

# Examination Conventions 2021–22

## Final Honour School of Mathematics and Philosophy Part A

### 1 Introduction

This document sets out the Examination Conventions for marking and classification in examinations in the **Final Honour School of Mathematics & Philosophy Part A**. Examination conventions are the formal record of the specific assessment standards for the course or courses to which they apply. This document explains how your work will be marked and how these marks will be used to derive your final classification for Parts A and B.

The formal procedures for the conduct of University examinations are established by the University’s Education Committee. The Proctors have responsibility for the conduct of examinations in accordance with those procedures. The Proctors may be consulted by chairs of examiners, or by senior tutors on behalf of examination candidates in their college, on matters arising in the conduct of exams.

The examination conventions applying to examinations in Mathematics & Philosophy in any given academic year are reviewed in Michaelmas Term of that year by the Joint Committee for Mathematics and Philosophy, and must then be approved by the Mathematical, Physical and Life Sciences Division, and by the Humanities Division, following consideration by the Mathematics Teaching Committee, and by the Philosophy Undergraduate Studies Committee.

The Board of Examiners may only make deviations from these conventions in exceptional circumstances, subject to the direction of Mathematics Teaching Committee, Philosophy Undergraduate Studies Committee, and the Proctors. This document is in all ways subsidiary to the current:

- *Examination Regulations*, in particular “Regulations for the Honour School of Mathematics and Philosophy” and “Regulations for Philosophy in all Honour Schools including Philosophy”
- *Examinations and Assessment Framework*

Further information set out for examiners can be found in the appendices of the Final Honour School of Mathematics Part A examination conventions:

[https://www.maths.ox.ac.uk/system/files/attachments/PartA\\_8.pdf](https://www.maths.ox.ac.uk/system/files/attachments/PartA_8.pdf)

### 2 Progression Through University Examinations

To qualify for your BA or MMathPhil in Mathematics and Philosophy you must pass a First and Second Public Examination. The First Public Examination in Mathematics and Philosophy is currently called the Preliminary Examination and is taken at the end of the first year. You must pass the Preliminary Examination before you can be admitted to the Second Public Examination.

The Final Honour School comprises three parts. Mathematics & Philosophy candidates for both the BA and the MMathPhil take Part A at the end of the second year and Part B at the end of the third year. Part A consists entirely of Mathematics subjects. In Part B both Mathematics and

Philosophy subjects are examined. There is no requirement of a minimum standard to be achieved in Part A in order for a candidate to proceed to Part B. Candidates are classified on the basis of Parts A and B together. Though Part A candidates are not classified at that stage, the rules for classification in Parts A + B are included in this document so that Part A candidates are aware how their marks in this examination enter into the classification process for Parts A + B, and since MP Part A candidates are studying Philosophy subjects during that year, the marking conventions for Philosophy are also included.

Any candidate who wishes to leave at the end of their third year and who satisfies the Examiners may supplicate for a classified BA in Mathematics & Philosophy at the end of Part B with the classification they have received in Parts A and B together. In order to proceed to Part C, a candidate must be awarded an Upper Second Class or higher in the combined classification of Parts A and B.

Candidates for Part C receive a separate classification based on their USMs in the Part C examination. A candidate achieving Honours, that is, an average USM  $\geq 40$ , is permitted to supplicate for the degree of MMathPhil. A candidate who in Part C fails to achieve Honours (that is, any candidate whose average USM in Part C is less than 40) may supplicate for a BA with the classification obtained at the end of Part B.

Successful candidates may supplicate for one degree only – either a B.A. or an MMathPhil. Whilst the MMathPhil is doubly classified a candidate will not be awarded both a BA degree and an MMathPhil degree, with two associated classifications.

### 3 Part A Examination Papers

Part A consists of two core papers, A0 and A2, papers A3, A4, A5, and A8 relating to the long options and Paper ASO relating to the short options. Paper A2 is of 3 hours in duration, whilst the remaining papers are of 1.5 hours' duration.

In all papers, each question is worth 25 marks and candidates may submit answers to as many questions as they wish. Details are given below of which questions count towards a candidate's total mark.

Each question should be divided into two to four parts and an indication of the raw marks available for each part of each question should be given on the question paper.

Candidates are required to offer Papers A0 and A2 and also two papers from Papers A3, A4, A5, A8, and ASO.

