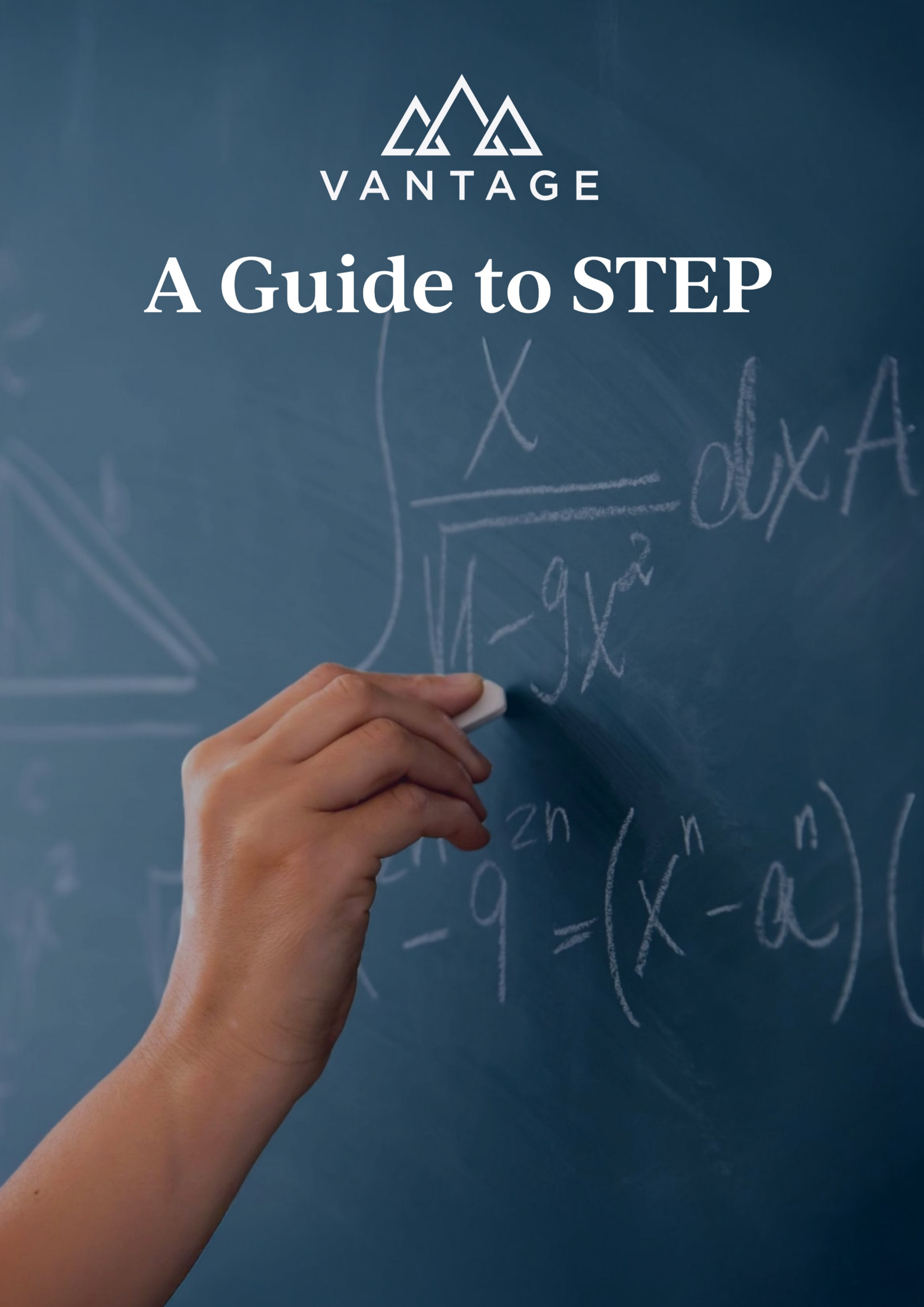
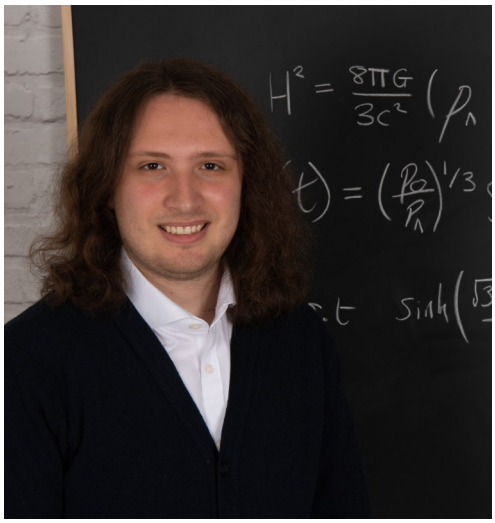
VANTAGE

A Guide to STEP



Welcome to Vantage



Welcome to Vantage Admissions, experts in UK university admissions for mathematical science courses.

Our comprehensive programmes address each element of the university admissions process, from admissions tests such as STEP and TMUA, to the infamously challenging Oxbridge interviews. We pride ourselves on demystifying the intricate thought processes behind the difficult problems students are expected to tackle. Our team of Oxbridge graduates, admissions test examiners, and Oxbridge interviewers look forward to working with you.

Whether you are interested in joining one of our programmes or would just like expert advice on your preparation strategy, I would be delighted to meet you in a free 30-minute video consultation. Visit www.vantageadmissions.co.uk to find out more.

RWright

Rowan Wright
Founding Director

Contents

About STEP

The Sixth Term Examination Papers (STEP) have been used in Mathematics admissions at the University of Cambridge since 1987. A notoriously challenging exam, STEP is included in almost all conditional offers to read Mathematics at Cambridge, and is also used by a small number of other UK universities, such as Imperial College London and the University of Warwick. STEP is taken in June, concurrently with A Level exams. STEP 2 and STEP 3 are separate exam papers with different prerequisite knowledge (STEP 1 was discontinued in 2020). Students might be required to take either or both of the papers, depending on the conditions of their university offers.

STEP is designed to test a student's ability to construct innovative arguments and apply familiar mathematical knowledge in unfamiliar contexts. STEP questions are closer in style to undergraduate level problems than A Level questions because they require greater creativity in using problem solving techniques, and often use several different 'topics' in a single question. STEP is used by universities because it is a better predictor of success at degree level than A Level or IB results: it is aimed at the top 5% of Year 13 Mathematics students.

Key Dates	
1st March 2026	Registration opens. Students register for STEP through an exam centre (usually their school). Registration costs £102.50 per paper for UK students, and £142.25 per paper for students outside of the UK. Exam centres may also charge an administration fee.
4th May 2026	Registration closes. Last date to request access arrangements.
4th June 2026	STEP 2 test date (9am UK time)
10th June 2026	STEP 3 test date (9am UK time)
13th August 2026	Test results released. Students can view their results on the OCR 'Results Online' system. Universities receive the results automatically through UCAS. Cambridge colleges receive students' answer booklets to assess their work in more details in the case of a missed offer.
20th August 2026	Last date for results enquiries. An application for a results enquiry costs £50.75 per paper. Students can request to check if their results have been reported accurately or request for a senior examiner to review their mark.

A 'good' STEP score will depend on the university and course applied for. A summary of each university's requirements is provided on the following pages, which has been updated for the 2025-26 admissions cycle. We recommend that candidates also read their chosen university courses' entry requirements carefully.

University of Cambridge

Students who receive a conditional offer to read Mathematics at the University of Cambridge will be required to take STEP 2 and STEP 3. The most common grade requirements are grade 1 in both papers, in addition to A*A*A (including Mathematics and Further Mathematics). Cambridge colleges receive their offer holders' STEP scripts, so they can assess a student's performance on the exam more closely in the case of a missed offer.

