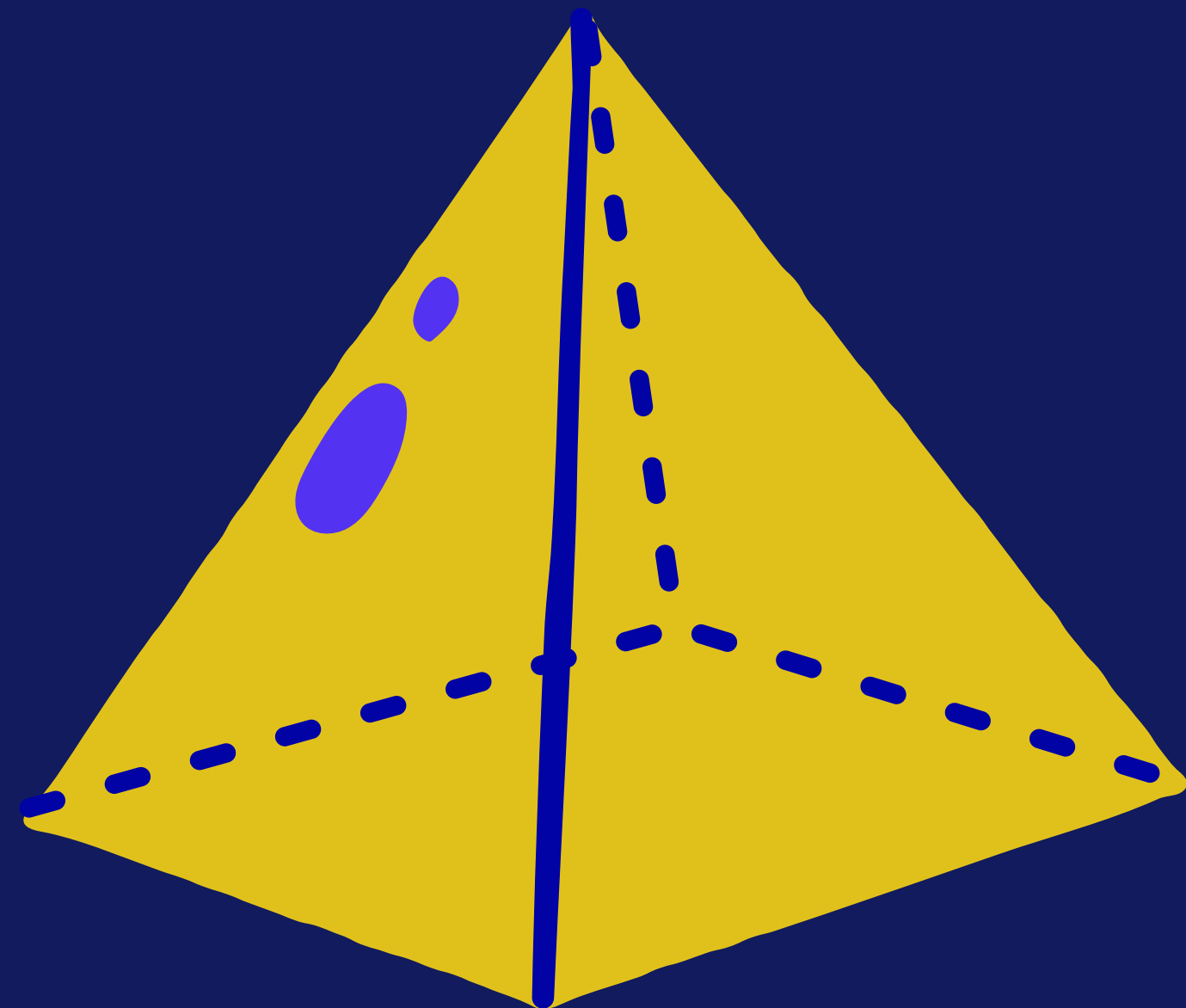




IB MATHS ANALYSIS & APPROACHES

The Ultimate Study Guide

Updated for the 2025 Syllabus

ABOUT THIS GUIDE

This guide was created with one purpose: to give you the ultimate resource for mastering your IB subject. It's built on the invaluable advice of our fantastic Lanterna tutors—the very best in the field.