#### **Paper A0 Linear Algebra**

This core paper consists of three questions and the best two answers will count towards a candidate's total for the paper.

#### **Paper A2 Metric Spaces and Complex Analysis**

This core paper consists of six questions and the best four answers will count towards a candidate's total for the paper.

#### **Long Option Papers**

The long option papers consist of three questions and the best two answers will count towards a candidate's total for the paper. They examine the long options below:

- A3 Rings and Modules
- A4 Integration
- A5 Topology

- A8 Probability

### **Paper ASO Short Options**

This paper will contain one question on each of the short options below. The best two answers will count towards a candidate's total for the paper.

- Number Theory,
- Group Theory,
- Projective Geometry,
- Multidimensional Analysis and Geometry,
- Integral Transforms,
- Calculus of Variations,
- Graph Theory,
- Special Relativity,
- Mathematical Modelling in Biology.

## **4 Examination Conduct**

Part A candidates will receive information from the examiners about the conduct of the examination they will be sitting in Trinity Term of the 2021-22 academic year. Examiners' Notices to Candidates from last year, which show the sort of information that will be provided, can be found on the Mathematical Institute website at <https://www.maths.ox.ac.uk/members/students/undergraduate-courses/examinations-assessments/examination-conventions>, past notices will be superseded by this year's notices.

## **5 Penalties for Non-attendance**

Rules governing non-attendance at examinations and any consequent penalties are set out in full in the Examination Regulations (Regulations for the Conduct of University Examinations, Part 14). If you will be prevented by illness or other urgent cause from attending one of your examinations you should contact your college office or college tutor as soon as possible.

In cases where the Proctors do not believe there are satisfactory reasons for non-attendance or an application to the Proctors has not been submitted, this will result in the technical failure of that exam paper. The examiners will award a mark of 0 for that paper. A student with a technical fail on one paper may enter to resit that paper on at most one subsequent occasion, at the time of taking their Part B examinations. The University Standardised Mark for the resit of the exam paper will be capped at 40. A student with a technical fail on two or more papers will be considered not to have completed Part A and will have to resit all of the Part A exam papers before proceeding to Part B. The marks of a student resitting all papers will not be capped.

## **6 Marking conventions**

Examination scripts, theses, dissertations, and essays are marked by examiners and assessors. Their marks result ultimately in a University Standardised Mark (USM), in the range from 0 to 100, for each script and submitted piece of work, which are then used in the process of classifying candidates. USMs in the classification process are always whole numbers.

## Plagiarism

You are reminded of the importance of avoiding any plagiarism, please see <http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism> for further guidance. Depending on their severity, cases of suspected plagiarism may be referred to the Proctors for investigation or may be dealt with by the board of examiners. If dealt with by the board of examiners as a case of poor academic practice, the examiners may deduct marks (for lack of adequate referencing, poor use of citation conventions, etc.) of up to 10% of the marks available for the assessment. Where the consequence of the marks deduction would result in both the failure of the assessment and of the programme the case must be referred to the Proctors.

## The scale of USMs

In classified examinations USMs on each individual script and submitted piece of work is correlated with classification bands as follows:

- 70-100: First Class
- 60-69: Upper Second Class
- 50-59: Lower Second Class
- 40-49: Third Class
- 30-39: Pass
- 0-29: Fail

The processes by which USMs on scripts and submitted pieces of work are arrived at are as follows:

### 6.1 How USMs are determined in Mathematics

#### Analysis of Marks

At the end of the Part A examination, a candidate will be awarded a University Standardised Mark (USM) for each of the papers offered. The Examiners may scale the raw marks to arrive at the USMs reported to candidates.

The scaling algorithm used by the mathematics examiners is explained in detail in the 2021 examiners' report which can be found at <http://www.maths.ox.ac.uk/members/students/undergraduate-courses/examinations-assessments/examiners-reports>.

The examiners may choose to scale marks where in their academic judgement:

- a paper was more difficult or easier than in previous years, and/or
- an optional paper was more or less difficult than other optional papers taken by students in a particular year, and/or
- a paper has generated a spread of marks which are not a fair reflection of student performance on the University's standard scale for the expression of agreed final marks, i.e. the marks do not reflect the qualitative marks descriptors.

Such scaling is used to ensure that all papers are fairly and equally rewarded.