STEP is the most challenging and important part of the Cambridge application process for Mathematics: only half of offer holders typically meet their offer conditions and are accepted onto the course, so it is crucial to take the STEP requirement seriously and start preparing early!

Imperial College London

Since 2024, applicants for many mathematical courses at Imperial are required to take the TMUA if their application is submitted on or before the final TMUA registration deadline (19th December 2025). Applicants for the following courses are very likely to have a STEP condition included in their offer (usually grade 2 on either paper) if they applied *after* the TMUA registration deadline:

- Mathematics, including joint courses with Applied Mathematics/Mathematics Physics, Mathematical Computation, Statistics, and Statistics for Finance
- Mathematics (Pure Mathematics)

Applicants with a borderline TMUA score, or applicants whose schools don't offer Further Mathematics, may also be required to take STEP as part of their conditional offer.

The TMUA is also compulsory for students applying for admission to Computing or the joint Mathematics and Computer Science courses. Typical offers of A*A*A* or A*A*AA will *not* include a STEP condition, but applicants may be asked to take STEP if they missed the final TMUA registration deadline, achieved a borderline TMUA result, or don't take Further Mathematics (or equivalent) qualification.

University of Warwick

The University of Warwick uses the TMUA and STEP across several courses in the Mathematics Institute and Department of Statistics. Applicants will be given the opportunity to notify the university if they intend to take STEP as an alternative to the TMUA. Offers made to Mathematics applicants *without* TMUA scores will be conditional upon grade 2 in either STEP paper.

Applicants for the following courses in the Department of Statistics will be eligible for a reduced offer if they achieve 5.0 on the TMUA, a grade 2 in either STEP paper, or Distinction in the AEA:

- Mathematics and Statistics
- MORSE
- Data Science

This can lead to a reduced offer and support the applications of students who do not take A Level Further Mathematics, or only the AS Level. We recommend checking the university website for more details. The Department of Statistics offers a prize of £2000 to any student who achieves grade 1 in either STEP paper or 7.5 on the TMUA (link for further information).

Durham University

Durham strongly encourages applicants to take the TMUA or STEP because they are heavily weighted in their selection process for:

- Mathematics
- Mathematics and Statistics

Students achieving 5.0 on the TMUA or a grade 2 in either STEP paper are eligible to be considered a reduced offer one grade below the standard offer (A*AA with an A* in Mathematics or Further Mathematics, rather than A*A*A). A good score in one of these tests is compulsory for students with AS Further Mathematics only. For further information, see the university website.

In most cases, we recommend that students take the TMUA rather than STEP because it is more accessible (see page 7 for more information).

University of Bath

STEP or the AEA will be required as an offer condition for students who have not studied sufficient content in their A Level or IB qualifications. This includes students taking AS Level Further Mathematics only. Students taking the full Further Mathematics A Level or IB Higher Level Mathematics: Analysis and Approaches do *not* need to take an admissions test, and their score will *not* be considered in the selection process for Bath if they take an admissions test for admission to another university.

An admissions test may be required for the following courses:

- Mathematics
- Mathematics and Statistics
- Mathematics and Computer Science
- Mathematics and Economics

Achieving grade 2 in either STEP paper, or a Merit in the AEA, will be sufficient to meet the offer condition.

University College London

University College London applicants can take STEP or the AEA to be considered for a reduced offer for the following courses:

- Mathematics
- Mathematics joint honours with Statistical Science, Physics, Mathematical Physics, Economics, Management Studies, and Modern Languages

Achieving a grade 2 in either STEP paper, or a Distinction in the AEA, reduces the standard offer of A*A*A to A*AA with A*A in Mathematics and Further Mathematics.

Should I take STEP 2 or STEP 3?

All Cambridge colleges require applicants to take both STEP papers, and Imperial College London occasionally requires both. Other universities typically require one STEP paper, which might be specified in the offer conditions or the applicant might be able to choose. If the applicant has a choice, it is generally easier to take STEP 2 because it is does not require any content from the second-year A Level Further Mathematics syllabus.

Should I take the TMUA or AEA instead of STEP?

STEP is a compulsory offer condition for applicants to the University of Cambridge for Mathematics, and applicants to the University of Warwick and Imperial College London who missed the TMUA registration deadline. Otherwise, students may have the choice of an alternative test, such as the TMUA or AEA, in place of STEP.

Where the TMUA is available as an alternative to STEP, we strongly encourage students to take the TMUA. There are two main advantages to this. Firstly, it is generally considered to be easier to achieve a 'good' score in the TMUA than STEP because it only requires first-year A Level Mathematics content (no Further Mathematics is required). The style of questioning is also likely to be more familiar in the TMUA. Secondly, the TMUA is taken in the Autumn term of Year 13, so students can dedicate the Summer holiday to preparing. STEP is taken at the same time as A Level/IB exams, so often creates additional pressure in an already stressful period. STEP can then provide an additional opportunity for students to take an admissions test in the Summer term, if they did not achieve a high enough score in the TMUA.

The AEA (Advanced Extension Award) was originally introduced to distinguish between the highest achieving students before the A* grade was introduced for A Levels in 2010. Since then, very few students (~350) take the AEA each year. The specification is the same as the Pearson Edexcel A Level in Mathematics. Students may consider taking the AEA if it is an option because it is a less challenging examination than STEP: it does not require content from AS or A Level Further Mathematics. However, STEP provides much better preparation for undergraduate-level mathematics.

The MAT is not offered as an alternative to STEP by any universities for the 2026 admissions cycle. MAT is a compulsory test used by the University of Oxford for courses in Mathematics and Computer Science.

Exam Format

How is STEP structured?

Candidates sit STEP in at a test centre, which is usually their school or college. STEP 2 and STEP 3 are each are 3 hours long and their formats are very similar. Each exam consists of 12 questions, of which candidates may attempt up to 6. The questions are arranged into three sections:

Section A	Pure	8 questions
Section B	Mechanics	2 questions
Section C	Probability/statistics	2 questions

Note that section C consisted of 3 questions in papers before 2019. All questions attempted by a candidate will be marked, but the final score is based on the 6 questions with the highest marks only. Each question is marked out of 20, and the paper is marked out of 120 in total.

Questions Answered	Total Marks	Marks per question	Total Time
Up to 6	120	20	3 hours

How is STEP marked?

There is no prescribed method for solving a STEP question and any correct solution will gain credit. However, it is important to emphasise that there are method marks available: a student who fails to justify their reasoning or who uses incorrect mathematical logic will not receive full marks, even if they get the correct answer. The STEP grading system consists of 5 levels, from S to U:

S — Outstanding
1 — Very good
2 — Good
3 — Satisfactory
U — Unclassified

It is also important to note that a certain number of correct solutions does not guarantee a particular grade (common advice is that 4 'good' answers will result in a grade 1, but this is not always true). The grade boundaries are adjusted according to the performance of the cohort each year, which results in very variable boundaries, as demonstrated on the following page.

Grade Boundaries

Explanation of results documents are available on the OCR website for examinations from 2019-2025. They state the grade boundaries, the cumulative percentage of candidates achieving each grade, and include a graph showing the score distribution (the percentage of candidates on each mark).

Grade boundaries for STEP 2 and STEP 3, 2007-2025, are provided below.

