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

Chief Examiner Report

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Table of Contents

Document revision history 1
1 Introduction 3
2 Overall Performance 4
2.1 Areas of good performance 5
2.2 Areas for development 5
2.2.1 General observations 5
2.2.2 Underpinning knowledge (UPK) questions 6
2.2.3 Problem solving questions 8
3 Recommendations/Advice for centres 12
4 Additional Information 13

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 April 2022 to December 2022.

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%)**	between 2 to 5 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 achieved well within these assessment requirements. The overall pass rates have improved, and a number of candidates have achieved high marks. However, approximately 10% of candidates achieved 10 marks or less, indicating that they were less well prepared for an assessment with Level 2 requirements. For example, some candidates were unable to complete basic calculations involving fractions and/or percentages and did not attempt the problem-solving questions in Part 2 of the assessment.

2.1 Areas of good performance

A large number of candidates produced well worked solutions to problems set, both on screen and on paper.
Many candidates handled the isolated and context free questions and used their knowledge and skills to recognise and obtain a solution to a number of complex problems. These candidates achieved correct answers to most of the underpinning knowledge items and scored well in the non-calculator section

Similarly, candidates understood the principles of basic operations (addition, subtraction, multiplication, division and BIDMAS) and dealt with fractions, decimals, percentages, ratios/proportion and scaling within both types of question. Basic geometry and algebra were dealt with well by successful candidates.

Statistical problems were dealt with competently, including accurately calculating averages and estimating means from grouped data and ranges. Two-event probability questions using tabulated data and probability trees were completed well by some candidates. Similarly, understanding and interpretation of scales, scale plans and various data presentations has been dealt with satisfactorily.

Successful candidates gave 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 are not able to meet the demands of the Level 2 papers. In particular the need to make accurate calculations using fractions, percentages and ratios; rounding to given numbers of decimal places; reading and applying scales; grouping data and making statistical calculations including probability.

Candidates are expected to show their working in order to be eligible for compensation marks in cases where they have not achieved a fully correct answer.
Some online candidates do not appear to have had sufficient practice in using the diagram or chart tools and therefore lost a significant number of marks.

2.2.2 Underpinning knowledge (UPK) questions

There are a total of 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 are calculations involving an understanding of fractions, percentages and ratios. Some involve basic geometry (calculation of angles); calculations of areas, perimeters and volumes; and simple statistics questions including probability.

Areas where some candidates performed less well –

Under Pinning Knowledge questions

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

Underpinning knowledge	Examples/explanation
Writing numbers given word version:	Many candidates have difficulty with positions and numbers of figures e.g. forty nine thousand and twenty three is 49 023 not 4900023 e.g. 7.95 million is 7 950 000 not 7000000950000
Identify largest amount from a mix expressed as words and figures	e.g. understanding nought point three million, two hundred thousand and 1,531,491
Division and multiplication with large numbers	Some candidates find use of large numbers challenging, the decimal place position being particularly difficult, e.g. 27,000 ÷ 400 = 67.5 For the non-calculator section, a number of candidates are attempting to use grid methods for these (and other) calculations. For many, the method itself seems to evoke more confusion than the calculation.
Multiplication and division using whole numbers, including negative numbers	candidates sometimes neglect to take account of negative signs, e.g. -12 x 1400
Approximation using rounding	some candidates do not understand using approximation in calculations, e.g. an accurate approximation of 72 x 159 would be 70 x 160
Simple algebraic equations	e.g. solve for x the equation 5x – 6 = 29 e.g. find the value of b if a = 4, given $2b + \frac{a}{2} = 8$

Multiplication of decimals	e.g. 3.011 x 0.3- confusion of decimal position
Recognising relationships between percentages, fractions and decimals. Fraction as a percentage; percentage as a fraction; decimal as a fraction (simplest form)	e.g. $\frac{7}{20}$ is 35% ; 60% is $\frac{2}{5}$; 0.875 as a fraction is $\frac{7}{8}$ Some candidates do not simplify or only partially simplify their answer.
Number as a percentage of another	e.g. some candidates thought that 27 / 27 was 0% or 1%
Calculation of the percentage of a number	e.g. 24% of 600; percentage including decimal place, e.g. 3.5% of 700
Calculations using mixed, proper and/or improper fractions	e.g. fraction of one number of another in simplest form - some candidates do not simplify or only partially simplify their answer. e.g. subtraction of improper fractions**;** addition of mixed and proper fractions**;** $5\frac{3}{8} - \frac{9}{16}$ = 4 15/16 *Note: Candidates need to be aware of the answer box format shown above* e.g. multiplication and division of integers by a fraction $275 \times \frac{5}{11} = 125 \quad 45 \div \frac{5}{11} = 99$
Rounding to a given number of decimal places	some candidates give more places or fail to round correctly, e.g. 456.4783 to 2 dp is 456.48
Ratios	difficulties with simplest form, e.g. 49 : 21 :14 simplifies to 7 : 3 : 2
Conversion of currencies (with calculator)	with given conversion factor
Using BIDMAS conventions in calculation	
Misunderstanding of index	e.g. $8^2 = 64$ not 16
Calculation of speed, distance and time	e.g. how long does it take to travel 360 miles at 60 miles/hour
Surface area and volume of a cube	some candidates add dimensions
Volumes of 3-D shapes	e.g. pyramid from given formula

