4748-120 (E-volve) and 4748-220 (Paper-based) Functional Skills Mathematics Level 2

Chief Examiner Report

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For external use

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1 Introduction

The purpose of this document is to provide centres with feedback on the performance of candidates for 4748-120 and 4748-220 Functional Skills Mathematics Level 2.

Centres should read this report in conjunction with the Guidance for Delivery document.

2 Overall Performance

This report covers the period from January 2023 to October 2023.

Candidates are expected to adequately cover underpinning knowledge and problem-solving skills within the assessment, including completing part of the assessment without a calculator. Candidates are therefore required to undertake a two-part assessment.

	Part 1 **Calculator not permitted** **(25 minutes)**	**Part 2** **Calculator permitted** **(1 hour 20 minutes)**
Underpinning knowledge **(15 marks = 25%)**	10 single mark context free questions	5 single mark context free questions
Problem solving **(45 marks = 75%)**	2 problem solving questions with practical context (total 5 marks)	1 single mark check (for sense of given result) 9 problem solving questions with practical context (mark tariff between 2 and 6 marks each, total 39 marks)

Many candidates have coped well with the assessment requirements and have achieved pass grades. The resulting overall pass rate, 45%, for this assessment is encouraging.

However, a very significant percentage of candidates have performed poorly. Approximately 10% of candidates have achieved 10 marks or less.

2.1 Areas of good performance

A large number of candidates produced well worked solutions to the problems set. Many candidates coped well with both the isolated, context free questions -Underpinning Knowledge (UPK) and using their knowledge and skills to recognise and obtain a solution or solutions to a number of complex problems -Problem Solving (PS).

Many candidates coped with calculation requirements and understood the principles of basic operations (addition, subtraction, multiplication, division and BIDMAS) and could deal with fractions, decimals, percentages, ratios/proportion, and scaling. Basic geometry and algebra have been dealt with well by successful candidates.

Understanding and interpretation of scales, scale plans and various data presentations has been dealt with satisfactorily.

Statistical problems have been dealt with competently by many candidates, who can generally choose, and accurately calculate appropriate averages, including estimation from grouped data, and ranges. Successful candidates have also competently dealt with two event probability with tabulated data and probability trees.

Successful candidates have given clear explanations of their results and demonstrated understanding of the problem contexts.

2.2 Areas for development

2.2.1 General observations

Script marking shows that some candidates were not able to meet the demands of the Level 2 papers. In particular, candidates must be able to make accurate calculations using fractions, percentages, and ratios; round to given numbers of decimal places; read and apply scales; group data and make statistical calculations including probability.

Candidates are expected to show their working to be eligible for compensation marks in cases where they have not achieved a fully correct answer. This has been a particularly important issue for some online candidates who appear to be doing their working out on paper and neglecting to transfer some, or all, their working to the online script.

Some online candidates did not appear to have had sufficient practice in using the diagram or chart tools and have therefore lost a significant number of marks.

2.2.2 Underpinning knowledge (UPK) questions

There are 15 underpinning knowledge questions, generally with no contextual setting. Ten of these questions are in the 'calculator not permitted' section. In this section candidates have just under two minutes per question and therefore need to remain aware of the time limitations.

Many of the questions causing problems for the weaker candidates are calculations involving an understanding of fractions, percentages and ratios. Some involve basic geometry (calculation of angles); calculations of areas, perimeters, and volumes; and statistics questions including probability.

Many of the difficulties encountered by candidates in the UPK sections translate into difficulties in dealing with problem solving (PS) questions, where the same issues arise for solving questions in more complex contexts.

Areas where some candidates performed less well –

Underpinning Knowledge questions

The following underpinning knowledge question types were the ones that were less successfully attempted by more than half the candidates:

Underpinning knowledge	Examples/explanation
Multiplication and division using large numbers, including negative numbers with results needing decimal numbers	Some candidates found use of large numbers challenging, the decimal place position being particularly difficult, e.g. 27,000 ÷ 400 = 67.5 Candidates should use a point (full stop) to indicate decimal position, the use of a comma is not acceptable. i.e. 67.5 is acceptable but 67,5 is not. In the non-calculator section, a number of candidates were attempting to use grid methods for these (and other) calculations.
Addition and subtraction of numbers with decimals	Some candidates did not align numbers, including (different) numbers of decimal places, when adding and/or subtracting.
Multiplication of decimals	Some candidates found difficulty in placing the decimal point. e.g. 3.011 x 0.3 = 0.9033
Writing numbers given word version:	Many candidates had difficulty with positions and numbers of figures. e.g. four hundred and nine thousand and twenty three is 409 023 not 40900023 Some candidates were using full stops rather than commas to divide large numbers into thousand segments which then reads as an (incorrect) decimal figure.
Rounding to a given number of decimal places	Some candidates had difficulty with the instruction to round to a given number of places. e.g. 456.4783 to 2dp is 456.48