	STEP 2				STEP 3			
	S	1	2	3	S	1	2	3
2007	95	67	56	35	86	64	52	35
2008	94	69	58	35	82	63	52	34
2009	98	71	61	39	95	67	55	38
2010	105	79	64	40	78	56	46	29
2011	83	62	49	29	91	65	52	30
2012	91	72	60	31	84	65	53	32
2013	100	79	67	32	85	63	48	27
2014	95	74	64	30	81	59	48	28
2015	94	68	60	30	88	65	54	29
2016	95	74	65	31	88	64	55	32
2017	101	80	69	34	95	69	57	28
2018	100	77	65	36	87	59	49	27
2019	90	68	55	30	77	57	48	27
2020	77	54	42	25	88	67	53	30
2021	92	67	54	28	89	67	54	29
2022	81	62	52	30	82	63	51	29
2023	90	65	50	28	85	63	54	32
2024	93	69	51	26	93	70	57	34
2025	92	75	61	35	86	61	49	27

Exam Content

What do I need to know for STEP?

Traditionally, STEP has been designed with A Level Mathematics and Further Mathematics courses in mind, such that the prerequisite knowledge for STEP 2 and 3 is:

STEP 2	A Level Mathematics AS Level Further Mathematics
STEP 3	A Level Mathematics A Level Further Mathematics

Students following IB Mathematics (Analysis and Approaches or Applications and Interpretations) at Higher Level should be familiar with the majority of the STEP specification, though it is worth going through the STEP specification point-by-point since it is primarily designed to overlap with the A Level. Students following other international courses will likely find that their courses overlap with the STEP syllabus substantially, but it would be wise to consult with an expert to ensure that any gaps in knowledge are addressed.

The 2026 specification for both STEP exams can be accessed here. We recommend that all students work through the specification document in detail, but the best way to become familiar with the frequently assessed topics is by practising past paper questions (see page 15 of this handbook for advice on the most beneficial approach to past papers). It is worth noting that some topics are important for A Levels but de-emphasised in STEP papers because they can't be worked into sufficiently creative and challenging questions. These topics include hypothesis testing for statistics, the trapezium rule, and numerical methods.

When completing past papers, students should be aware that the STEP syllabus changed in 2019, along with the withdrawal of the STEP 1 exam. Some topics were added to STEP 2 and 3 - notably matrices - and some topics were removed, including moments of inertia and probability generating functions. Students who are only taking STEP 2 should pay particular attention to the changes: before 2019, no Further Mathematics was relevant to STEP 2, but knowledge of AS level Further Mathematics is now required.

Will I have a formula booklet?

A formula booklet is no longer provided for STEP, so students should diligently memorise the required formulae. These can be found in Appendix 1 of this handbook (page 22).

Exam Technique

Timing

- You may attempt up to six questions. Although common guidance is to aim to do 'four questions well', it is generally more effective to aim to do 'six questions decently'. It is often much easier to gain marks in the earlier parts of the questions, and there is no special advantage given to students who complete a question fully over students who complete three quarters of the question. Don't fixate on getting the very last part of the problem, and be prepared to move on, even if you haven't completed every part of a question.

Question Choice

- Question choice is extremely important for STEP because you will only attempt (at most) half of the questions on the paper. It is worth allocating a certain amount of time – perhaps 5-10 minutes – to read through all of the questions carefully and decide which to attempt.
- In addition to prioritising topics that you tend to prefer, or questions for which you have a good idea of what to do, an important criterion that might motivate your question choice is if a question is similar to past paper questions you have completed.
- Question 1 is designed to be more accessible, which, in practice, means it is easier. Therefore, you should plan to attempt Q1, unless it turns out to be on a topic that you very strongly dislike. Q2 is also typically a little more straightforward than the other problems, so it is worth serious consideration. Otherwise, the questions do not become more difficult as the paper progresses, so the question number should not be taken into account when you choose your questions.
- Don't be fooled into thinking that a question that looks very long or has many parts is going to be longer or more difficult. In fact, such questions are often more straightforward because the question is guiding you through the solution step by step. Often, questions that look briefer on the page are more challenging.
- Pay attention to terminology used in the questions. 'Deduce' means that you need to use the result you have just found or proved. 'Write down' or 'state' means that no substantial workings should be needed. 'Hence' means that you must use the result you have just proved in order to gain the marks.

'**Deduce**'	-	Use the result you have just proved
'**Write down**' or '**state**'	-	No workings needed, no method marks
'**Hence**'	-	You must use the result you have just proved and reason in the way they suggest

Written Presentation

- STEP examiners are particularly strict when it comes to clarity of written presentation and explanation. If you are doing anything more complicated than algebraic rearrangement, you should include written remarks explaining your logic and any required justifications. For instance, if you divide an equation through by something, explain why you know it's non-zero and therefore legitimate to do so. Examiners will be especially strict in the case of 'show that' questions because candidates may bluff!
- If you have learned any off-syllabus ideas, such as L'Hôpital's Rule, take extra care in your presentation.

  For example, if using L'Hôpital's Rule for:

  $$\lim_{x \mapsto c} \frac{f(x)}{g(x)}$$

  you need to manually verify that f(c) = 0 and g(c) = 0

  The examiners' attitude is that if students are trying to be clever by going off-piste, they had better do it right!
- As a result of the increased mathematical maturity you are expected to show in STEP problems, it can very often be helpful to reason graphically, geometrically or pictorially rather than solely algebraically. As such, drawing a quick sketch or diagram - whether of a function or something else pertaining to the problem - can often be very helpful, even if the question doesn't specifically ask you to.

Getting Unstuck

- When stuck, one of the best strategies is to look back at earlier parts of a question. Sometimes, a result you proved earlier is now applicable, or it might be a matter of reapplying a method which you used earlier. Very often, a question will first guide you through applying a new method step by step, then expect you to apply it independently to another problem later on.
- If you can't solve one part of a problem, it doesn't mean you can't move onto the next part. It is not uncommon for students to be unable to solve the middle section of a question then find the remainder straightforward. Note that, even if you have been unable to prove a 'show that' result, you are still allowed to assume the result in your work for the later parts.

Preparing for STEP

The most common time to start preparing for STEP is January of Year 13, after most university offers have been made. If students are taking STEP for Cambridge Mathematics entrance, it would be beneficial to start preparing as early as a full year before the exam. This might be particularly possible for those who won't be preparing for any Autumn admissions tests (e.g. TMUA). A student's preparation strategy will depend on when they begin preparing and the number of hours per week they will spending studying. For serious students beginning preparation in January, we recommend a minimum of 7-8 hours per week.

Memorisation

Do this **as soon as possible**, as it will help with past paper practice.

There is a significant amount of content to memorise for STEP because a formula booklet is not provided. Students should ensure that they can recall the standard formulae accurately. The list of required formulae from the Cambridge specification has been reproduced in Appendix 1 (page 22) of this handbook. The specification states some very elementary content that you have likely known since you were 15! However, some common pitfalls are:

- Formulae for the n'th term or sum of first n terms of an arithmetic or geometric sequence (including sum to infinity for geometric)
- Sine and cosine rules
- Standard graph transformations
- Standard results for integrals and derivatives, including complicated trigonometric functions
- The binomial theorem, including in the case where the exponent is not a positive integer
- Standard Maclaurin series (especially for STEP 3)
- Trigonometric identities, including compound angle formulae
- Standard transformation matrices e.g. rotation matrices

Students tend to become dependent on their calculator during the A Level/IB courses, but STEP is a non-calculator exam. It is surprisingly beneficial to re-familiarise yourself with aspects of non-calculator arithmetic, such as methods for multiplying large numbers. It is also very helpful to revise and memorise times tables up to 15, square numbers up to 20^2, cube numbers up to 10^3. Aside from the fact that you might need to know e.g. 18^2 as part of a computation, *spotting* that something is itself a square or cube number can itself be very helpful, and is only possible if you have memorised the first few squares and cubes

Taught Resources

Our 21 STEP Primer Course lessons are 1-2 hours long, with additional time for study of worksheets.