Circumference of circle	candidates must know formula and are expected to use given value for π, e.g. $\frac{22}{7}$ must be used if given.
Issues with co-ordinates	e.g. co-ordinates from constructed triangle on grid.
Calculation of angles in geometric shapes, such as polygons, and between parallel lines.	
Plans and elevations	identification from 2-D diagrams
Probability for two events	

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2.2.3 Problem solving questions

There is a total of 12 problem-solving questions, including two in the 'calculator not-permitted' section.

Many candidates have 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 will be expected to choose an appropriate approach and methods as well as carry out calculations. They will also be given opportunities to interpret information.

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, prevents some candidates from successfully completing questions. Many candidates did not show units either in their answers or workings. Although a candidate will not be repeatedly penalised for this, the absence of units can lead to confusion for the candidate as their answer develops.

Similarly, the £ sign is not used and answers are given in incorrect money format.

e.g. an answer £107.30 written as £107.3 will be penalised.

Explanations: Explanations of results in context are a problem for many candidates as they miss an extra mark in questions that require 'rounding off' with a brief summary of how their results answer the problem outlined in the question.
Problem-solving questions may specify a requirement for explanation. Candidates must be aware that, although marks will be awarded for relevant calculations, full marks will require suitable explanations using their results, preferably with reference to numerical values calculated. The explanation should link with the problem stated.

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
Graphs and charts	Many candidates lose marks through omitting axis labels, failing to draw lines of best fit accurately or with a straight edge in paper-based versions. Explanations from lines of best fit often miss reference to trends (many candidates pick out specific plots rather than trends)
Check for sense	Many candidates struggled with this type of question where there is an expectation that they will consider whether a result is sensible or not. 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, eg 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	Use of approximation/estimation to find simple fractions from large numbers and for checking answers
Calculation of VAT from full price	e.g., cost of object before VAT added, given price including VAT
Percentages / fractions	Comparison of values as percentages/fractions of amounts, some candidates do not recognise a realistic answer e.g. agents' fees greater than price of object sold
Proportion / fractions	e.g.**,** quantities of materials required to make solutions, given concentration as fraction or ratio
	e.g. ml disinfectant to make solution of given concentration
Ratio / proportion	Use of comparative proportion, e.g. ramp gradient from scaled diagram
Calculation of minimum numbers of items to produce a given profit	e.g. working out material costs from tabulated data and determining a break-even point
Understanding simple balance sheets	e.g., simple profit and loss calculations including negative numbers
Percentage change	e.g. compound interest
Conversion factors	e.g. failing to convert linear measure (applying linear conversion factor to area measure) when finding area from scale diagram
	e.g. conversion lbs< > kg given conversion factor
Speed/ distance/ time calculations	
Weight of food goods that can be purchased for given amount of money given cost per kg	Fractions of kg can be purchased e.g. 2.5kg of potatoes
Calculation of volume of cylinders	With associated percentage increases of size
Scaling and scale diagrams	e.g. drawing top plan view to scale given 3-D sketch with dimensions e.g. scaling up from scale diagrams, given scale.

	e.g. completion of given template plan with scaled items. Many online candidates struggled to use the diagram tool efficiently.
Use of given formulae	Misunderstanding of BIDMAS implications, e.g. brackets and indices
	e.g. calculation of volume using given formula (of shape) to calculate mass from given density formula
Probability	Involving two events and probability from table with two variables
Estimation of means from grouped data	e.g. use of estimation of mean and calculation of mode from grouped data for comparison with given data – many candidates did not work with both mean and mode as required for a full answer.
Range	Many candidates see range as an alternative average rather than a description of the consistency or variation of data, which can lead to contradictory explanations of results e.g. calculation and application of range to confirm variability

3 Recommendations/Advice for centres

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

Centres should understand that 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). Centres should also be aware that 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 practised in the use of the presentation tools (tables, diagrams, charts and graphs).

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.

4 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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