

Marker Leader Report

August 2013

Functional Skills Mathematics
Onscreen, On-Demand
MAT01 and MAT02

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Introduction

This report has been compiled by the Marker Leaders for Onscreen Functional Skills Mathematics at level 1 (MAT01) and 2 (MAT02) and considers all test versions available.

The report is designed to provide guidance for centres when preparing their learners for the onscreen assessments for Functional Skills Mathematics at level 2. It is recommended that centres also consult the paper-based Functional Skills Examiner Reports.

As we have tests that are 'live' and run concurrently, examples of successful answers may use the sample assessment materials and practice tests, or past papers from paper-based tests, as a point of reference.

All above mentioned documents are available at www.edexcel.com/fs.

The Report

Many learners are continuing to do well and display their functional ability in mathematics with originality and positive flair. However, the focus of this report is to highlight areas where learners could improve their performance. Learners will benefit from taking the practice tests, and using past papers from the paper-based tests as part of their preparation.

There are 12 screens on each test. Each screen provides a problem set in a functional context which can be solved using the mathematical skills detailed in the coverage and range within the specification. Centres can access the sample assessment materials and practice tests, alongside mark schemes, www.edexcel.com/fs by following the link to Onscreen On-demand Testing. These materials will enable learners to become familiar with the style of the tests.

Past papers from our paper-based tests are also good sources of practice material. The papers, alongside their mark schemes, can be found at www.edexcel.com/fs by following the link to Mathematics (Levels 1-2).

Many of the points raised in last years Marker Leader report and, as such, are reiterated in the current report.

This report addresses MAT01 and MAT02 respectively. Centres will benefit from reading the whole report.

MAT01

Interpreting Data

Learners need to interpret data which may be presented in a variety of ways.

Learners may need to interpret data by:

- making a decision and giving a written reason.
- making a decision and providing supporting calculations

Learners need to clearly make a decision.

The use of 'Yes' or 'No' should be encouraged as best ways to make a decision.

Reference: Paper based test February 2013 Q8
Paper based test March 2013, Q7a
Paper based test June 2013, Q3b

The temptation to personalise and give opinions should be resisted. An answer to the demand of the question is required, with reference to relevant figures from a table or graphical display if necessary.

Reference: Paper based test, May 2011, Q8

Graphical Representation

There are three key features for learners to consider for graphical representation.

- Choosing a suitable scale to plot all the data.
- Providing suitable and sufficient labelling
- Plotting the data accurately.

Learners need to provide a linear scale for the data range.

Learners sometimes provide incomplete or ambiguous labels.

Data plotting is currently completed well by learners.

Reference: Paper Based Q6a February 2011
Paper Based Q6c March 2013

Checking answers

On occasion, learners are required to check their answers. The understanding of what is required as a check is improving. However, learner performance in this area could improve further. A check might be performed by a reverse calculation, or a set of reverse calculations.

Reference: Paper based test, June 2012, Q7c
June 2013, Q6b

Recording answers correctly

Learners should write answers in correct notation.

Eg: A learner arrives at a figure of 812.5 from calculating the total cost of 26 items priced at £31.25 each. The calculator displays the result as £812.5, which is not an acceptable form. The figure should be written correctly in money notation as £812.50

Reference: Sample assessment material Q13

Handling Time Calculations

Learners may be required to add or subtract time periods from a clock time.

Eg: An activity has a start time of 13:25. The activity takes $\frac{3}{4}$ hour. What time does the activity end?

Learners appear to know that 60 minutes constitute 1 hour. However, they are not as competent as they might be when using this fact in time calculations.

Reference: Sample assessment material Q2
Paper based test March 2012, Q1a
Paper based test June 2013, Q6

Statistical Calculations

Learners appear able to calculate the mean of a data set with confidence. However, success in finding the range of a data set can be improved.

Reference: Paper Based Q7a May 2013

Choosing an appropriate arithmetical operation

Learners appear confident using add, subtract and multiply. An area of improvement is recognising when to use division and to handle calculations confidently.

Eg: 1000 football supporters will travel on 52 seat coaches to an away match. What is the minimum number of coaches required?