How can I benefit from using taught resources?

There are several reasons why students will benefit from using some taught resources while attempting past papers. It is essential to prepare to answer questions from one of the applied sections (mechanics or probability/statistics) in order to capitalise on the larger question choice and take advantage of the fact that these problems can be surprisingly straightforward and repetitive. Students might be deterred by not having leaned the entirety of the material in school, but studying the applied content - either independently or through a specialist programme - is straightforward and there is not a lot to cover.

Additionally, it is useful for students to encounter concepts and techniques in a 'neutral' setting first, to avoid associating it with a particular problem or situation. A 'bird's eye view' allows students to apply ideas more fluently in unfamiliar settings. A further benefit is that a good taught programme will pre-empt challenges that haven't appeared in previous papers, but are likely to appear in future.

Which resources should I use?

One of the most commonly used taught materials is the STEP Support Programme, which is provided for free online by the University of Cambridge. It is an entry-level programme consisting of brief summary notes followed by topic specific past paper questions, and it can be used as a good starting point. Students should be cautious if using this programme because one of the main challenges of STEP is working out what 'topic' the questions are on. Attempting questions arranged by topic entirely removes this challenge, so we strongly encourage students to complete past paper questions by paper rather than by topic.

Many third party resources are outdated, of a poor quality, and mass-produced by undergraduate students. 'STEP, MAT, TMUA: Skills for Success in University Admissions Tests for Mathematics', published by Hodder Education, is a good option for students who have a limited access to paid resources, and it may be available to borrow from libraries. It is a fairly short book and is split across three exams, so the amount of content covered is limited.

We provide a comprehensive taught course through our STEP Programme. The STEP Primer Course is a pre-recorded course of 21 lessons, designed specifically for STEP preparation. Each lesson has an accompanying worksheet of original problems, which enables students to consolidate important concepts and techniques. The STEP Programme also includes detailed past paper solutions, individual mentoring sessions, weekly office hours, and mock exam marking by real STEP examiners. Learn more about our programme on page 17.

Past Papers

It typically takes **15 hours** to thoroughly study a STEP past paper.

Taking into account the amount of study time available, and allowing 15 hours per paper, students should determine how many past papers they will have time to complete between now and the exams. They should factor in whether they are taking both papers or only one. Students should work from the oldest paper forwards, and alternate between STEP 2 and 3 papers if relevant. This process might require some experimentation as students determine their pace. Students should aim to complete the 6 most recent papers as an absolute minimum: the most serious students will often complete all papers back to 2008. The question style was slightly different before 2008, so older papers are of limited use. We recommend the following process for completing every past paper.

1. Timed Mock

Ideally, a timed mock should be a single 3-hour session. This may seem intense, but it is very important because it requires a lot of stamina to remain sharp for the full duration of the exam. If it is too difficult to schedule one 3-hour session, two sessions of 90 minutes are better than no timing at all. In the timed mock, students should attempt the questions which they think will optimise their score, just as in the real exam. Taking timed mocks also enables students to master timing and experiment with exam strategy, including the order of question completion and a procedure for choosing questions.

2. Complete the Remaining Questions

After completing the timed mock, students should set aside their work and complete the entire paper. It's important to work through all of the questions - even the ones they don't think they would choose. For instance, many students initially dislike problems on position vectors but, after persevering with a few, find that they are very repetitive and generally a good choice. Students often have the same experience with the applied questions (section B and C). Later in the process, students may choose to skip certain problems on topics that they are certain they wouldn't attempt in the real exam.

3. Marking

After completing everything possible, students should mark their mock and consult solutions, teachers, or friends to work out how to do the questions they couldn't complete. It's important to ensure that they understand how to 'come up with' the idea of using a certain method, rather than just following the steps of someone else's solution. The official solutions are adequate for determining whether an answer is correct, but sometimes they barely describe the method, so most students would benefit from accessing some solutions designed to guide them through the entire thought process.

A Note on Applied Mathematics Questions (Sections B and C)

Students are often daunted by the applied questions, but they are sometimes the easiest questions on the paper and it is very advantageous to prepare seriously for at least one of the mechanics or probability/statistics questions (Sections B and C), especially if aiming to complete six questions. Students sometimes worry that they haven't covered all of the material in school but, since STEP problems are far more geared towards problem solving than memorisation, there is not a lot to learn and it is generally straightforward to fill the gaps in knowledge, whether through independent study, with a tutor, or through the taught component of our STEP programme. Certain topics which feature prominently and are often quite straightforward are probability density functions, collisions and projectiles .

Individual Tuition

The recommended amount of tuition depends on the individual.

Most students could benefit from some individual tuition when preparing to take STEP. It can provide a unique opportunity to troubleshoot doubts arising from either taught resources or past paper questions. It allows students to explore questions further and pursue their own interests. Further to understanding a successful solution to a problem, it is important for students to understand why a particular approach did not work, which is uniquely well-served by one-to-one discussion. Individual tuition builds students' confidence considerably and is certainly worth considering if it is accessible.

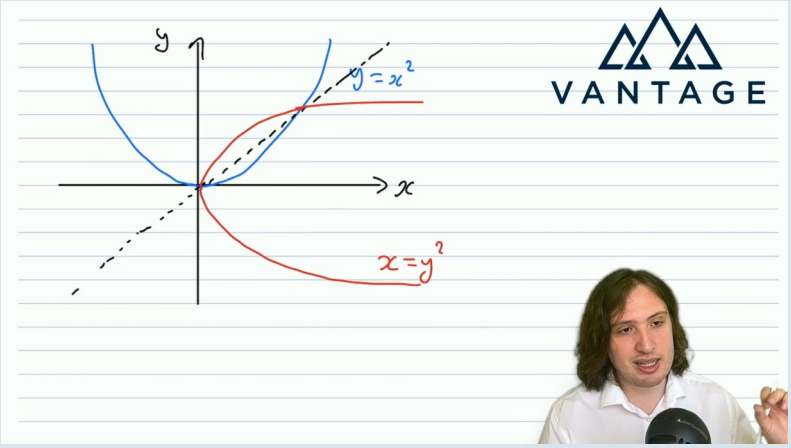
The Vantage STEP Programme

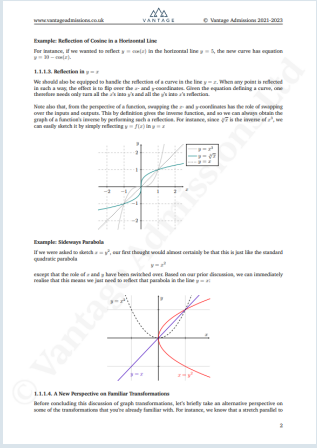
To many students, STEP is a daunting obstacle in the mathematics admissions process, far surpassing any of their previous exams in difficulty and time pressure. However, students can reliably improve their score with rigorous preparation and practice. Our STEP Programme is authored and delivered in its entirety by past STEP examiner and specialist tutor Rowan Wright. The programme combines a comprehensive course of lessons with resources that enable students to make best use of past papers. Our STEP Programme is available for students studying for both STEP exams, or STEP 2 alone.

