Chief Examiner Report for Functional Skills Mathematics

NCFE Level 1 Functional Skills Qualification in Mathematics – 603/5055/6
NCFE Level 2 Functional Skills Qualification in Mathematics – 603/5060/X

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Introduction

This report details the Chief Examiner's findings for the Reform standards for Functional Skills Mathematics qualifications at Level 1 and Level 2, for the first year of delivery since September 2019. It covers both on-screen and paper-based assessments.

Overview – Level 1 & Level 2

The subject specifications were revised and new standards introduced as of September 2019. Both levels of assessment now consist of two sections in each assessment, Section A which is a non-calculator section and Section B which permits the learners to use a calculator.

The assessments comprise 60 marks per assessment for both levels, with 15 marks for Section A and 45 marks for Section B.

Learners are required to complete both sections of the assessment, with both sections being taken in the same sitting. All centres have the opportunity to enter learners for either on-screen or paper-based assessments.

Evidence has been seen in completed assessments to indicate that some learners were able to clearly demonstrate the revised required mathematical skills and have shown the ability to use both the underpinning skills and the required problem-solving skills to complete a variety of mathematical problems, clearly explaining their calculations and final answers and justifying answers when required.

There have, however, been several examples where learners were clearly not at the required level for both levels of assessment, and in some instances learners had only looked at the first task and then not attempted any further tasks, which is a concern. There were also instances of learners only attempting one section when both sections are required to be completed. It was evident from scripts seen that some learners had clearly struggled with the non-calculator section but then performed well in the calculator section. Furthermore, there were also some assessments where the learners had not attempted any of the tasks in the assessment, even straightforward tasks that involved one calculation or extraction of one piece of data from a given table or chart.

Both levels of assessments are marked in accordance with set mark schemes and are marked positively, ie learners may be awarded marks for correct tasks and methods where seen, even if final answers are incorrect. This is one of the reasons it is crucial that learners show all of their working out.

All Examiners were involved in standardisation meetings for the new script variants prior to being approved to mark that variant of script. Examiner marking was then sampled during the marking window to ensure that there was accurate marking of scripts across Examiners.

All script variants are then subject to a thorough awarding process to determine the Pass mark for each script variant prior to learner results being released. Once the Pass mark has been set for each script variant, then learners' results are released generally 6 working days from the assessment being undertaken.

Level 1

At this level, it is expected that learners are able to use the required knowledge and skills contained within the reformed assessment criteria, to recognise and obtain solutions to straightforward problems. This may include tasks that require the learners to work through problems involving either one step or process or more than one connected step or process. They are also expected to address individual problems, some of which will draw upon a combination of two of the mathematical content areas, eg using number and common measures or using number and handling data. Learners may also be asked to explain answers or reasons for choices of options following their calculations and in some examples learners have not been awarded marks if these comments were missing, eg a response may require a mathematical calculation along with a 'yes' or 'no' for all marks to be awarded. In several cases, responses of 'yes' or 'no' also require a justification or valid comparison. Learners need to ensure that a forward slash is used to indicate a division symbol and that money is correctly indicated to two decimal places, even when the final digit is a zero. Final answers involving time should indicate either am or pm if given in the 12 hour clock system and with a colon between the hours and minutes when using the 24 hour clock system, not a decimal point.

Number:

At this level, tasks involving calculations with numbers have been competed well, although there have been some variations between the non-calculator and calculator sections. Some learners have undertaken the non-calculator section well, clearly demonstrating a sound knowledge and ability to apply the underpinning skills, but then not performed as well when applying the underpinning skills to problem-solving tasks, and the opposite has also been noted where learners have performed poorly when unable to use a calculator but have performed well on problem-solving tasks with the use of a calculator.

One area where the weaker learners have struggled has been in the use of equivalences between fractions, decimals and percentages, which often appears to be a challenge for many learners, particularly when it is evident that the learners do not have a sound understanding (and/or the ability) in applying the underpinning skills and particularly in applying the skills to problem-solving tasks, eg finding the original value of a discounted price has been problematic for some learners or finding the original price after an percentage increase.

Working with simple ratio has been another problematic area for some learners, both when given a specific ratio and values to work with and when asked to decide what the ratio for a given set of values would be.

Measure, Shape and Space:

Whilst some tasks in the assessments have been completed well, errors are still seen with final displays of money, with responses frequently not shown to two decimal places, particularly when the value ends with a zero, ie £127.9 instead of £127.90.

Conversion between units of measurement, including time, has sometimes been seen as a problematic area for learners.

