

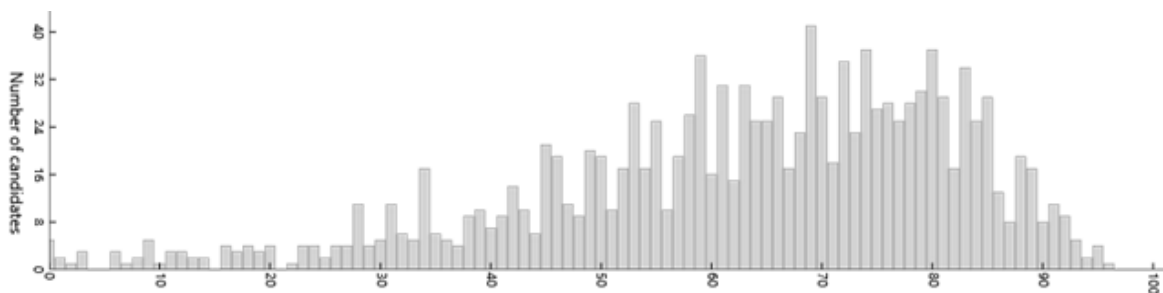


## Summary report of the 2023 ATAR course examination report: Mathematics Specialist

Year	Number who sat	Number of absentees
2023	1297	18
2022	1350	28
2021	1503	18
2020	1526	23

The number of candidates sitting and the number attempting each section of the examination can differ as a result of non-attempts across sections of the examination.

### Examination score distribution



#### Summary

Attempted by 1295 candidates                      Mean 62.65%                      Max 95.62% Min 0.00%

Section means were:

Section One: Calculator-free	Mean 62.58%		
Attempted by 1295 candidates	Mean 21.90(/35)	Max 34.64	Min 0.00
Section Two: Calculator-assumed	Mean 62.70%		
Attempted by 1292 candidates	Mean 40.75(/65)	Max 62.81	Min 0.00

#### General comments

The 2023 Mathematics Specialist examination appeared to be very well received by almost all candidates. Ample opportunities were provided to demonstrate knowledge of standard techniques and related concepts. The mean score of 62.65% compared favourably with the 2022 mean of 61.78%, suggesting a very similar standard compared to last year. The performances in the Calculator-free section (mean 62.58%) and Calculator-assumed section (mean 62.70%) were similar.

The more able candidates scored well as indicated by the good number scoring above 80%. Question 8, arguably the most challenging question on the examination, enabled the top candidates to showcase their ability. Question 19 part (d) provided candidates the opportunity to relate several ideas and to show a depth of understanding.

The distribution of marks indicated that the examination was very effective in discriminating between candidates. There were slightly fewer candidates this year that were not able to attempt some questions.

The length of the paper was deemed to be appropriate. The last question (Question 19) had high participation rates with only part (e) showing a slight decrease in the number of candidates attempting to answer.

### *Advice for candidates*

- Check your work from one line to another as you write your response, rather than checking at the end of the examination.
- Write your digits legibly. Remember that if the marker cannot read your answer, then the appropriate marks cannot be awarded.
- Ensure that there is a clear conclusion to your answer. Markers should not be expected to search for the final answer amongst a page full of numbers if there is no clear sequence or conclusion.

### *Advice for teachers*

- Improve students' understanding of the intersection of planes when there is no unique solution.
- Strengthen general algebraic processes that are assumed for this subject, in particular, the multiplication or expansion with brackets.
- Test students' recall of exact trigonometric values regularly throughout the course.

## **Comments on specific sections and questions**

### **Section One: Calculator-free (48 Marks)**

Candidates performed very well in:

- identifying the coefficients in the rational function (Question 1)
- evaluating a definite integral using a given substitution (Question 3)
- solving the complex number equation (Question 6).

Areas where candidates experienced difficulty were:

- working with a complex polynomial in not being able to apply the distributive property correctly in expanding an expression (Question 2)
- determining the domain so that a function composition is defined (Question 4 part (c))
- the use of appropriate mathematics vocabulary (Question 5 part (a))
- writing the solution for the case where planes intersect in a line (Question 5 part (c))
- algebraic errors made in not being able to simplify the integrand correctly (Question 7 part (b)).

### **Section Two: Calculator-assumed (89 Marks)**

Candidates performed very well with:

- finding the intersection of a line and sphere using vectors (Question 9)
- working with the slope field differential equation (Question 11)
- the distribution of the sample mean (Question 13)
- the volume of solid of revolution (Question 17).

Areas where candidates experienced difficulty were:

- the use of appropriate mathematics vocabulary (Question 10 parts (b) and (d))
- poor presentation of work with 3D vectors (Question 14 part (d)) and little explanation of what was being done.