple steps until the final stage is performed.

Question 10a

Although using a scale given in a ratio format is within the expected competence of a Level 2 learner, weaker learners were unable to begin to correctly process this information. Many learners often chose to multiply or divide by 1.75, thus demonstrating a gap in knowledge. Understanding that 1:75 means 1 **TO** 75 is key and learners would benefit by deepening their understanding of how ratio notation can be described in words and should be encouraged to begin any question involving ratio notation by rewriting the ratio as say 1 to 75 before performing any calculation.

Question 10b

This multi-step question set in an unfamiliar context required learners to work with volume and rate of airflow for two possible scenarios, one using a multiple of 2.5 and one requiring a conversion from litres to m^3 . Most learners were able to calculate the volume correctly and calculate the rate as a multiple but was unable to recognise that each rate needed to be calculated separately and therefore were unable to identify the correct process to find the second rate. There were occasional instances where this question was not attempted at all. Centres should encourage learners to attempt all questions, even if just a partial attempt is made.

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