Chief Examiner Report for Functional Skills Mathematics

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

Window: 09th December – 13th December 2019 (Paper)

Level 1 Pass Mark	37 / 60
Level 2 Pass Mark	38 / 60

Each learner's external assessment paper is marked by an Examiner and awarded a raw mark. During the awarding process, a combination of statistical analysis and professional judgement is used to establish the raw marks that represent the minimum required standard to achieve a Pass grade. As well as analysing performance on the assessment paper itself, performance standards and statistical outcomes in legacy qualifications and equivalent assessments (both within NCFE and, where available, across other awarding organisation) are considered to ensure Pass marks represent comparable standard

Introduction

This report details the Chief Examiner's findings for the December 2019 assessment window for the reformed Functional Maths Skills qualifications at Level 1 and Level 2. It covers both onscreen and paper based assessments

Overview – Level 1 & Level 2

Both levels of assessment consist of two sections in each assessment, one section that is non-calculator and one section where the use of a calculator is permitted. The assessments comprise 60 marks per assessment, with 15 marks for the non-calculator section and 45 marks for the calculator section.

Learners are required to complete both sections of the assessment, with both sections being taken in the same sitting. Centres have the facility to enter learners for an onscreen or paper based assessment.

There was evidence in the assessments seen to indicate that some learners clearly have the required mathematical skills and have shown the ability to use both the underpinning skills and the problem solving skills to complete a variety of mathematical problems, clearly explaining their responses and justifying answers when required. There have however also been examples where learners were clearly not at the required level for both levels 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. 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 involving one calculation of extraction of one piece of data from a table or chart.

All assessments are marked in accordance with set mark schemes and are marked positively, i.e. learners are awarded marks for correct tasks and methods where seen which is why it is crucial that learners show all of their working out. All examiners were standardised on the same live scripts prior to being approved to mark that variant of script. Examiner marking is sampled during the marking window ensuring accurate marking of scripts.

Level 1

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 which require them to work through 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, e.g. 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; e.g. a response may require a mathematical calculation along with a yes or no for all marks to be awarded,

Number:

Generally, tasks involving calculations with numbers have been completed well, although there have been some variations between the non-calculator and calculator sections. Some learners have undertaken the non-calculator section well, demonstrating a clear 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 where it is evident that the learners do not have a sound understanding of, and the ability, to apply the underpinning skills and particularly in applying the skills to problem solving tasks; e.g. finding the original value of a discounted price has been problematic for some learners or 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 a ratio for a given set of value would be.

Measure, Shape and Space:

Whilst some tasks in the assessments have been completed well errors have often been seen with final displays of money, with responses frequently not shown to two decimal places, particularly when the value ends with a zero, i.e. £8.5 instead of £8.50.

Conversion between units of measurement including time has sometimes been seen as a problematic area for learners ,with incorrect metric conversions, i.e. use of 100 to convert from mm to m; inconsistent units or lack of familiarity in applying the appropriate approaches or methods to tackle the problem. 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, e.g. metric to imperial. Learners have also sometimes struggled with conversions of area and volume when original values were perhaps in cm or mm, but the required answer is in metres. Such errors can affect solving problem solving as well, such as calculating a correct area or perimeter, skills that are often completed incorrectly and regularly muddled up by learners with perimeter calculations for an area task and area calculations for a perimeter task frequently seen. In addition the conversion of time between both hours and minutes and when shown as a decimal has been an area identified as problematic, e.g. 4.25 hours is often written as 4 hours and 25 minutes instead of 4 hours and 15 minutes.

Handling Data:

In the area of handling data some learners seemed to find it difficult in representing the probability of an outcome as a numerical response, e.g. percentage, fraction or decimal. 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.

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 labelling 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 which require them to work through at least two connected steps or processes that involve multistep. 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 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, i.e. 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, particularly more so in the use of compound 2D and 3D shapes. There have also been errors in the conversion 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 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 e.g. 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. e.g. 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 where 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 essential that all learners are adequately prepared prior to being entered for an assessment. Several examples have been noted where learners were clearly not at the level being assessed, with some very low marks being awarded including in some instances of zero marks where no calculations or responses were seen at all. In addition there were some assessments that had insufficient evidence to justify any marks at all across the whole assessment. Centres are advised to 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 will also enable 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 be confident in their underpinning skills and have the ability to transfer the necessary skills to a range of tasks and across mathematical content areas, especially crucial when dealing with tasks that involve more than one mathematical content area.

Learners also 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 and indicating the position of particular items for some tasks as well as the use of an online protractor.

In several cases 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.

Learners need to ensure that they show all working out, this is especially crucial for tasks with several marks. If they initially make an error, marks may still be awarded for part answers and also may be awarded for follow through to a correct answer from their working, even with an incorrect final response. In some task the incorrect final response may also be awarded a mark. Examples have regularly been 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.
In addition learners also need to ensure that they indicate if their values include indices to indicate whether a measurement is a volume or an area, as this is often an area where marks may not be awarded. In some cases learners had indicated only a correct answer with no working but some tasks require the working to be shown for full marks to be awarded correct. This may have been as a result of the learner completing their working out on a paper but learners need to be encouraged to transfer any such working out to the onscreen assessment as there is a risk they may not receive any marks for such tasks. In some cases this lack of working out made the difference for the learner between achieving and not achieving so it is crucial that centres advise learners of the importance of 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. e.g., giving a fraction as an answer, when the task asks for a percentage or decimal.
Learners should be guided to read questions more than once and in the case of paper based assessments can be encouraged to underline or highlight key information essential to the tasks.

Several learners are not awarded marks through not taking note of key command phases such as:

"Explain your answer"
"Show how ..."
"Is he/she correct"

These phrases indicate that more than a numerical answer may be required, and fulfils 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.
For both levels in some examples, 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 such cases this has usually resulted in no marks being awarded for that task. Some tasks require all working out to be shown so learners must be encouraged to ensure that they show all working, even if this has been completed on paper when undertaking an online assessment. Any

such working out should be transferred to the online assessment.

Learners also need to ensure that they use correct symbols, especially for online assessments, i.e. use of a colon when indicating a ratio; use of a forward slash (/) when indicating fractions to make it absolutely clear what the learner means.

There have been a range of assessments that have included a variety of suitable topics to engage learners of all ages and abilities. The assessments are generic 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.

A full suite of learning resources is available on the NCFE website that can provide 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.

Chief Examiner: Heather Peacock
Date: January 2020