When scaling the raw marks on a paper the examiners will consider the following:

- the total sum of the marks for all questions on the paper, subject to the rules above on numbers of questions answered;
- the relative difficulty of the paper compared to the other Part A papers;
- the report submitted by the examiner or assessor who set and marked the paper.

Examiners will use their academic judgement to ensure that appropriate USMs are awarded and may use further statistics to check that the marks assigned fairly reflect the students' performances on a paper. Examiners may also review a sample of papers either side of the classification borderlines to ensure that the outcome of scaling is consistent with the qualitative marks descriptors.

The USMs awarded to a candidate for the papers offered in Part A will be carried forward into a classification as described below.

## Marking of Mathematics Examinations

All mathematics examinations are marked by a single assessor or examiner according to a pre-agreed mark scheme which is strictly adhered to. The examination scripts are then checked by an independent checker to ensure that all work has been marked, and that the marks have been correctly totalled and recorded. Please see the qualitative descriptors of the bands of marks awarded to examination answers.

Further information on the setting and marking of mathematics papers is given in the appendices to the Examination Conventions in Mathematics available online <https://www.maths.ox.ac.uk/members/students/undergraduate-courses/examinations-assessments/examination-conventions>

## Marking schemes and Model Solutions

Those setting questions are asked to provide **complete model solutions** worthy of full marks, carefully annotated so as to indicate what is considered bookwork and standard material, what has been seen before on problem sheets and what is considered to be new and unseen, and with a draft marking scheme for the approval of the examiners; the solution, with additional comments, should also make clear how much of the question is accessible to less strong candidates.

Those setting questions should be aware that solutions may be released to students in the future.

Marking schemes for the questions should aim to ensure that the following qualitative criteria hold:

**20–25 marks** A completely, or almost completely, correct answer, showing excellent understanding of the concepts and skill in carrying through the arguments and/or calculations; minor slips or omissions only.

**13–19 marks** A good though not complete answer, showing understanding of the concepts and competence in handling the arguments and/or calculations, and some evidence of problem-solving ability. Such an answer might consist of an excellent answer to a substantial part of the question, or a good answer to the whole question which nevertheless shows some flaws in calculation or in understanding or in both.

**7–12 marks** Standard material has been substantially and correctly answered with some possible minor progress on to other parts of the question.

**0–6 marks** Some progress has been made with elementary, accessible material.

## Qualitative description of examination performance in Mathematics

The average USM ranges used in the classifications reflect the following general **Qualitative Class Descriptors** agreed by the Teaching Committee:

**First Class:** the candidate shows excellent skills in reasoning, deductive logic and problem-solving. They demonstrate an excellent knowledge of the material, and can use that in unfamiliar contexts.

**Upper Second Class:** the candidate shows good or very good skills in reasoning, deductive logic and problem-solving. They demonstrate a good or very good knowledge of much of the material.

**Lower Second Class:** the candidate shows adequate basic skills in reasoning, deductive logic and problem-solving. They demonstrate a sound knowledge of much of the material.

**Third Class:** the candidate shows reasonable understanding of at least part of the basic material and some skills in reasoning, deductive logic and problem-solving.

**Pass:** the candidate shows some limited grasp of at least part of the basic material.

[Note that the aggregation rules in some circumstances allow a stronger performance on some papers to compensate for a weaker performance on others.]

**Fail:** little evidence of competence in the topics examined; the work is likely to show major misunderstanding and confusion, coupled with inaccurate calculations; the answers to questions attempted are likely to be fragmentary only.

## 6.2 How USMs are determined in Philosophy

### Marking of FHS Examinations in Philosophy

All Philosophy scripts and submitted work in Finals are marked independently by two markers. The two markers discuss any difference between their marks, and endeavour to agree a mark. Since USMs are always whole numbers, the agreed mark cannot in general be reached by ‘splitting the difference’ between the two initial marks, e.g. two Philosophy markers whose marks for a given script are 67 and 68, cannot submit a mark of 67.5, but rather must determine an agreed mark that is either 67 or 68. A third marker marks the script or submitted work if the two original markers cannot agree a mark.

## Qualitative description of examination performance in Philosophy

The standard of work for the various classes is specified in the following terms.

- **Class I 70-100**

In order to encourage use of a wider range of First Class marks, markers are asked to give First Class marks divisible by 3 as initial marks. Agreed marks can be any marks within the First Class range, e.g. initial marks of 72 and 75 might result in an agreed mark of 74.