STEP Primer Course

The STEP Primer Course is a pre-recorded course of lessons designed for STEP preparation. Authored by past STEP examiner and expert admissions tutor Rowan Wright, each session focuses on an important theme or topic that frequently arises in STEP questions. Students are equipped with the knowledge to attempt every question on the exam—including sections B and C—regardless of the modules selected by their school. There are 14 lessons for STEP 2 and 7 lessons for STEP 3, each lasting 1-2 hours in video form, though students can also study the lesson by using the detailed lesson notes if preferred.

Each lesson has an accompanying worksheet of original questions, carefully designed to cover the quirks and difficulties STEP questions pose. Students are encouraged to complete all worksheets, which are estimated to take 1-2 hours each, and review their work with the detailed solutions provided. This ensures mastery of the techniques and concepts taught in each lesson before applying them to past paper questions.





Past Paper Solutions

The STEP Programme includes solution booklets for all STEP 2 and 3 past papers, 2008-2025, and solution videos for the 2019-2025 papers. The solutions are authored and presented by Rowan Wright. In contrast to the official STEP solutions/mark schemes, our solutions show the complete method and any alternative methods to solve each problem. Rather than merely presenting a method that works, Rowan explains how a student can 'come up with' the right ideas and think through a problem systematically. This enables students benefit fully from past paper practice, coming away from each question with a complete understanding and ready to tackle variations on similar concepts in future. Crucial insight from delivering thousands of hours of admissions test tuition has allowed us to identify the precise issues students encounter in each question and hone in on them.

Mock Exam Marking

Solving a STEP question often requires multiple logical leaps, so students are held to a particularly high standard in terms of the clarity of their written explanation. The style of presentation required for STEP is different from the way students are taught to present their A Level or IB work, so receiving feedback on mock exams is extremely beneficial. In our experience, most students can gain an additional 10-15 marks per paper solely by improving the presentation of their work: this can amount to more than half a grade boundary! Our mock marking service is provided exclusively by Vantage team members who have trained as STEP examiners with Cambridge Assessment. Students receive an accurate estimation of score and detailed, actionable feedback for each submitted mock.

Mentoring Sessions

All Vantage students benefit from regular mentoring sessions over the course of their exam preparation, ideally attended along with their parents/guardians. All meetings are held with our founding director Rowan Wright. These meetings are completely tailored to the student's specific goals, with the aim of reviewing progress, addressing doubts or concerns, providing motivation, and creating actionable plans to resolve any difficulties. Personalised mentoring enables students to ensure they are staying on track for success and provides vital support over what is often a long process of preparation.

VANTAGE

Office Hours and On-Demand Support with Course Materials

All STEP students are invited to attend weekly office hours, hosted by Rowan Wright, which will provide the opportunity for further discussion and exploration of the STEP Primer Course and past papers. Students are invited to submit questions in advance relating to any aspect of the STEP Programme, and encouraged to attend office hours for regular contact with the course director. Office hours will take place on Saturdays, 9-10am GMT, from 14th February until 6th June 2026. Students may also submit questions via email at any time to receive a quicker response.

Individual Tuition

Many STEP students can benefit greatly from individual tuition as part of their exam preparation. It is not included in our STEP programme but it can be purchased ad hoc and provides a unique opportunity to troubleshoot issues arising from either the STEP Primer Couse or past paper questions. Tuition is provided by members of our highly qualified and experienced team, all of whom are Oxbridge graduates: we never outsource to undergraduate students.

Why choose Vantage?

The unique benefits of Vantage courses are multifarious and have resulted in our students' remarkably high success rates. Our professional team is trusted by students and dedicated to helping you achieve your academic aspirations.

Our Expert Team

Our team consists solely of Oxbridge graduates with additional expertise as examiners, Oxbridge interviewers, undergraduate supervisors, and qualified teachers.

Nurturing Academic Excellence

Our courses are designed not only to help you gain admission to your first-choice university, but to prepare you for academic success at elite universities.

Bespoke Mentoring

Every Vantage student has their entire preparation strategy overseen by our founding director in regular mentoring sessions with students and their parents/guardians.

Mathematical Focus

Our courses are composed entirely of useful mathematical content, omitting the cliché and extraneous filler content often found on the mass market.

VANTAGE

Testimonials

"Rowan from Vantage is the real deal: a rare blend of being a sufficiently brilliant mathematician to have a complete, deep and intuitive grasp on the difficult problems set in STEP, but also a great teacher who is able to explain the thought process in a way students can understand."

*Parent of a **STEP student** who was admitted to read Mathematics at Cambridge after achieving 1 in STEP II and S in STEP III,*

"Rowan from Vantage was incredibly helpful for my MAT prep. The explanatory course materials are comprehensive and clear, providing several distinct ways of looking at any one problem, to make sure that you really get it. As a past examiner, he also has great insight into how questions are constructed and what examiners really expect."

***MAT student** who was admitted to study Computer Science at Brasenose College, Oxford, after achieving 82% on the MAT*

"Rowan is an incredible tutor! My son was underperforming when doing TMUA past papers, and was struggling to understand the Cambridge solutions. As soon as he started sessions with Rowan, my son picked up several essential exam techniques and thoroughly understood the questions. This resulted in him seeing a drastic increase in his score. Rowan was able to provide my son with shortcuts to difficult questions that would render them trivial. I would highly recommend Vantage to any student preparing for an admissions test. It is truly one of a kind!"

*Parent of a **TMUA student** who achieved 9.0 and received admission to King's College Cambridge to read Computer Science*

"It became clear as soon as our son started his sessions with Rowan that he had found an exceptional tutor. Rowan's mathematical prowess, complete understanding of the STEP process and, most importantly, his unwavering positivity were a huge benefit to him. Our son always looked forward to his sessions with Rowan and came away from them enthused and upbeat."

*Parent of a **STEP student** who achieved 1 in STEP II and STEP III, receiving admissions to read Mathematics at Cambridge*

VANTAGE

REQUIRED FORMULAE

Roots of polynomials		
Formula	**Comment**	**Papers**
$ax^2 + bx + c = 0$ has roots $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$		2, 3
For $ax^2 + bx + c = 0$ with roots α and β: $\alpha + \beta = -b/a$, $\alpha\beta = c/a$		2, 3
For $ax^3 + bx^2 + cx + d = 0$ with roots α, β and γ: $\alpha + \beta + \gamma = -b/a$, $\alpha\beta + \beta\gamma + \gamma\alpha = c/a$, $\alpha\beta\gamma = -d/a$	The pattern is the same for polynomial equations of higher degree	2, 3

Laws of indices		
Formula	**Comment**	**Papers**
$a^x a^y = a^{x+y}$		2, 3
$a^0 = 1$	$a \neq 0$	2, 3
$(a^x)^y = a^{xy}$		2, 3
$a^x = \mathrm{e}^{x \ln a}$	defines a^x when x is not an integer	2, 3 •

Laws of logarithms		
Formula	**Comment**	**Papers**
$x = a^n \Leftrightarrow n = \log_a x$	$x > 0$, $a > 0$ $(a \neq 1)$	2, 3
$\log_a x + \log_a y = \log_a(xy)$		2, 3
$\log_a x - \log_a y = \log_a(x/y)$		2, 3
$k \log_a x = \log_a x^k$	for $x > 0$	2, 3

From STEP Mathematics Specifications for Examinations from June 2026 onwards
Version 1.3