Repeated addition of 52, or repeated subtraction of 52 from 1000, are not efficient processes. Learners need confidence in using division ie. $1000 \div 52$ as the first process.

Rounding appropriately

Learners need to make judgements on rounding based on the context of the question. For example, if cement is purchased in 40kg bags and 850kg is required it would be appropriate to purchase 22 bags of cement.

The process of division ($850 \div 22 = 21.25$) yields an answer which, in this case, needs to be rounded up to the nearest bag.

Reference: Paper Based Q1b May 2011

The CBT Environment

1. Drop down menus

Learners may have to use drop down menus within a question, and need to recognise the existence of such a mechanism and act accordingly.

Reference: Practice test set 1, Q6

2. Drag and drop mechanisms

Learners may have to use drag and drop mechanisms within a question, and need to recognise the existence of such a mechanism and act accordingly.

Eg: resize and place icons on a grid

Reference Practice test set 1, Q11

Providing evidence when making comparisons

In general, Learners are organising their work well. The computer based nature of the testing appears to be facilitating this process. However, on occasion, learners show incomplete working which often results in the award of fewer marks than might be expected.

Learners need to provide evidence when comparing two or more features. Evidence must be written down clearly, and features need to be in an equivalent format to enable comparison. If a comparison needs to be made between two time periods, both periods should be displayed in the same unit of time.

If a comparison needs to be made between costs of items, both costs should be displayed in the same money unit.

Reference: Practice test set 1, Q6

Multi stage problems

Learners may need to answer questions where two or more processes are present in a functional context. These questions frequently attract at least 4 marks. Practice in tackling these questions will give learners confidence.

Eg: Use knowledge of units and area.

Reference: Sample assessment material Q11

Eg: Use knowledge of units and area and optimise for a best buy

Reference: Paper based test, May 2011, Q3

Metric Unit Conversions

Learners should be able to recall metric unit conversions.

Eg: $1000\text{ml} = 1\text{l}$ and $1000\text{m} = 1\text{km}$ and $1000\text{g} = 1\text{kg}$

Unit conversions are needed when working on a variety of problems.

Reference: Paper Based Q2 January 2013

Paper Based Q6b June 2013

Paper Based Q8a June 2013

Judging the reality of an answer

Learners need to inspect their answers to check if they are sensible.

Eg: the cost of two baby formula milk containers is unlikely to be greater than £100 or less than £1.

Learners should be encouraged to scrutinise their workings and, if needed, rework the question.

Reference: Paper Based Q2 February 2011

Area and perimeter

Many learners confuse area and perimeter. Within the learning environment, they need to learn these technical terms. Practical examples of the use of these measures and the differences between them can be beneficial.

Reference: Sample assessment material, Q11

Use of the working box

Many questions state above the working box 'You **must** use the working box to show how you get your answer.' This is a clear indication that there will be marks for the processes the learners will use. Centres are advised to ensure that learners understand that presenting clear logical working often gains marks even if the final answer is incorrect.

MAT02

Graph plotting and interpretation

Learners are often asked to draw graphs from given information and to interpret the data. There are three key features for learners to consider for the graphical representation, namely choosing a suitable scale to plot all the data, providing suitable and sufficient labelling, and plotting the data accurately. When drawing a bar chart for example, the learner does not need to start the scale from zero but must use a scale that is linear and allows all the data to be plotted.

Learners should be advised to check the mark allocation beside the demand for the interpretation of the data. If two marks are allocated, often two statements of comparison are required. When only 1 mark is allocated, often 1 statement of comparison is sufficient.

Past papers from the paper-based tests contain many examples of this type of question which learners could use in preparation.

Eg: Level 2, May 2011, Questions 9a and 9b
Level 2, October 2011, Questions 4a and 4b
Level 2, May 2012, Questions 2 and 6
Level 2, March 2013, Question 8a and 8b
Level 2, May 2013, Question 2

Centres may find it useful to provide examples of partially correct solutions to problems and encourage learners to find the flaws and suggest improvements that would gain full marks.