- Upper: 84+

Exceptional answer displaying originality, outstanding analytical and argumentative skills, superior command of the facts and arguments relevant to the question, excellent organisation, and lucid and precise expression.

- Middle: 78, 81

Excellent answer offering high-level analysis, independent and rigorous argument, skilled handling of the facts and arguments relevant to the question, transparent organisation, and lucid and precise expression.

- Lower: 72, 75

Strong answer displaying a high standard of analysis and argument, a thorough command of the facts and/or arguments relevant to the question, transparent organisation and clear language.

- **Class II.1** 60-69

- Upper: 65-69

Strengths: Effective analysis and argumentation, thorough command of evidence, clarity of expression, transparent organisation of material.

Weaknesses: Occasional imprecision in argumentation or expression; or lack of depth; or minor omissions; or lapses in focus.

- Lower: 60-64

Strengths: Well-structured answer offering a generally accurate analysis of central arguments and themes, and a well-reasoned conclusion.

Weaknesses: Occasional lapses in argumentation; writing may be somewhat pedestrian or unclear or imprecise; some omissions or infelicity in organisation of material.

- **Class II.2** 50-59

- Upper: 55-59

Strengths: Adequate, if somewhat basic, analysis and understanding of key concepts and arguments.

Weaknesses: Significantly lacking in scope, depth or precision; pat or pedestrian representation of thoughts and arguments; important inaccuracies or omissions; some lapses in argumentation.

- Lower: 50-54

Strengths: Answer showing a basic grasp of relevant material and arguments, and a fair attempt to arrive at a reasoned conclusion.

Weaknesses: Serious inaccuracies or omissions; significant lapses in argumentation (e.g. nonsequiturs, misuse of concepts or evidence); failure to digest material; minor irrelevance.

- **Class III** 40-49

- Upper: 45-49

Strengths: Limited answer to the question; constructs a rudimentary argument; some evidence of relevant study.

Weaknesses: Superficial or incomplete treatment; some gaps or mistakes in understanding of key concepts and arguments; poor focus and organisation; some irrelevance.

- Lower: 40-44

Strengths Significant elements of a basic and relevant answer.

Weaknesses: Muddled argumentation, very superficial discussion with poor focus, significant misunderstanding of key concepts and arguments; considerable irrelevance; seriously incomplete answer.

- **Pass** 30-39

Strengths: Limited attempt to address question showing a rudimentary grasp of some relevant information.

Weaknesses: Very incomplete, brief, or poorly organised answer; fundamental misunderstanding of key arguments or ideas; large portions of discussion irrelevant or tangential.

- **Fail 0-29**

- Upper: 15-29

- Strengths: Some slight evidence of a proper attempt to answer question; glimpse of relevant material.

- Weaknesses: Extremely limited and inadequate answer, for instance in note form; discussion mostly irrelevant.

- Lower 0-14:

- Weaknesses: Completely or almost completely irrelevant or ignorant answer. Nothing or almost nothing written.

## 7 How classifications in Parts A + B of Finals are determined

After marks for each examination script and submitted piece of work have been determined (in accordance with §6 above), classifications in Finals are determined from each candidate's weighted overall average mark, average mark in Mathematics and average mark in Philosophy, according to conventions (see below) for each examination.

### 7.1 Decimal points and rounding of averaged marks in the determination of classification in Parts A + B

Averages of marks are calculated to two decimal points, which the examiners need in order to recognize candidates very close to a class borderline, in which case their marks profile needs to be given particular attention, and also for ranking candidates when awarding prizes. However, at the stage of applying the classification rules to determine a candidate's classification from their average marks, the averages are then symmetrically rounded to a whole number, so that e.g. 69.50 is rounded to 70 (which, if this is as an overall average, gives that candidate a First), and 69.49 is rounded to 69 (in which case, unless Rule (2) for Part A + B classification applies, the candidate is classified II(i), but only in that case after the examiners have carefully gone over the candidate's marks, being so close to a borderline).

### 7.2 Classification in Parts A + B

The classification conventions for Parts A + B are in conformity with the stipulation that, "The highest honours can be obtained by excellence either in Mathematics or in Philosophy provided that adequate knowledge is shown in the other subject of the examination." (in "Regulations for the Honour School of Mathematics and Philosophy", *Examination Regulations 2019*).