These tutors not only achieved top grades in the IB themselves but also have years of experience helping students like you succeed. Their insights, strategies, and tips are pure gold—insider knowledge you won't find anywhere else online.

Whether you're a current student or trying to decide if this subject is right for you, this guide has everything you need to thrive.

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WHY SHOULD YOU TRUST US?

The tutors whose information we compiled to create this guide have not only conquered the IB but they are experts in simplifying the learning journey for you. The most common score for our IB tutors is the full 45 points. More specifically, they have received a 7 in this particular subject.

42.3

Average IB score of
our tutors

150K+

Hours tutored



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OVERVIEW: MATH AA

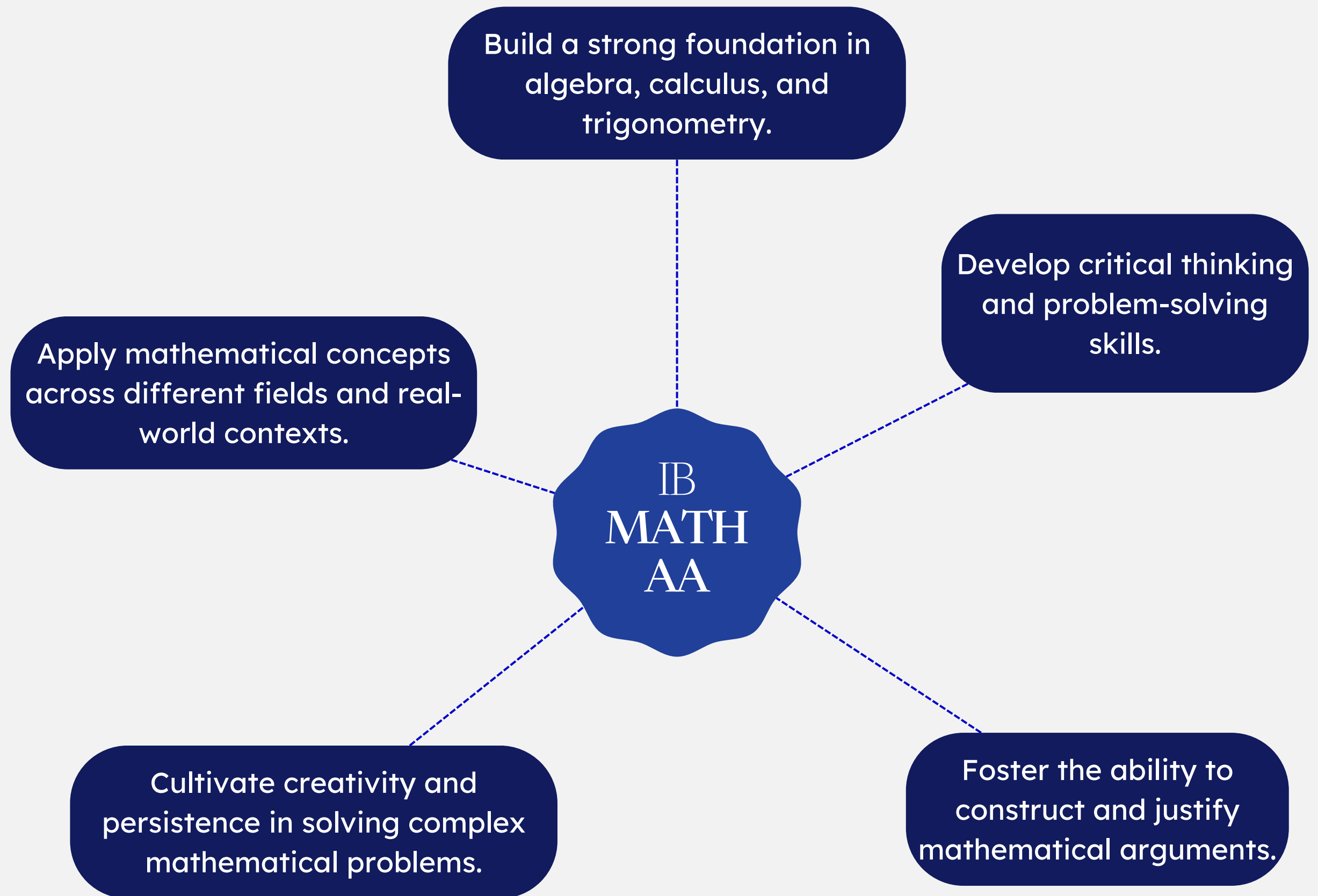
IB Mathematics: Analysis and Approaches focuses on developing a deep understanding of mathematical concepts and their application in solving both abstract and real-world problems.