Choosing the best option

With this type of question learners are often provided with data relating to two or three options and asked to choose the best option. It is vital that the learners work through the necessary mathematics for each option, showing the working and the answer clearly in the working box. Often, most of the marks in this type of question are for sight of these processes. Learners should then be advised to read the question again to decide whether they want to choose the largest or smallest option, or a combination of the options. Clearly, wanting to pay the cheapest cost requires a different decision from wanting to receive the most money. It must be stressed to learners that the decision made must be backed by clear working.

Question 6 on the Onscreen Level 2 Practice Test is an example of this type of question. Learners who selected the radio and printer, but left the working box empty and so had no justification for making this decision, were awarded no marks. However, it was possible to gain up to three of the five marks if the correct processes for the fraction and percentage calculations were seen and a suitable decision made even if the answers to the calculations were not correct.

Our past papers from the paper-based tests also contain many examples of this type of question which learners could use in preparation.

Eg: Level 2, June 2011, Question 8
Level 2, January 2012, Questions 2 and Q9
Level 2, February 2012, Question 7
Level 2, November 2012, Question 4

A wealth of material for practice can also be found by comparing online deals for products or services.

Budgeting

Functionally we do this all the time.

Do I have enough money for what I want to do?

Do I have a sufficient quantity of materials for a task?

How much do I need to charge for something to make a profit?

Will I meet a target I have been set?

These are examples of questions that we meet regularly in daily life. The most successful learners set out the working carefully in the working box and ensure they have figures which can be directly compared and then indicating a clear decision, often of 'yes' or 'no', based upon their figures. Again, often almost all the marks are for the processes and learners who show all the correct processes to find figures that can be directly compared, but make an arithmetic error, can gain most of the marks. However, learners who click 'yes' or 'no' but leave the working box blank are seldom awarded any marks.

Question 5 on the Onscreen Level 2 Practice Test is an example of this type of question. In this question learners needed to use concepts of area, proportion and conversion to same units of weight before they could decide whether or not one box of grass seed would be enough. Regrettably in this question, and others of this type, there were learners who clicked 'yes' and may have done working on paper or used their own calculators but no evidence was shown in the working box. Therefore, no marks could be awarded. Use of the calculator provided onscreen is recommended. Using the 'copy to working box' calculator function ensures the processes can be seen and credited when worthy of marks.

Questions of this type will frequently require the learner to do calculations from several concepts in the coverage and range within the specification, to find figures which can be compared. Learners who were less successful with these types of questions often did not know the correct conversions to change between grams and kilograms, millilitres and litres, or centimetres and metres. Further practice can be found on past papers from the paper-based tests.

Eg: Level 2, March 2011, Question 2
Level 2, May 2011, Questions 4 and 6
Level 2, January 2012, Question 7
Level 2, May 2012, Question 1

Time planning

The ability to be in the correct place at the correct time is a very functional one. Centres are advised to simulate real life situations where time planning or other time calculations are required.

Do I have enough time to fit in all the activities I want to do today?

I have to be at a destination by a given time, when should I leave home?

I need a time plan to fit in a set of timed activities showing when each will start.

The most successful learners are able to convert between fractions of an hour and minutes. They are able to add times together without falling in the trap of doing so as if they are adding decimals. They know how to convert between days, weeks, months and years and use their converted values in calculations.

Our past papers from the paper-based tests contain many examples of this type of question which learners could use in preparation.

Eg: Level 2, March 2013, Question 2
Level 2, June 2012, Question 7
Level 2, July 2012, Question 1
Level 2, May 2012, Question 3
Level 2, May 2013, Question 5

Planning to meet constraints

In everyday life we are faced with situations where we have a wealth of information to process to produce a workable solution meeting constraints. These types of questions that test this may involve producing diagrams. Learners who are most successful ensure they have used the key correctly to produce diagrams with correct dimensions, and have read constraints carefully to ensure the diagrams are in suitable positions.

Learners should be advised to read the question again after producing their solution to check that they have evidence that they have met all the constraints. Less successful learners often neglect to resize objects having dragged them to suitable positions (in questions where this is applicable) or, in questions where calculations were involved, forget to complete the totals boxes to provide evidence that they knew the solution met the constraints.

Questions 2, 5 and 9 on the Level 2 Sample Assessment Material, and Questions 2 and 4 on the Onscreen Level 2 Practice Test, are examples of these types of question. Centres are strongly advised to give learners the opportunity to attempt these questions as they ensure the learner is familiar with the 'drag, drop and resize' mechanisms which are a feature of some on-screen tests.