### Weightings in the calculation of averages in Parts A + B

In calculating these averages, USMs for individual papers in Mathematics are first weighted to take account of the proportion of the course examined in each subject, and then scaled so that Parts A and B are weighted in the ratio 2 : 3. This gives the following weights:

Paper A2	16
Each of Papers A0, A3, A4, A5, A8, ASO	8
Part B Mathematics unit	15

(Thus, in particular, the four Part A Mathematics papers jointly carry the same weight as half of Part A in the Honour School of Mathematics, and 2/3 of the weight, 60, of four Part B units in Mathematics.)



No weighting is applied to USMs for Philosophy papers.

## Conventions for classification in Parts A + B

Let  $M$  denote the average USM for Mathematics papers in Parts A and B, calculated according to the weightings given above. Let  $P$  denote the average of the USMs in Philosophy in Part B. The overall average  $A$  is calculated to be

$$A = [(8 - k)M + kP]/8,$$

where  $k$  is the number of Philosophy papers taken (which may be either 3 or 4, depending on the papers chosen by the candidate).

In Mathematics & Philosophy a candidate may be given a class higher than the average of their marks, on the basis of particular strength in one of the two subjects.

The quantities  $M$ ,  $P$  and  $A$  are calculated according to the above formulae. After these quantities have been symmetrically rounded to the nearest integer, as stipulated in §7.1, classifications are determined by the following inequalities:

1. No candidate will be given a classification lower than that implied by the place of the value of  $A$  on the scale 70–100 First; 60–69 Upper Second; 50–59 Lower Second; 40–49 Third; 30–39 Pass; 0–29 Fail.
2. In the following circumstances a candidate will be given a higher classification than that implied by the value of  $A$ :
  - a. A candidate who achieves  $A \geq 67$  and either
$$M \geq 70 \text{ and } P \geq 60, \text{ or}$$
$$P \geq 70 \text{ and } M \geq 60$$
will be awarded a First.
  - b. A candidate who is not awarded a First but who achieves  $A \geq 57$  and either
$$M \geq 60 \text{ and } P \geq 50, \text{ or}$$
$$P \geq 60 \text{ and } M \geq 50$$
will be awarded an Upper Second.

The award of a Third, Pass or Fail will, in all cases, be by individual consideration.

## 8 Resits

Part A shall be taken on one occasion only (there will be no resits).

## 9 Alternative Examination Arrangements and Mitigating Circumstances Notices to Examiners

A candidate in any University Examination with specific learning difficulties or disability/illness may apply through the Senior Tutor of their college for alternative examination arrangements relating to their condition. Please see <http://www.ox.ac.uk/students/academic/exams/arrangements> for further information on the process.

Candidates who would like the examiners to be aware of any mitigating circumstances that may have affected their performance before or during an examination are advised to discuss their circumstances with their college and consult the Examination Regulations (Part 13). The candidate's college will submit the Mitigating Circumstances Notice to Examiners for forwarding to the relevant chair of examiners.

Where a candidate or candidates have made a submission, under Part 13 of the Examination Regulations, that unforeseen circumstances may have had an impact on their performance in an examination, a subset of the board will meet to discuss the individual applications and band the seriousness of each application on a scale of 1–3 with 1 indicating minor impact, 2 indicating moderate impact, and 3 indicating very serious impact. When reaching this decision, examiners will take into consideration the severity and relevance of the circumstances, and the strength of the evidence. Examiners will also note whether all or a subset of papers were affected, being aware that it is possible for circumstances to have different levels of impact on different papers. The banding information will be used at the final board of examiners to adjudicate on the merits of candidates. Further information on the procedure is provided in the *Examinations and Assessment Framework* and information for students is provided at [www.ox.ac.uk/students/academic/exams/guidance](http://www.ox.ac.uk/students/academic/exams/guidance).

## 10 Examiners for 2021–22

The internal examiners are:

Prof. Alan Lauder (Chair),

Prof. Jan Obloj,

Prof. Konstantin Ardakov,

Prof. Derek Moulton,

Dr Neil Laws.

The external examiner is:

Prof Neil Strickland (University of Sheffield)

It must be stressed that to preserve the independence of the Examiners, you should not make contact directly with them about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if they deem the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chair of Examiners.