Approximation using rounding including fractions	Many candidates found difficulty with the concept of approximating figures for calculations and checking. e.g. an accurate approximation of 72 x 159 would be 70 x 160
Solving simple algebraic equations	Some candidates did not understand solving basic algebraic equations. e.g. solve for x the equation 5x – 6 = 29 e.g. find the value of b if a = 4, given 2b + a 2 = 8
Calculations using mixed, proper and/or improper fractions	Many candidates had difficulty understanding fractions. e.g. fraction of one number of another in simplest form - some candidates did not simplify or only partially simplified their answer. e.g. subtraction of improper fractions; addition of mixed and proper fractions Note: Candidates need to be aware of the answer box format shown above. e.g. multiplication and division of integers by a fraction $275 \times \frac{5}{11} = 125 \quad 45 \div \frac{5}{11} = 99$ Many candidates did not understand a 'cancelling' method for dealing with these calculations.
Calculation of angles in geometric shapes	Many candidates had difficulty with relating to and calculating from diagrams with given angles. e.g. angles in regular polygons e.g. angles found with reference to parallel lines
Calculation of areas	Candidates must know the formula for area of a circle and use the value for π if given – many candidates failed to use the fraction $\frac{22}{7}$ when given the instruction 'use $\pi = \frac{22}{7}$ '
Calculation of volumes and surface areas of 3-D objects	Many candidates did not know the formula for volume of a cylinder ($V = \pi r^2 h$) which is a requirement. Some candidates added dimensions (rather than multiplying) for volumes of cuboids. Many candidates did not understand given formulas for other 3-D objects. e.g. volume of cone $V = \frac{1}{3}\ \pi r^2 h$: a common mistake is the addition of h rather than multiplication by h
Probability	Many candidates did not understand two event calculations requiring multiplication of probabilities (many candidates added probabilities inappropriately). Candidates should understand that a probability cannot be >1 (100%)
Identification of a modal value	Many candidates found difficulty in identifying a mode from tabulated data.

2.2.3 Problem solving questions

There are 12 problem-solving questions, including two in the 'calculator not-permitted' section.

Many candidates found difficulty coping with the style and scope of problem- solving questions, given the number of different contexts presented.

There is little or no scaffolding within a question and little guidance given beyond a start point and a finish point. Candidates are expected to choose an appropriate approach and methods as well as carry out calculations. They will also be given opportunities to interpret information and are expected to provide explanations relating their results to the question context.

Areas where some candidates performed less well in problem-solving questions

Units

Misunderstanding units, particularly relating to linear dimensions (mm, cm, m and km) and those of time, prevented some candidates from successfully completing questions.

Many candidates did not show units either in their answers or workings. Although candidates will not be repeatedly penalised for this, the absence of units can lead to confusion for them as their answer develops.

Many candidates did not make use of the £ sign and some gave answers in incorrect money format,
e.g. an answer £107.30 written as £107.3 will be penalised.

Explanations

Problem solving questions may specify a requirement for explanation, sometimes asked for as 'comments'. Explanations of results in context have been a problem for many candidates as they missed an extra mark in questions that required 'rounding off' with a brief summary of how their results answered the problem outlined in the question.

The explanation should link with (refer back to) the problem stated in the question using values calculated.

Example of a problem	Explanation/Example of an expected answer
A company claims that the area rented for an exhibition last year was 4% smaller than the area on offer this year	*Result of calculation*: area last year is 5m2, this year it is 4.8m2 *Answer*: the company is correct *Explanation:* last year is 0.2m2 = 4% smaller this year.
A student wants the best deal for travel to and from a concert.	*Result of calculation*: return ticket costs £37, two single tickets cost £16 each *Answer*: the student should buy two single tickets *Comment:* two single tickets are £5 cheaper.

Questions involving graphical interpretation	Many candidates lost marks by omitting axis labels, failing to draw lines of best fit accurately (or at all) and drawing accurately using a straight edge (paper-based) or the straight line function (online).
	Many candidates were unable to extrapolate given graphs, and many did not read accurately from line graphs. e.g. some candidates mixed up readings by misunderstanding the axes.
	Explanations from lines of best fit often missed reference to trends (many candidates pick out specific plots rather than trends).
1 single mark check (for sense of given result)	Some candidates have difficulty with this question where there is an expectation that they will consider whether a result is sensible or not. There is usually no requirement to make a calculation (although this is optional) and candidates should be advised to look at given data or graphical evidence relating to a given comment or result. e.g. the dimensions of a door will not be 100m e.g. the average temperature in Manchester will not be 55°C e.g. graphical information can be misleading and misinterpreted

The following problem-solving question types were not successfully achieved by more than half the candidates.

