

**3850 Certificate in Mathematics**  
**Chief Examiner's Report – July 2022**

**Introduction**

This report is based on the cohort which sat the Mathematics paper in July 2022.

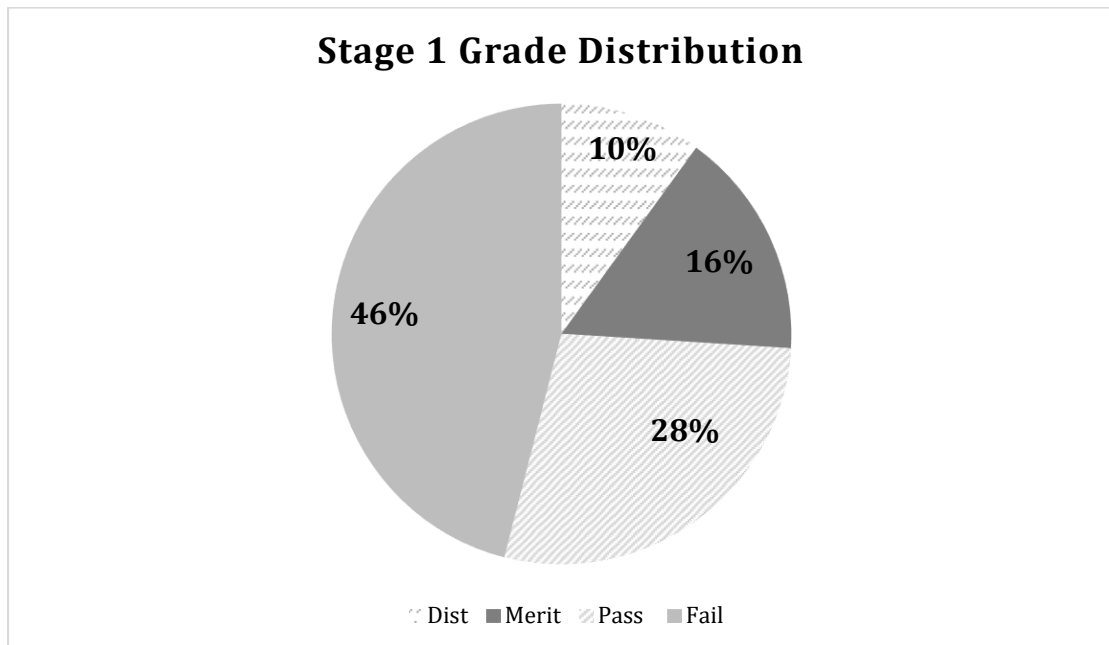
The question paper is based on the learning outcomes and assessment criteria for 3850 as stated in the Qualification Handbook. Many of the questions are based on the sample contexts but questions may be based on any aspect of the assessment criteria. This report refers to the assessment criteria (AC) causing particular concern to candidates.

**General comments**

**Stage 1**

**Grade Distribution**

	<b>Stage 1</b>
<b>Number of Candidates</b>	984
<b>Distinction</b>	9.76%
<b>Merit</b>	15.75%
<b>Pass</b>	28.25%
<b>Fail</b>	46.24%



Candidates appeared relatively confident when working with whole numbers but had problems working with fractions, including decimal fractions, and converting within a system. Some aspects of the sections covering Measurement and standard units were challenging, and Shape and space continues to cause problems. However, most candidates attempted all the questions and candidates appear relatively confident with tables, graphs and charts.

Candidates are generally finding problems in the same areas as noted in the Chief Examiner's report for previous years.