The course emphasizes constructing and communicating mathematical arguments while fostering logical thinking, problem-solving, and creative exploration. With a strong foundation in calculus, algebra, and trigonometry, students engage with mathematical models, refine problem-solving techniques, and explore connections across different areas of mathematics.

Students are encouraged to think critically and apply technology to investigate and solve complex problems. The course prepares them for fields requiring analytical expertise, such as engineering, physical sciences, and mathematics itself.

COURSE AIMS

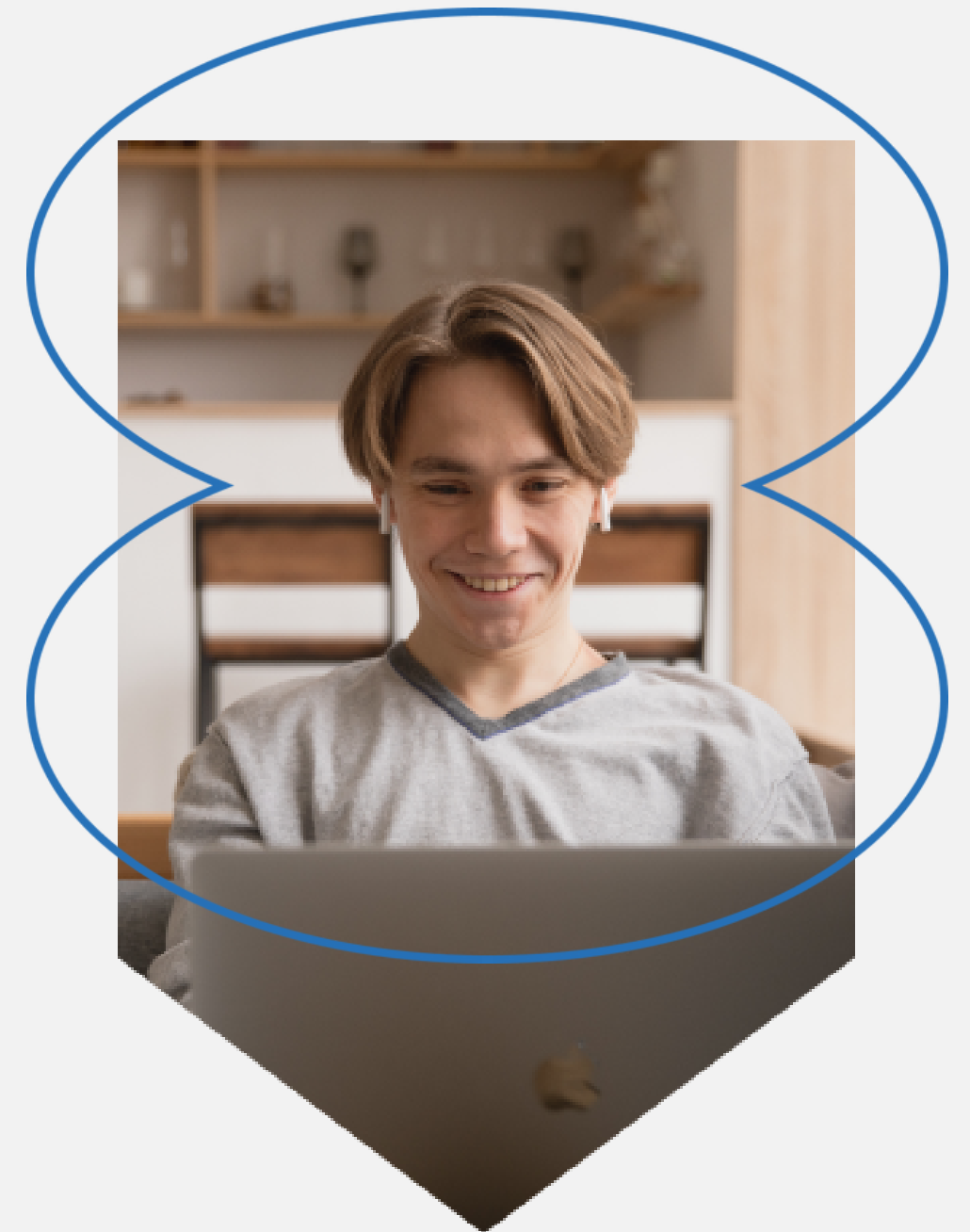
IB Mathematics: Analysis and Approaches focuses on developing students' analytical skills, logical reasoning, and ability to solve abstract mathematical problems.