Further practice can be found on past papers from the paper-based tests.

Eg: Level 2, February 2011, Question 8
Level 2, May 2011, Questions 2 and 5
Level 2, May 2012, Question 4

Averages and spread

Learners need to be able to calculate different averages showing clearly the process used, but equally importantly they need to be able to interpret the results of the calculations to make decisions. The most successful learners know mean, median and range by name as well as which process to use for each. Having done appropriate calculations they can make comparisons and decisions. Learners also need opportunities to consider averages questions that are more varied than just adding up values to find a total and dividing by the number of values involved

Practice can be found on past papers from the paper-based tests.

Eg: Level 2, February 2011, Question 7
Level 2, March 2011, Question 10a
Level 2, July 2011, Question 3
Level 2, May 2012, Question 5
Level 2, March 2013, Question 8c

Algebra

Functional Mathematics tests at Level 2 are required to provide learners the opportunity to show that they can use a formula to solve a functional problem. Learners are awarded marks for showing they can substitute into the formula and evaluate successfully, and then use the result to make a decision. Learners that are less successful have confused

squaring with doubling, do not understand order of operations, or that PQ in a formula means multiply the value of P by the value of Q for example.

Centres are advised to give learners practice in use of a wide variety of formulas. The list below shows some examples of questions involving algebra:

Level 2 Sample Assessment Material, Question 12
Onscreen Level 2 Practice Test Question 3
Level 2 paper based test, February 2011, Question 2
Level 2 paper based test, March 2011, Question 9
Level 2 paper based test, June 2011, Question 4
Level 2 July 2011 Question 7

Recognise and use 2D representations of 3D objects

The most successful learners are able to sketch 3D solids, produce nets, draw plans and elevations and use isometric grids to draw 3D shapes.

Practice can be found on the paper-based tests.

Eg: Level 2, May 2011, Question 2a
Level 2, May 2012, Question 10a
Level 2, Oct. 2011, Question 6b
Level 2, March 2013, Question 5a
Level 2, June 2012, Question 3b

Data collection sheets

Learners need to be able to design forms to collect and collate data. The most successful learners are able to produce efficient 2 way tables.

Practice can be found on the paper-based tests.

Eg: Level 2, May 2012, Question 8b
Level 2, May 2011, Question 2b
Level 2, January 2012, Question 3

Probability

The coverage and range includes the concept of chance. The most successful learners are able to calculate and compare theoretical probabilities. They need to give probabilities in correct notation.

Practice can be found on the paper-based tests.

Eg: Level 2, Oct. 2011, Question 3b
Level 2, July 2011, Question 4a

Recommendations for Centres

Centres should ensure that learners are confident in the use of the content detailed in the coverage and range. Learners need to be able to add, subtract, multiply and divide numbers of any size, use and calculate with ratio and proportion, fractions, decimals and percentages. They need to understand how to use simple formulas and equations and use 2D representations of 3D objects. They need to be able to use area, perimeter and volume and calculate with and convert between units of time, length, weight, capacity and temperature. They need to understand how to make a data collection sheet or draw and interpret a variety of graphs. They need to know the different averages by name and how each should be calculated and how to use probability to express the likelihood of an outcome. Centre assessment prior to entry would be advisable.

However, in a Functional Skills test, learners need to be able to decide for themselves which mathematics to select to solve a problem and then to apply it in an organised way. Centres need to allow learners many opportunities to tackle multi stage problems. Breaking a problem down to its component parts, then deciding the order to complete the steps is key to success. Centres might also find it useful to prepare solutions to multi stage problems which are only partially correct and give them to learners to discuss, evaluate and improve. This process may improve learners understanding of what is required. Learners should be regularly asked 'Is the solution fit for purpose'?

The majority of marks on previous Functional Skills tests are for showing a correct process. Learners should be encouraged to show how they arrive at an answer. Showing logical steps, especially when a calculator is used, is very important for communicating the way a problem is solved.

Learners should be encouraged to read through questions carefully and identify key information. They should also re-read the question after answering it to ensure that they have provided a full answer.

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