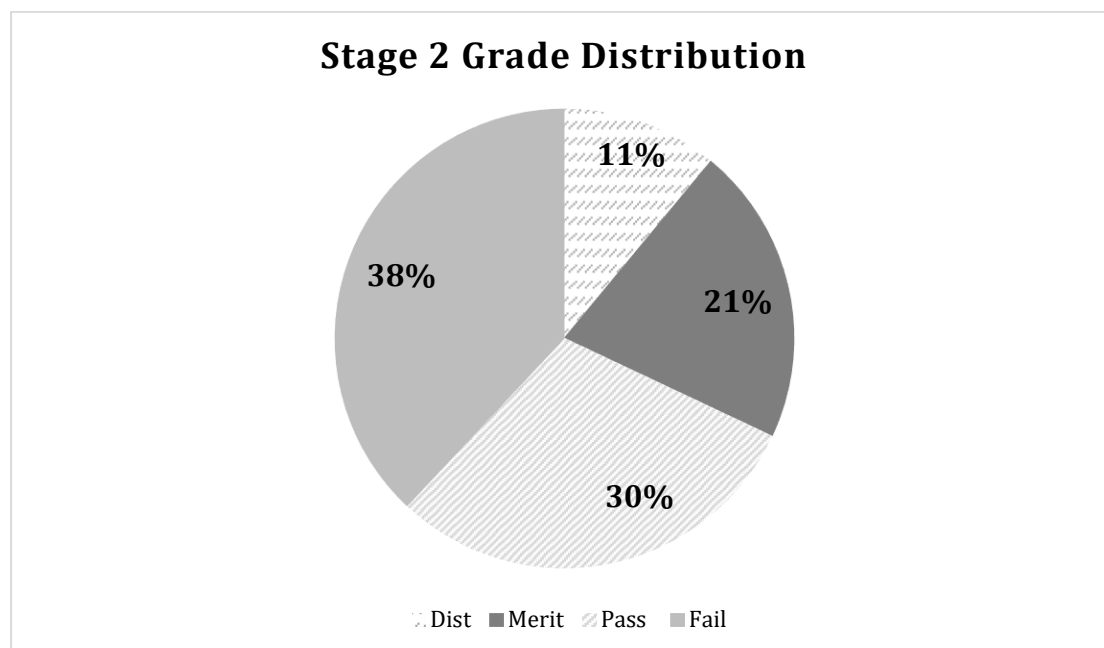
Unit		Comments
101	Number	<p>Candidates generally performed well in this section, particularly finding the second longest time, counting the cake cases, and finding the missing numbers in calculations. Further improvement was noted in candidates writing an amount expressed in words in figures.</p> <p>Recognising decimal fractions and common fraction equivalences for halves and quarters was challenging and some candidates just rearranged the figures given in the question.</p> <p>Rounding to the nearest dollar attracted more responses to the distractor rounding to ten cents than to the correct answer.</p>
102	Measurement and standard units	<p>Most candidates were able to measure the line correctly and many were able to choose the correct diagram for turning the dial a quarter-turn anti-clockwise.</p> <p>Candidates found aspects of this section challenging. Some candidates were unable to estimate weight and capacity and measuring temperature was challenging. Expressing metres in centimetres was difficult for many candidates with the most popular choice using a conversion of 10 cm to a metre.</p>
103	Pictograms, tables, graphs and charts	<p>Candidates performed well in this section, particularly in extracting information from a table. However, only a third of candidates were able to select what was needed to finish the bar chart.</p> <p>Most candidates were able to recognise a transaction taking money out of an account as a withdrawal.</p>
104	Shape and space	<p>Many candidates found this section challenging. Around a third of the cohort had problems with tessellation.</p> <p>Slightly more candidates found the perimeter instead</p>

		<p>of the area of squares and rectangles, even when the squares were shown on the rectangle.</p> <p>Less than a quarter of the candidates were able to find the volume of a cuboid shown as a 3D diagram with many adding the dimensions shown. Similarly, the symmetry question was challenging for many candidates with only a quarter selecting the correct answer.</p>
105	Operations on whole numbers	<p>This section attracted a good percentage of correct answers. Over three-quarters of the candidates gave correct answers for addition and a similar proportion for one of the subtraction questions. However, when the question asked 'find the difference', this proportion fell considerably. Just under a half of the candidates gave the correct answers for multiplication and division.</p> <p>Over 2% did not attempt the multiplication and division questions that were not set in context.</p>
106	Operations on decimal fractions	<p>Some candidates found this section challenging. Subtraction and multiplication out of context caused the most problems for the candidates and a small number of candidates did not attempt these.</p>
107	Operations on common fractions	<p>Candidates found this section challenging. Less than a quarter could add fractions or subtract fractions. Candidates often added the numerators and added the denominators and used a similar approach for subtraction. However, almost half demonstrated an understanding of 'a quarter of' in context.</p>
108	Appropriate strategies and mathematical terms	<p>Candidates found this section challenging. Under half of the candidates could recognise a suitable equation or a suitable check. Only slightly more showed an understanding of mathematical terms in everyday conversation.</p>

## Stage 2

### Grade Distribution

	Stage 2
Number of Candidates	8,955
Distinction	10.47%
Merit	21.07%
Pass	30.41%
Fail	38.05%



Candidates appeared relatively confident when working with whole numbers and decimals (apart from division). They appear to have problems with some aspects of Percentages and with Operations on common fractions. Average and range and Shape and space caused the most problems together with Measurement and standard units. There were still some challenges with the interpretation of Tables, graphs, charts and maps.

Candidates are generally finding problems in the same areas as noted in the Chief Examiner's report for previous years.

201	Place value	Candidates generally performed well in this section. However, candidates gave a variety of responses to the question relating to recognising hundredths.
202	Measurement and standard units	Candidates found this section challenging. Over three-quarters were able to work with imperial measurements. However, over half found it difficult to convert, and work with, metric units of length and mass, or calculate the age of someone.