Sequences and series		
Formula	**Comment**	**Papers**
General (nth) term of an arithmetic progression: $u_n = a + (n-1)d$	d is the common difference	2, 3
General (nth) term of a geometric progression: $u_n = ar^{n-1}$	r is the common ratio	2, 3
Sum of an arithmetic progression: $S_n = \frac{1}{2}n\{2a + (n-1)d\}$	or: $S_n = an + \frac{1}{2}n(n-1)d$	2, 3 •
Sum of a geometric progression: $S_n = \dfrac{a(1-r^n)}{1-r}$		2, 3 •
Sum to infinity of a geometric progression: $S_\infty = \dfrac{a}{1-r}$	$\lvert r\rvert < 1$	2, 3 •
${}^nC_r = \dfrac{n!}{(n-r)!r!}$		2, 3 •
$(a+b)^n = \displaystyle\sum_{r=0}^{n} {}^nC_r a^{n-r}b^r$	Binomial expansion, $n \in \mathbb{N}$	2, 3 •
$(1+x)^k = 1 + kx + \frac{k(k-1)}{2!}x^2 + \cdots + \frac{k(k-1)\cdots(k-r+1)}{r!}x^r + \cdots$	$\lvert x\rvert < 1$, $k \in \mathbb{Q}$	2, 3 •
$\displaystyle\sum_{r=1}^{n} r = \frac{1}{2}n(n+1)$		2, 3 •
$\mathrm{f}(x) = \displaystyle\sum_{r=0}^{\infty} \frac{1}{r!}\,\mathrm{f}^{(r)}(0)\,x^r$	Maclaurin series	3 •
$\mathrm{e}^x = \displaystyle\sum_{r=0}^{\infty} \frac{x^r}{r!}$	converges for all x	2, 3 •
$\ln(1+x) = \displaystyle\sum_{r=1}^{\infty} (-1)^{r+1}\frac{x^r}{r}$	converges for $-1 < x \leqslant 1$	3 •
$\sin x = \displaystyle\sum_{r=0}^{\infty} (-1)^r \frac{x^{2r+1}}{(2r+1)!}$	converges for all x	3 •
$\cos x = \displaystyle\sum_{r=0}^{\infty} (-1)^r \frac{x^{2r}}{(2r)!}$	converges for all x	3 •

Coordinate geometry		
Formula	**Comment**	**Papers**
The straight line graph with gradient m passing through the point (x_1, y_1) has equation $y - y_1 = m(x - x_1)$		2, 3
Straight lines with non-zero gradients m_1 and m_2 are perpendicular if and only if $m_1 m_2 = -1$		2, 3

Trigonometry		
Formula	**Comment**	**Papers**
Sine rule for the triangle ABC: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$		2, 3
Cosine rule in the triangle ABC: $a^2 = b^2 + c^2 - 2bc\cos A$		2, 3
Area of triangle ABC: $\frac{1}{2}ab\sin C$		2, 3
$\cos^2 A + \sin^2 A = 1$		2, 3
$\sec^2 A = 1 + \tan^2 A$		2, 3
$\operatorname{cosec}^2 A = 1 + \cot^2 A$		2, 3
$\sin 2A = 2\sin A\cos A$		2, 3
$\cos 2A = \cos^2 A - \sin^2 A$		2, 3
$\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$	$A \neq (k + \frac{1}{2})\frac{\pi}{2}$, $k \in \mathbb{Z}$	2, 3
$\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$		2, 3
$\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$		2, 3
$\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A\tan B}$	$A \pm B \neq (k + \frac{1}{2})\pi$, $k \in \mathbb{Z}$	2, 3 •
$\sin\theta \approx \theta$, $\cos\theta \approx 1 - \frac{1}{2}\theta^2$, $\tan\theta \approx \theta$	θ small (compared with 1); θ in radians	2, 3 •

Hyperbolic functions		
Formula	**Comment**	**Papers**
$\sinh x = \dfrac{\mathrm{e}^{x} - \mathrm{e}^{-x}}{2}$	by definition	3
$\cosh x = \dfrac{\mathrm{e}^{x} + \mathrm{e}^{-x}}{2}$	by definition	3
$\tanh x = \dfrac{\sinh x}{\cosh x}$	by definition	3
$\cosh^2 A - \sinh^2 A = 1$		3 •
$\operatorname{sech}^2 A = 1 - \tanh^2 A$		3 •
$\operatorname{cosech}^2 A = \coth^2 A - 1$		3 •
$\sinh 2A = 2 \sinh A \cosh A$		3 •
$\cosh 2A = \cosh^2 A + \sinh^2 A$		3 •
$\tanh 2A = \dfrac{2 \tanh A}{1 + \tanh^2 A}$		3 •
$\sinh(A \pm B) = \sinh A \cosh B \pm \cosh A \sinh B$		3 •
$\cosh(A \pm B) = \cosh A \cosh B \pm \sinh A \sinh B$		3 •
$\tanh(A \pm B) = \dfrac{\tanh A \pm \tanh B}{1 \pm \tanh A \tanh B}$		3 •

Derivatives			
Function	**Derivative**	**Comment**	**Papers**
$\sin x$	$\cos x$		2, 3
$\cos x$	$-\sin x$		2, 3
$\tan x$	$\sec^2 x$		2, 3 •
$\cot x$	$-\mathrm{cosec}^2 x$		2, 3 •
$\sec x$	$\sec x \tan x$		2, 3 •
$\mathrm{cosec}\, x$	$-\mathrm{cosec}\, x \cot x$		2, 3 •
$\sin^{-1} x$	$\dfrac{1}{\sqrt{1-x^2}}$		2, 3 •
$\tan^{-1} x$	$\dfrac{1}{1+x^2}$		2, 3 •
$\sinh x$	$\cosh x$		3
$\cosh x$	$\sinh x$		3
$\tanh x$	$\mathrm{sech}^2 x$		3 •
$\coth x$	$-\mathrm{cosech}^2 x$		3 •
$\mathrm{sech}\, x$	$-\mathrm{sech}\, x \tanh x$		3 •
$\sinh^{-1} x$	$\dfrac{1}{\sqrt{1+x^2}}$		3 •
$\tanh^{-1} x$	$\dfrac{1}{1-x^2}$		3 •
e^x	e^x		2, 3
$\ln x$	$\dfrac{1}{x}$		2, 3
$\mathrm{f}(x) + \mathrm{g}(x)$	$\mathrm{f}'(x) + \mathrm{g}'(x)$		2, 3
$\mathrm{f}(x)\mathrm{g}(x)$	$\mathrm{f}'(x)\mathrm{g}(x) + \mathrm{f}(x)\mathrm{g}'(x)$	product rule	2, 3
$\dfrac{\mathrm{f}(x)}{\mathrm{g}(x)}$	$\dfrac{\mathrm{f}'(x)\mathrm{g}(x) - \mathrm{f}(x)\mathrm{g}'(x)}{\big(\mathrm{g}(x)\big)^2}$	quotient rule	2, 3 •
$\mathrm{f}\big(\mathrm{g}(x)\big)$	$\mathrm{f}'\big(\mathrm{g}(x)\big)\mathrm{g}'(x)$	chain rule	2, 3