Converting between metric units and the necessity to work with consistent units is a common area that requires development, as is the ability to convert between units in different systems, eg metric to imperial and with incorrect metric conversions, ie use of 100 to convert from cm to km. Learners have sometimes lost marks through inconsistencies in units used. Learners have also sometimes struggled with conversions of area and volume when original values were perhaps in metres but the required answer is in kilometres and vice versa.

Such errors can affect solving problem-solving as well, such as calculating a correct area or volume, skills that are often completed incorrectly and regularly muddled up by learners.

In addition, the conversion of time between both hours and minutes and when shown as a decimal has been an area identified as problematic, eg 6.4 hours is often written as 6 hours and 4 minutes instead of 6 hours and 24 minutes.

Handling Data:

In the area of handling data, evidence seen in scripts would indicate that some learners had found it difficult to represent the probability of an outcome as a numerical response, eg percentage, fraction or decimal, although it does appear that this is being completed better. Learners often represent it as likely or unlikely, and learners need to be taught to show this as a mathematical response, either as a fraction, decimal or percentage as well being able to complete a probability scale.

The identification of information from tables and graphs involving whole numbers has generally been completed well by learners but there is evidence to show that completion of simple pie charts and graphs, especially in the labeling and the completion of a scale on an axis and suitable titles for bar charts and line graphs when requested, can be problematic for some learners.

Level 2

Learners are expected to be able to use the required knowledge and skills contained within the reformed assessment criteria to recognise and obtain solutions to complex problems, that may require them to work through at least two connected steps or processes that involve multistep calculations. It is also expected at this level that learners can address individual problems, some of which will draw upon a combination of all three of the mathematical content areas (Number, Measurement and Handling Data) and that they have the ability to make connections between those content areas.

Number:

At this level, the reformed criteria now requires learners to read, write, order and compare numbers, both positive and negative, of any size and complete calculations with numbers up to one million.

At this level, learners tended to demonstrate good skills in the use of the four operations and evidence seen indicated that the learners were able to apply these to a range of tasks. Working with larger numbers was generally undertaken competently, although in some cases errors were seen that may be the result of incorrect input to a calculator, as working appeared to support a good understanding of the task requirements but final answers were incorrect.

Evidence has also been seen to indicate that further practice for learners preparing for assessment in the use of fractions and percentages would be of benefit, especially calculating reverse percentages, ie finding the original value when given a discounted or increased value.

Learners generally indicated the ability to know the equivalences between fractions, decimals and percentage, although some very weak responses were also seen.

The use of decimals to three places was generally performed well and evidence of this was seen in both sections.

The use of ratio and direct and inverse proportion was an area where errors were often seen, with learners clearly not understanding the concept.

Measure, Shape and Space:

It has been evident that some learners still tend to be careless with units – either omitting them particularly when calculating an area or volume or performing incorrect conversions between different metric units. Examples of such misconceptions include 100 metres being equivalent to a kilometre and a litre is equal to 100 millilitres.

There have also been errors in conversions between metric and imperial units.

The use of conversion graphs to find values tended to be done well, although subsequent calculations were not always accurate.

There has been evidence of learners confusing calculations for area and volume of 3D shapes and this has occasionally manifested itself in the area of compound shapes being calculated as the product of three lengths. Learners are no longer given the formulae for triangles and circles so centres need to ensure that this is included in the teaching delivered to learners.

As part of measure, learners are also now required to use coordinates, both positive and negative, to specify the position of objects or to plot items, and evidence seen in assessments indicated this had been problematic for some learners, mainly around the X & Y axis as it was apparent that some learners did not know which axis was which. Learners need to understand which value in a set of coordinates would be the first value when writing them down as errors in this were regularly seen.

Handling Data

Errors were seen by learners in calculations involving the use of averages when calculating the median and mode, with these often being incorrectly calculated, especially involving data sets that may have zeros in them. Learners have generally calculated this without recognising that zero is a value for this purpose. In addition, tasks where learners are asked to use two appropriate statistical measures of their own choosing have tended to be partially correct, but many learners have failed to calculate two measures, eg mean and median, and have only calculated one. In addition, explanations of the comparisons between different means, modes and medians has appeared problematic for some learners, eg the use of higher or lower for the comparison of a range is not correct; the learners should be identifying that there is a greater spread of values or a smaller spread.

The completion of frequency tables and identifying suitable groupings has been a skill that has been evidenced poorly in a high number of assessments. The calculation of the mean for a grouped frequency has been another area which many learners seemed to have struggled with. In many cases, they have failed to find the midpoint but have used the upper or lower boundaries instead or have not multiplied the midpoint by the number of values before attempting to find a mean or median.

Learners have also struggled with the probability of combined events, which is a new skill area for this level, as is the drawing and interpretation of scatter graphs and recognising positive and negative correlation on graphs.