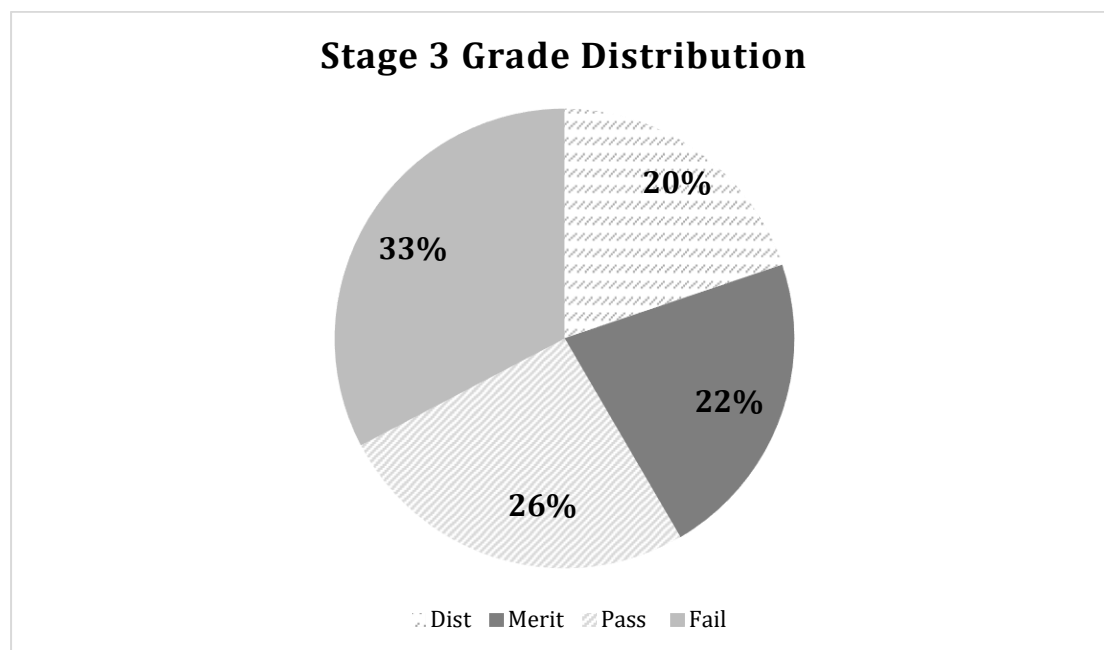
203	Operations on whole numbers	Candidates generally performed well in this section. Division by a two-digit number caused the most problems but almost half of the cohort still chose the correct answers.
204	Operations on decimal fractions	Some candidates found this section more challenging than working with whole numbers. Again, division caused problems. This was particularly noticeable when candidates were asked to multiply by ten, then divide by 100.
205	Operations on common fractions	Candidates found this section challenging. Just under half of the cohort were able to recognise equivalencies. The most common incorrect answers for addition and subtraction were to add the numerators and then add the denominators or subtract the numerators and then subtract the denominators.
206	Percentages	Candidates found aspects of this section challenging. They could generally express marks out of 10 as a percentage but under half could find 20% of an amount and the question asking for the value of a discount received a variety of responses.
207	Conversions between common fractions, decimal fractions and percentages	Candidates found this section challenging. Although they could generally express nine-tenths as a decimal fraction, over half had problems finding the highest value from a list of common fractions, decimal fractions and percentages.
208	Orders of magnitude	Some candidates found this section challenging. The main challenge was writing a number to one decimal place where candidates seem divided between rounding up or rounding down.
209	Ratio and proportion	Candidates generally performed well on two of the questions in this section. However, only a third of candidates chose the correct answer for the length of the wall on the plan.
210	Average and range	Most candidates found this section challenging with less than a quarter choosing the correct answer for the average mean and the range. The most popular answer for all these questions was the mode. Only the average mean and range are tested at this level.
211	Elementary algebra	Some candidates found this section challenging. They were generally able to substitute values into a formula but less than half could find the missing values.

212	Shape and space	<p>Candidates found some parts of this section challenging. Over half of the candidates were able to give the correct answer for the missing angle but the relationship between equilateral triangles and isosceles triangles proved challenging for most candidates as was the question on matching the congruent shapes.</p> <p>Candidates generally found the questions on area, perimeter and volume difficult, with around a third choosing the correct responses. Adding the measurements shown was a popular choice.</p>
213	Tables, graphs, charts and maps	<p>Some candidates found this section challenging. The pictogram and line graph questions attracted more correct responses than the bar chart or the frequency table questions.</p>

### Stage 3

#### Grade Distribution

	Stage 3
Number of Candidates	13,351
Distinction	20.37%
Merit	21.75%
Pass	25.50%
Fail	32.57%



Candidates appeared relatively confident when working with integers, percentages, and decimals but still experienced problems working with fractions. The section on Ratio and proportion was more challenging at this level and range continued to cause problems. Both Measurement and standard units and some aspects of Shape and space caused problems.