Integrals			
Function	**Integral**	**Comment**	**Papers**
x^n	$\frac{1}{n+1}\,x^{n+1}+c$	$n \neq -1$	2, 3
x^{-1}	$\ln\lvert x\rvert + c$		2, 3
$\cos x$	$\sin x + c$		2, 3
$\sin x$	$-\cos x + c$		2, 3
$\sinh x$	$\cosh x + c$		3
$\cosh x$	$\sinh x + c$		3
$\dfrac{1}{\sqrt{1-x^2}}$	$\sin^{-1} x + c$	$-1 < x < 1$	2, 3 •
$\dfrac{1}{1+x^2}$	$\tan^{-1} x + c$		2, 3 •
e^x	$\mathrm{e}^x + c$		2, 3
$\mathrm{f}'(x) + \mathrm{g}'(x)$	$\mathrm{f}(x) + \mathrm{g}(x) + c$		2, 3
$\mathrm{f}'\big(\mathrm{g}(x)\big)\,\mathrm{g}'(x)$	$\mathrm{f}\big(\mathrm{g}(x)\big) + c$		2, 3
$\dfrac{\mathrm{f}'(x)}{\mathrm{f}(x)}$	$\ln\lvert\mathrm{f}(x)\rvert + c$		2, 3 •
$\big(\mathrm{f}(x)\big)^n\,\mathrm{f}'(x)$	$\frac{1}{n+1}\big(\mathrm{f}(x)\big)^{n+1} + c$	$n \neq -1$	2, 3 •
$u\dfrac{\mathrm{d}v}{\mathrm{d}x}$	$uv - \displaystyle\int v\frac{\mathrm{d}u}{\mathrm{d}x}\,\mathrm{d}x$	integration by parts	2, 3 •

General calculus		
Formula	**Comment**	**Papers**
$\mathrm{f}'(x) = \lim_{h\to 0} \dfrac{\mathrm{f}(x+h) - \mathrm{f}(x)}{h}$	first principles definition	2, 3 •
$\dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{\mathrm{d}y}{\mathrm{d}t} \Big/ \dfrac{\mathrm{d}x}{\mathrm{d}t}$	for the parameterised curve $y = y(t)$, $x = x(t)$	2, 3 •
Area under the curve $y = \mathrm{f}(x)$ and above the x-axis: $\displaystyle\int_a^b \mathrm{f}(x)\,\mathrm{d}x$		2, 3
Volume of revolution about the x-axis: $\pi \displaystyle\int_a^b \big(\mathrm{f}(x)\big)^2\,\mathrm{d}x$		3
$\displaystyle\int_a^b y\,\mathrm{d}x \approx \tfrac{1}{2}h(y_0 + y_n) + h(y_1 + y_2 + \cdots + y_{n-1})$	$h = \dfrac{b-a}{n}$, $y_r = y(a + rh)$, trapezium rule	2, 3 •
$\ddot{x} = -\omega^2 x \Rightarrow x = R\sin(\omega t + \alpha)$ or $x = R\cos(\omega t + \beta)$ or $x = A\cos\omega t + B\sin\omega t$	simple harmonic motion	3 •

Circles		
Formula	**Comment**	**Papers**
Length of an arc of a circle of radius r: $r\theta$	θ is angle subtended in radians	2, 3
Area of a sector of a circle of radius r: $\frac{1}{2}r^2\theta$	θ is angle subtended in radians	2, 3

Complex numbers		
Formula	**Comment**	**Papers**
$e^{i\theta} = \cos\theta + i\sin\theta$		3
$z = r(\cos\theta + i\sin\theta) \Rightarrow z^n = r^n(\cos n\theta + i\sin n\theta)$	de Moivre's theorem	3 •
$z^n = 1$ has roots $z = e^{2\pi ki/n}$ where $k = 0, 1, \ldots, (n-1)$	Roots of unity	3 •
Half line with end-point a: $\arg(z-a) = \theta$	θ is the angle between the line and a line parallel to the positive real axis	2, 3
Circle, centre a and radius r: $\lvert z-a\rvert = r$		2, 3

Vectors		
Formula	**Comment**	**Papers**
$\lvert x\mathbf{i} + y\mathbf{j} + z\mathbf{k}\rvert = \sqrt{x^2+y^2+z^2}$		2, 3
$\mathbf{a}.\mathbf{b} = a_1b_1 + a_2b_2 + a_3b_3 = \lvert\mathbf{a}\rvert\,\lvert\mathbf{b}\rvert\cos\theta$	scalar product, $\mathbf{a} = a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}$	2, 3
$\mathbf{a}\times\mathbf{b} = (a_2b_3 - a_3b_2)\mathbf{i} + (a_3b_1 - a_1b_3)\mathbf{j} + (a_1b_2 - a_2b_1)\mathbf{k}$	vector product	3 •
$\lvert\mathbf{a}\times\mathbf{b}\rvert = \lvert\mathbf{a}\rvert\,\lvert\mathbf{b}\rvert\lvert\sin\theta\rvert$	θ is the acute angle between the vectors	3 •
Equation of the line through the point with position vector $\mathbf{a}$ parallel to $\mathbf{b}$: $\mathbf{r} = \mathbf{a} + t\mathbf{b}$		2, 3
Equation of the plane containing the point with position vector $\mathbf{a}$ and with normal $\mathbf{n}$: $(\mathbf{r}-\mathbf{a}).\mathbf{n} = 0$		3

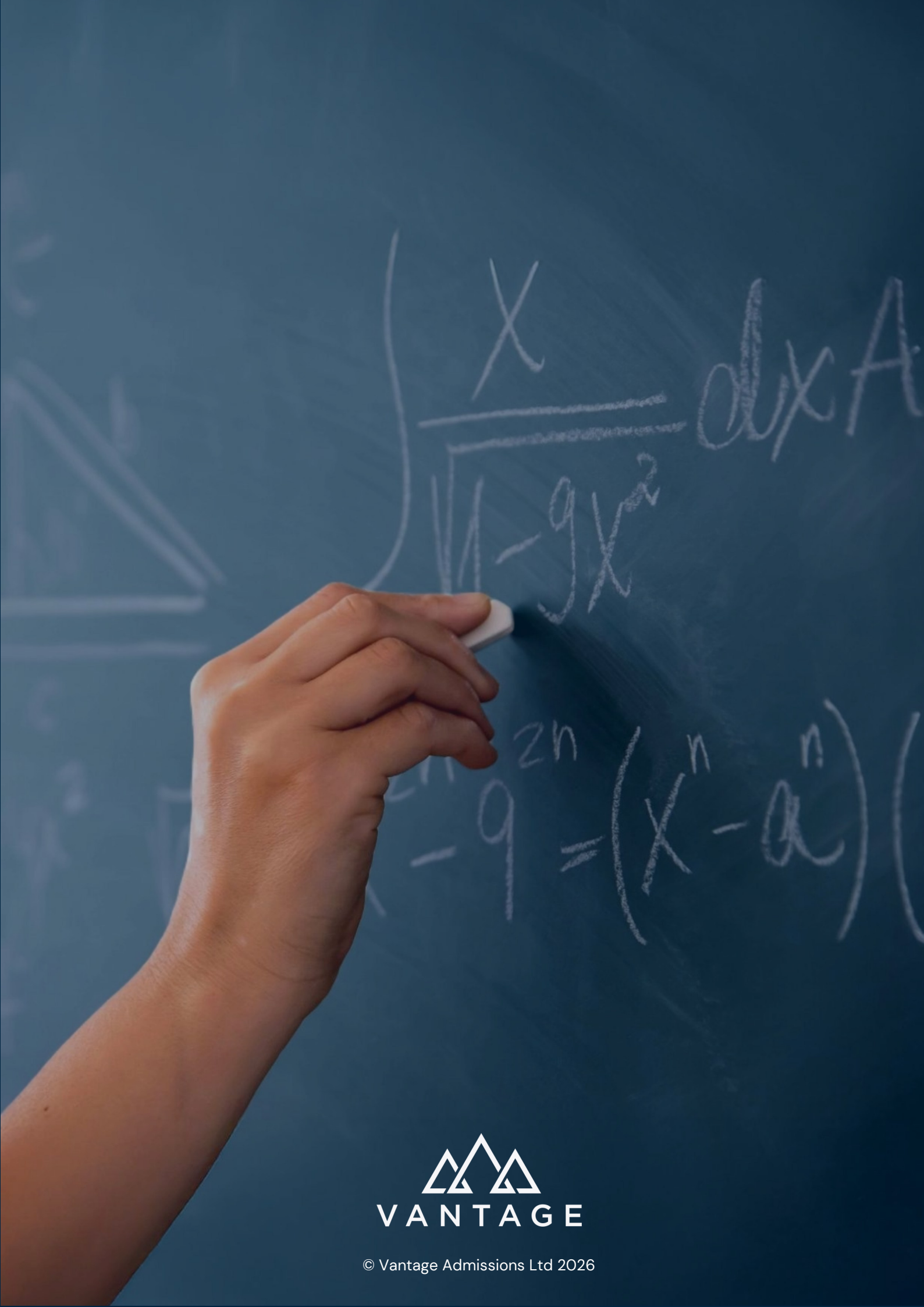
Matrices		
Formula	**Comment**	**Papers**
For $\mathbf{A} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, $\det \mathbf{A} = ad - bc$		2, 3
For $\mathbf{A} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, $\mathbf{A}^{-1} = \frac{1}{\det \mathbf{A}} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$	$\det \mathbf{A} \neq 0$	2, 3
$\mathbf{AB}$ is equivalent to $\mathbf{B}$ then $\mathbf{A}$	for transformations represented by these matrices	2, 3
$(\mathbf{AB})^{-1} = \mathbf{B}^{-1}\mathbf{A}^{-1}$	$\det \mathbf{AB} \neq 0$	2, 3
$\begin{pmatrix} 0 & \pm 1 \\ \pm 1 & 0 \end{pmatrix}$	reflection in the line $y = \pm x$	2, 3 •
$\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$	rotation by θ about the z-axis; the direction of positive rotation is taken to be anticlockwise when looking towards the origin from the positive side of the axis of rotation	2, 3 •
$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$	reflection in the plane $z = 0$	2, 3 •