Generic Summary – Level 1 & Level 2:

The reformed criteria means that it is crucial that all learners are adequately prepared prior to being entered for an assessment. There have been several examples seen where learners were evidently not at the level being assessed, with some very low marks being awarded, including some instances of zero marks where no calculations or responses were seen at all. In addition, some assessments had insufficient evidence to justify any marks at all across the whole assessment.

All centres are advised that it is essential that they ensure that learners undertake an initial/diagnostic assessment prior to being entered for any assessment, so that all learners can be entered onto the correct level. This then enables learners and centres to identify gaps in learners' skills and develop a learning plan that meets these needs, prior to undertaking an appropriate level of assessment. Learners also need to have confidence in their own ability to use the underpinning skills and have the ability to transfer those skills to a range of tasks that may be across different mathematical content areas. This is crucial when dealing with tasks that involve more than one mathematical content area.

In addition, all learners need to have had the opportunity to use the practice online assessments so that they are familiar with the tools for drawing shapes, plotting values on graphs (including lines of best fit on scatter diagrams), inserting labels on charts and indicating the position of particular items for some tasks, as well as the use of an online protractor. Evidence seen in marked scripts would appear to indicate that this has not happened and has then resulted in learners not being awarded crucial marks in some cases.

In some assessments, learners had not even provided responses to some of the more simple tasks such as identifying information from a table or chart or identifying the correct calculations to use. It is noticeable in learner feedback reports that some learners were not consistent in the application of various skills across a range of tasks.

One area that is particularly crucial is the need for learners to ensure that they show all working out, particularly for tasks with several marks. If a learner initially makes an error, they may still be awarded marks for part answers and also may be awarded for follow through to a correct answer from their working, even when that final response may be incorrect for the task. In some tasks, the incorrect final response may also be awarded a mark. This has been mentioned in previous reports but it is evident that some learners are still not doing this.

There have been examples seen in assessments where the learners had not indicated any working out with final incorrect answers so could not be awarded any part marks.

On some occasions, learners have lost all the marks for a task where an incorrect answer has been given without any supporting working.

This may have been as a result of the learner completing their working out and calculations on paper, so centres also need to encourage learners to transfer any such working out to both the on-screen assessment and paper-based, as there is a risk they may not receive any marks for such tasks if calculations are not evident In some cases, this lack of working out has made the difference for some learners between achieving and not achieving, so it is vital that learners are given the support by centres as to the importance of doing this.

Errors at the initial stages of tasks are regularly seen and may be the result of learners not ensuring that they have read the task instructions fully. In addition, some learners have not given the required final answer as asked for in the question, eg giving a decimal as an answer, when the task asks for a fraction or percentage.

Centres should encourage learners to read questions thoroughly and more than once, and in the case of paper-based assessments, they can be encouraged to underline or highlight key information essential to the tasks. This facility is also available for the online assessments.

There are several key phrases used in assessments that can help a learner with this:

“Explain your answer”
“Show how...”
“Is he/she correct?”
“Show your working”

These phrases indicate to the learners that more than a final numerical answer or comment is required, and fulfills the Level 2 skill standards of learners being expected to be able to use the knowledge and skills required to recognise and obtain a solution or solutions to complex problems. Examples seen in both levels of assessment meant that some marks were occasionally not awarded due to the lack of explanation or justification of learners’ choices or responses; learners have merely stated ‘yes’ or ‘no’ as their final response without a supporting explanation and in some cases without any calculations. In some cases, this may have resulted in no marks being awarded for that task.

Learners also need to ensure that for online assessments, they use correct symbols to avoid any uncertainty as to their response, ie use of a colon when indicating a ratio, not a forward slash or decimal, the use of the word ‘to’ is also acceptable. The use of a forward slash (/) is advised when indicating fractions or for division calculations with the result of the calculation being given as well, to make it absolutely clear what the learner means. Learners also need to ensure that any written calculations are clearly shown with the result of that calculation also given. The use of an asterix (*) is also acceptable as a multiplication symbol.

The assessments have comprised a variety of suitable topics that are aimed at engaging learners of all ages and abilities and are considered to be accessible by a range of learners of all abilities.

All assessments can be adapted to provide access for learners with specific learning needs, such as enlarged print, braille and coloured scripts. The online assessment system also a facility to enable coloured overlays to be used by learners who require it.

A full suite of learning resources is available on the NCFE website that provides opportunities for learners to fully prepare for their assessments. This includes sample assessments and resources, such as subject content specific information sheets, customisable PowerPoints and learner activity and answer sheets along with learner checklists, that can be used in teaching environments or as self-directed study.

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