WHO SHOULD CHOOSE IT?

IB Mathematics: Analysis and Approaches is ideal for students who enjoy abstract reasoning and solving complex mathematical problems. This course focuses on developing analytical skills and exploring mathematical concepts in depth. It's a great choice if you:

- Love mathematics and logical problem-solving.
- Enjoy working with algebra, geometry, and calculus in an abstract context.
- Are interested in pursuing careers in mathematics, engineering, computer science, physics, or economics.
- Want to develop strong reasoning and argumentation skills for theoretical problem-solving.



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SL

Teaching Hours **150**

Exams **3 hours**

focuses on foundational concepts.



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HL

Teaching Hours **240**

Exams **4.5 hours**

HL extends all main topics in greater depth. Specific additional topics include:

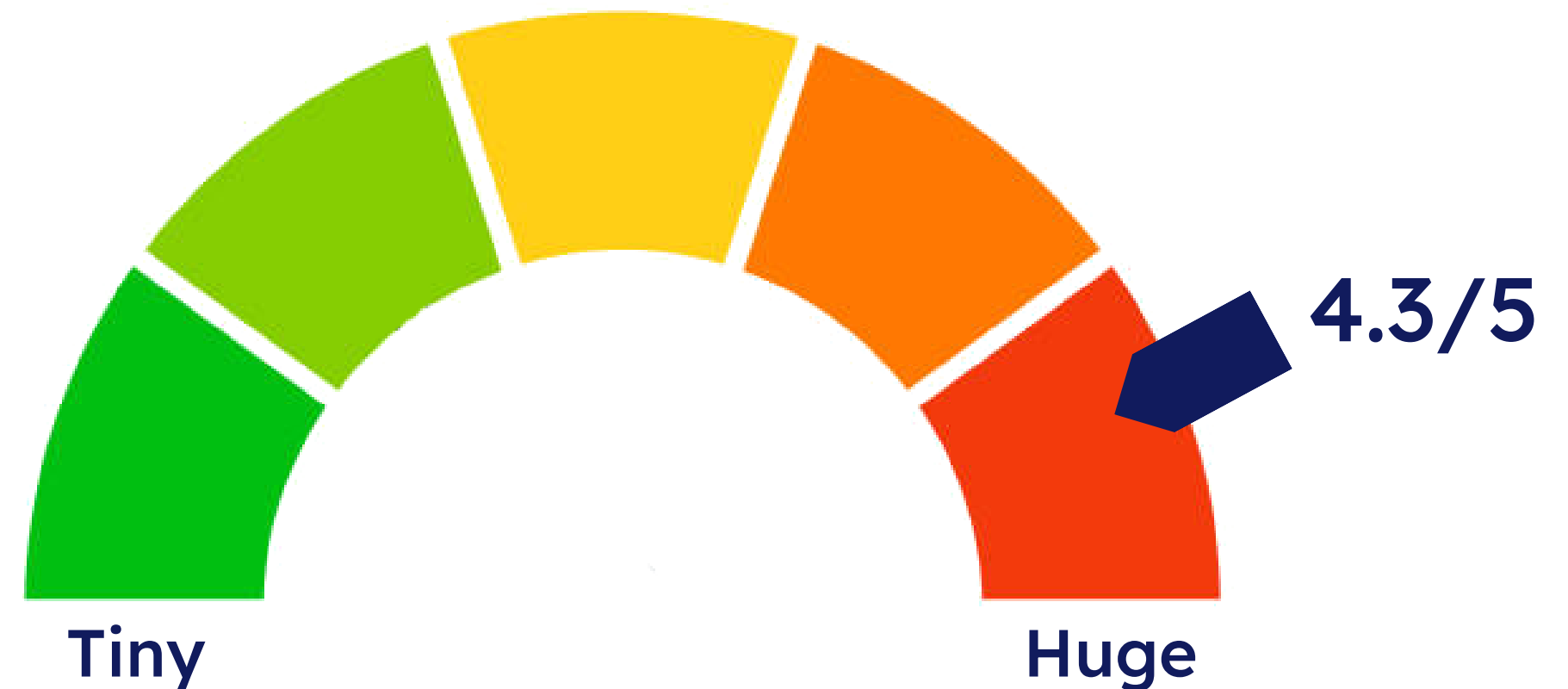
- Logarithmic & power models
- Complex numbers and applications
- 3D vectors and applications
- Hypothesis testing
- Probability distributions
- Differential equations & slope fields
- Numerical methods for solving equations