Problem-solving questions	**Example**
Approximation	Some candidates did not use approximation/estimation to find simple fractions from large numbers.
	Many candidates did not attempt part of a question requiring a check of their answer by approximation.
Percentages / fractions	Many candidates did not accurately compare values as percentages/fractions of amounts.
	Some candidates did not recognise a realistic answer. e.g. agents' fees are not greater than price of object sold.
Proportion / fractions	Many candidates did not accurately calculate quantities of materials required to make solutions / mixtures, given concentration as a fraction or ratio. e.g. ml disinfectant to make solution of given concentration.
Ratio/proportion	Many candidates did not make the link between direct proportion and ratio. e.g. calculating a gradient from scaled diagram measurements.
Percentage change	Some candidates did not accurately calculate values requiring percentage changes involving either decreasing or increasing values. e.g. calculation of compound interest (increasing value)

	e.g. calculation of original price from price + VAT (decreasing value).
Conversion factors	Many candidates misunderstood given conversion factors. e.g. conversion of euro to £ should calculate as value in £ less than euro. e.g. similarly kg to lbs.
	Some candidates used linear measure from scaled diagram to calculate area and then applied the linear conversion to the area. e.g. area calculated 40 square yards will not convert to m^2 using 1yard = 0.9144m.
Speed/ distance/ time calculations	Many candidates did not recognise the need to ensure calculations were made using the correct units. e.g. a calculation for mph means that time used in the equation must be in hours, i.e. time given in minutes in a question would need to be converted to hours.
Use of given formulas	Many candidates could not use given formulas accurately. e.g. misunderstanding that cw in a formula means c x w not c + w.
	e.g. not following the rules of precedence of operators (BIDMAS) particularly brackets.
Scaling and scaled diagrams	Many candidates found difficulty scaling up from diagrams where scale was given in ratio form (1:50 etc).
	Some candidates did not read scale diagrams accurately and sometimes this was compounded by failure to convert measurements to an appropriate order. e.g. mm to m.
	Many candidates did not draw the side elevation of a building accurately to scale.
Area	Many candidates made incorrect calculations of areas of complex shapes. e.g. rectangles having additional triangles (trapezium) e.g. area of rectangle with half circle.
Volume (capacity)	Some candidates added rather than multiplied dimensions to give volume.
	Many candidates did not recognise thin depths on diagrams that should have been multiplied by an area to give volume. e.g. a disc-like base should have been treated as a cylinder.
Probability	Many candidates did not fully understand probability trees – particularly the need to multiply going across the diagram.
	Some candidates were unable to calculate two event probability from tabulated data.
Estimation of mean from grouped date	Some candidates did not attempt these questions. Some did not understand how to find Σf from correctly calculated fx values.

Mean, median, mode	Some candidates confused the terms and therefore gave incorrect answers. Candidates should understand that they are all averages, but different. Some candidates thought that average was synonymous with mean only.
	When given statistical values to compare with calculated values, some candidates did not use the same statistic. e.g. a given median requires comparison with a calculated median (not a mean or mode).
Range	Many candidates saw range as an alternative average rather than a description of the consistency or variation of the data.

3 Recommendations/Advice for centres

The assessment, is based on the DfE Subject content functional skills Maths

The assessment is based on the 28 Subject Content Statements (SCS), and also the general descriptions preceding each section. The content at Level 2 subsumes and builds upon the content at all the lower levels (ie Entry 1 to Level 1). The Level 2 Functional Skills Mathematics is considered to be the equivalent of GCSE grade 4/5.

Centres should consider carefully whether a candidate is operating at an appropriate level for entry at Level 2.

There are two platforms, paper-based and online available for this assessment. Centres should ensure that an appropriate choice of platform is made for candidates based on each candidate's need and preference.

Centres should advise candidates about appropriate 'exam technique' particularly with regard to attempting questions in order. Candidates may attempt questions in any order.

Candidates who choose to access assessment online need to be prepared not only in terms of the prescribed Functional Skills Standards, but also in terms of using the E-volve platform. They must be well practiced in the use of the presentation tools (tables, diagrams, charts and graphs). This is particularly important for candidates now sitting the new HTML online versions, as the graphical tools operate differently from previous versions. Centres are reminded that sample assessments as well as familiarisation tests are available to use on Open Assess.

Online candidates must also understand how to insert sufficient text, e.g. to show calculations and working, so that potential compensation marks, in the event of incorrect answers, are accessible. The importance of showing working in paper-based assessment should be stressed for the same reason.

Additional Information

Centres should be aware that pass marks may vary from paper to paper as a result of an awarding process undertaken by City & Guilds. Any difference in pass marks reflects the perceived and actual difference in demand of the exam papers, including the source materials and the questions themselves. Therefore, it is possible that two candidates with the same score may have different overall results (pass or fail) if they sat different papers.

Centres are reminded of the Indicative Pass Mark document on the City & Guilds website.

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City & Guilds

5-6 Giltspur Street

London EC1A 9DE

www.cityandguilds.