Mechanics		
Formula	**Comment**	**Papers**
mg	weight	2, 3
$F \leqslant \mu R$	frictional force related to normal reaction R	2, 3
$F = ma$	scalar version of Newton's second law; constant mass	2, 3
$\mathbf{F} = m\mathbf{a}$	vector version of Newton's second law; constant mass	2, 3
$\frac{1}{2}mv^2$	kinetic energy	2, 3 •
mgh	change in gravitational potential energy; h is vertical height	2, 3 •
mv	momentum	2, 3 •
$mv - mu$	impulse	2, 3 •
$T = \dfrac{\lambda x}{l} = kx$	Hooke's law	2, 3 •
$E = \dfrac{\lambda x^2}{2l} = \dfrac{1}{2}kx^2$	elastic potential energy	2, 3 •
$v = \dfrac{\mathrm{d}r}{\mathrm{d}t}, \ \ a = \dfrac{\mathrm{d}v}{\mathrm{d}t} = \dfrac{\mathrm{d}^2r}{\mathrm{d}t^2}$	motion in a straight line (where acceleration, a, may not be constant)	2, 3 •
$v = u + at, \ \ s = ut + \frac{1}{2}at^2, \ \ s = \frac{1}{2}(u+v)t, \ \ v^2 - u^2 = 2as$	motion in a straight line with constant acceleration, a	2, 3 •
$\mathbf{v} = \dfrac{\mathrm{d}\mathbf{r}}{\mathrm{d}t}, \ \mathbf{a} = \dfrac{\mathrm{d}\mathbf{v}}{\mathrm{d}t}$	motion in two (STEP 2) or three (STEP 3) dimensions where acceleration, $\mathbf{a}$, may not be constant	2, 3 •
$\mathbf{v} = \mathbf{u} + \mathbf{a}t, \ \mathbf{s} = \mathbf{u}t + \frac{1}{2}\mathbf{a}t^2, \ \mathbf{s} = \frac{1}{2}(\mathbf{u}+\mathbf{v})t, \ \mathbf{v}.\mathbf{v} - \mathbf{u}.\mathbf{u} = 2\mathbf{a}.\mathbf{s}$	motion in two or three dimensions with constant acceleration, $\mathbf{a}$	2, 3 •
$v_1 - v_2 = -e(u_1 - u_2)$ or relative speed of separation = $e \times$ relative speed of approach	Newton's experimental law	2, 3 •
speed = $r\dot{\theta}$, radial acceleration = $\dfrac{v^2}{r} = r\dot{\theta}^2$ towards the centre, tangential acceleration = $r\ddot{\theta}$	motion in a circle of radius r	3 •

Probability/Statistics		
Formula	**Comment**	**Papers**
$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$	probability of the union of two events	2, 3 •
$\mathrm{P}(A \cap B) = \mathrm{P}(A \mid B)\,\mathrm{P}(B)$	probability of the intersection of two events	2, 3 •
$\mathrm{E}(aX + bY + c) = a\mathrm{E}(X) + b\mathrm{E}(Y) + c$	algebra of expectation	3 •
$\mathrm{Var}\,(aX + bY + c) = a^2\,\mathrm{Var}\,(X) + b^2\,\mathrm{Var}\,(Y)$	algebra of variances for independent variables	3 •
$\mu = \mathrm{E}(X) = \sum_i x_i \mathrm{P}(X = x_i)$	expectation of a discrete random variable X	2, 3 •
$\mu = \mathrm{E}(X) = \int x\mathrm{f}(x)\,\mathrm{d}x$	expectation of a continuous random variable X with p.d.f. f	2, 3 •
$\sigma^2 = \mathrm{Var}\,(X) = \sum_i (x_i - \mu)^2 \mathrm{P}(X = x_i)$ $= \sum_i x_i^2\,\mathrm{P}(X = x_i) - \mu^2$	variance of a discrete random variable X	2, 3 •
$\sigma^2 = \mathrm{Var}\,(X) = \int (x - \mu)^2 \mathrm{f}(x)\,\mathrm{d}x = \int x^2 \mathrm{f}(x)\,\mathrm{d}x - \mu^2$	variance of a continuous random variable X with p.d.f. f	2, 3 •
$\mathrm{F}(x) = \mathrm{P}(X \leqslant x) = \int_{-\infty}^{x} \mathrm{f}(x)\,\mathrm{d}x$	cumulative distribution function (c.d.f.)	2, 3 •

Random variables				
Distribution	$\mathrm{P}(X = x)$	$\mathrm{E}(X)$	$\mathrm{Var}\,(X)$	**Papers**
Binomial $\mathrm{B}(n, p)$	$\binom{n}{x} p^x (1-p)^{n-x}$	np	$np(1-p)$	2, 3 •
Uniform distribution over 1, 2, …, n	$\frac{1}{n}$	$\frac{1}{2}(n+1)$	$\frac{1}{12}(n^2-1)$ (included for completeness; memorisation not required)	2, 3 •
Poisson $\mathrm{Po}(\lambda)$	$\frac{\lambda^x \mathrm{e}^{-\lambda}}{x!}$	λ	λ	2, 3 •

Distribution	p.d.f.	$\mathrm{E}(X)$	$\mathrm{Var}\,(X)$	**Papers**
Uniform distribution over $[a, b]$	$\frac{1}{b-a}$	$\frac{1}{2}(a+b)$	$\frac{1}{12}(b-a)^2$ (included for completeness; memorisation not required)	2, 3 •
Normal $\mathrm{N}(\mu, \sigma^2)$	$\frac{1}{\sqrt{2\pi\sigma^2}}\, \mathrm{e}^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$ (included for completeness; memorisation not required)	μ	σ^2	2, 3 •



VANTAGE