02

HOW BIG IS THE JUMP FROM SL → HL

The jump from SL to HL in Math AA is 4.3 out of 5, making it one of the most challenging transitions.

HL covers advanced calculus and proofs, demanding strong analytical skills and a high level of mathematical fluency.



Compiled from our best IB Math AA tutors

WHO SHOULD PICK HL?

Enjoys Abstract and Rigorous Mathematics

Thrives on proofs, complex functions, and theoretical problem-solving.

Has Strong Algebraic and Logical Thinking Skills

Finds manipulating equations and understanding patterns intuitive.

Considering a Math-Intensive University Course

Aspires to study engineering, physics, mathematics, computer science, or economics at a top university.

Confident with Exam Pressure and Extended Problem-Solving

Can handle challenging, multi-step problems under time constraints (especially Paper 3).



CORE SKILLS FOR SUCCESS

Logical Thinking and Structured Problem Solving

Approach each problem step-by-step with logical deduction and planning. Work clearly and methodically for accurate solutions.

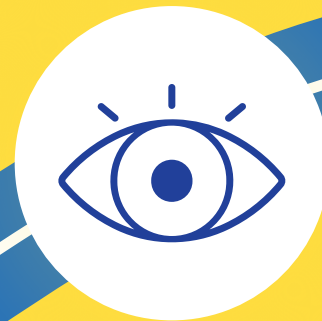


Develop Strong Analytical and Reasoning Skills

Understand the origin and theory behind concepts, not just memorization. Apply critical thinking to tackle complex mathematical problems.

Focus on Visualization

Visualizing abstract concepts like lines, planes, and complex numbers helps build a deeper understanding and intuitive grasp of mathematics.



Transfer Knowledge Across Topics

Integrate different areas of mathematics and apply your understanding to new, unfamiliar situations. Flexibility in applying concepts is key.



Embrace Mistakes as Learning Opportunities

Effective practice means learning from errors and refining your problem-solving strategies. Target the right questions to boost your skills.



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03

“WHAT IS THE MOST IMPORTANT SKILL FOR A STUDENT TO DEVELOP?”

“



“Logical deduction and structured thinking—approaching problems in a clear, organized way is crucial for success.”

“Critical thinking and problem-solving—analyzing questions, evaluating methods, and choosing the best approach is key to mastering challenging problems.”

“Visualize and connect concepts—understanding lines, planes, and complex numbers by visualizing them helps solidify theoretical knowledge and its applications.”

MEMORIZATION



4.5 OUT OF 10

The average rating our tutors gave for the importance of **strong memorization** for IB Math AA

Good news for those with bad memory!

ASSESSMENT STRUCTURE

PAPER 1

External

No technology allowed.

Section A: compulsory short-response questions based on the syllabus.
Section B: compulsory extended-response questions based on the syllabus.

SL: 1h30, 40% final grade
HL: 2h, 30% final grade

PAPER 2

External

Technology allowed.

Section A: compulsory short-response questions based on the syllabus.
Section B: compulsory extended-response questions based on the syllabus.

SL: 1h30, 40% final grade
HL: 2h, 30% final grade

PAPER 3 (HL ONLY)

Internal

Technology allowed.

Two compulsory extended-response problem-solving questions.