301	Operations on integers	Candidates generally performed well in this section. However, only a third could identify the statement that was not true when different terms to describe numbers were used. Over half of the candidates could not compare temperatures when one involved a negative number and a similar number had problems writing a number as a binary number.
302	Operations on decimal fractions	Candidates generally performed well on this section. Just under half had problems multiplying by 0.05.
303	Operations on common fractions	Candidates found some parts of this section challenging, particularly subtraction involving 'borrowing'.

		Some candidates had problems with multiplication and division.
304	Order of operations	Some candidates had problems with the order of operations but over half chose the correct response for the flow chart.
305	Percentages	Over half of the candidates performed well in this section. The question on depreciation attracted the most incorrect responses.
306	Conversions between common fractions, decimal fractions and percentages	This section was challenging for some candidates. Most candidates could express a percentage as a decimal fraction but fewer could express a common fraction as a decimal fraction or choose the discount voucher that gave the cheapest price for the chair.
307	Ratio and proportion	Candidates found some aspects of this section challenging. Less than a third could work out the actual distance using the scale from a map but over three-quarters could calculate the time taken for 6 workers to complete a job when given the time it would take for 4 workers to complete the same job.
308	Measurement and standard units	Many candidates found this section challenging. Less than a third could work with inches and yards and only slightly more could work with centilitres and millilitres. However, two-thirds of the candidates were able to work out the time in Tokyo when they were given the time in Bridgetown, Barbados.
309	Reading and interpreting tables of figures, data and scales	Candidates answered this section well, although a few candidates did not attempt an answer.
310	Elementary statistics	Candidates generally found this section challenging. The pie chart question attracted a spread of responses. Approximately a third of candidates were able to answer the question on range and a similar number for the question on average mean. The questions on median price and probability were answered correctly by slightly more candidates but still by less than half of the cohort.
311	Elementary algebra	Candidates answered most of the questions in this section well. They found solving equations easier than deciding on the correct formula. Just under half of the candidates were able to identify the period with the sharpest rise in sales from the graph.
312	Shape and space	Candidates found some questions in this section challenging. The majority of candidates could not calculate the area of the shape with many confusing this with perimeter. The most popular answer for



		<p>volume also used the perimeter to multiply by length and almost 2% of the cohort chose not to give any answer.</p> <p>Over half of candidates had problems finding the area of a circle but a similar number were able to use Pythagoras' theorem to find a missing length.</p> <p>Candidates appeared to have problems understanding of the idea of similarity and the effect of doubling the length of the sides of a cube, with many candidates thinking that this doubles the area.</p>
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### General Advice for Centres

Candidates can lose marks owing to examination technique. The following should be a point of focus when preparing candidates for the exam:

#### Reading

- Read the question carefully.

#### Rough Work

- Use the space on the paper for any calculations or other rough work.

#### Timing

- There are 60 questions and 120 minutes, so this is 2 minutes per question. The candidates should be encouraged not to spend too long on a question. They should answer the questions they find easier and come back to the harder questions. It is important **not to forget to come back**.
- Candidates should attempt all questions

#### Ordering

- The correct answer can be a, b, c or d for each question. Sometimes two consecutive questions will have the same letter as the correct answer. The paper does not have an equal number of correct answers for each letter.

#### Amendments

- Candidates should be shown how to change their answer

#### Focus

Diagnostic and formative assessments will identify areas that may need further teaching and learning for individual candidates. This report refers to the assessment criteria causing particular concern to candidates.

Generally, centres should ensure candidates have an understanding of what a fraction is to enable them to progress through the stages and the different demands for calculations with fractions.

At Stage 1, candidates should be aware of different terms for the four operations: addition, subtraction, multiplication and division. In particular from this paper, 'find the difference'.

At Stage 2, candidates should be aware of the different terms for average. At this level, candidates do not need to know the mode, they need to calculate the average mean, but the most common response is the mode.

Candidates should know that perimeter is the distance around a shape and is measured in linear units. They should know that area is the space inside the shape, and this is measured in square units. The most common response for area is the perimeter.

At Stage 3, candidates should be aware of the different terms for average: mean, median and mode. At this level, they need to be able to calculate each of them, but mode is still a popular response for both mean and range.

Candidates should know that perimeter is the distance around a shape and is measured in linear units. It is not sufficient to add up the numbers shown at this level, as all the measurements may not be shown.

They should know that area is the space inside the shape, and this is measured in square units. Again, all the measurements may not be shown.