HL Only: 1 hour, 20% of final grade

INTERNAL ASSESSMENT

Internal - 20% final grade

12-20 page report where students explore a mathematical topic of their choice, applying concepts to solve a problem or answer a question.

It showcases their ability to conduct independent research and analysis.

TRICKS FOR YOUR PAPER 1

Do's

- **READ THE QUESTION CAREFULLY** – Pay close attention to what is being asked, especially when dealing with inequalities, equations, and word problems.
- **SHOW YOUR WORK CLEARLY** – Even if your final answer is incorrect, you may still receive partial credit for correct steps.
- **USE CORRECT MATHEMATICAL NOTATION** – Stick to IB-approved symbols and notation to avoid unnecessary mark deductions.
- **MANAGE YOUR TIME WISELY** – Don't get stuck on one difficult question; move on and return to it later if needed.

Don'ts

- **DON'T SKIP QUESTIONS WITHOUT ATTEMPTING THEM** – Even partial solutions may earn you marks.
- **DON'T RELY ON MENTAL MATH ALONE** – Write down steps to reduce careless errors.
- **DON'T RUSH THROUGH SHORT QUESTIONS** – Double-check your work for small mistakes that could cost easy marks.
- **DON'T WASTE TIME ON COMPLEX CALCULATIONS** – Simplify expressions whenever possible to speed up problem-solving.



TRICKS FOR YOUR PAPER 2

Do's

- **USE YOUR CALCULATOR WISELY** – Know how to use key functions (e.g., graphing, solving equations, statistical tools) to save time.
- **CHECK YOUR ANSWERS USING DIFFERENT METHODS** – Use algebra, graphs, and tables when possible to verify your solutions.
- **FAMILIARIZE YOURSELF WITH THE IB FORMULA BOOKLET** – It contains key formulas that can help you avoid unnecessary memorization.
- **USE DIAGRAMS AND GRAPHS WHERE POSSIBLE** – Visual representations can help clarify your reasoning and score extra marks.

Don'ts

- **DON'T DEPEND ENTIRELY ON YOUR CALCULATOR** – If you make a mistake in inputting data, the wrong answer will result.
- **DON'T IGNORE EXACT ANSWERS** – Some questions require answers in terms of π , surds, or fractions instead of decimals.
- **DON'T FORGET TO LABEL GRAPHS AND DIAGRAMS** – Clear labels and correct scaling can help secure full marks.
- **DON'T SPEND TOO MUCH TIME TYPING INTO YOUR CALCULATOR** – If a question can be solved quickly by hand, do so to save time.



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TRICKS FOR YOUR PAPER 3 (HL)

Do's

- **PLAN YOUR APPROACH BEFORE SOLVING** – Read the whole problem, identify key information, and decide on the best strategy.
- **BREAK COMPLEX QUESTIONS INTO SMALLER STEPS** – Tackling multi-step problems systematically will improve accuracy.
- **PROVIDE CLEAR JUSTIFICATIONS FOR YOUR WORK** – HL Paper 3 requires reasoning and explanation, not just calculations.
- **REVIEW YOUR FINAL ANSWER IN CONTEXT** – Make sure it makes sense in the real-world scenario given in the problem.

Don'ts

- **DON'T PANIC IF YOU GET STUCK** – Move on and return later with a fresh perspective; sometimes, the next part of the question provides hints.
- **DON'T WRITE MESSY OR DISORGANIZED SOLUTIONS** – Examiners must be able to follow your logic step-by-step.
- **DON'T IGNORE UNITS OR CONTEXT** – If the question involves measurements, ensure your final answer has appropriate units.
- **DON'T LEAVE EXPLANATIONS BLANK** – Even if unsure, attempt a logical argument—showing your thought process can earn marks.



HOW TO ACE YOUR IA

PERSONAL ENGAGEMENT

Relate your research to personal or local experiences, and choose a unique research question that reflects your genuine interest.

Avoid generic topics—make it personal and creative to stand out.

CRAFT A STRONG RESEARCH QUESTION

Research common IA topics for inspiration, then adapt one to match your personal interests. A focused question with clear, measurable variables will make your investigation unique and engaging.

COLLECT 1ST HAND (QUALITY) DATA

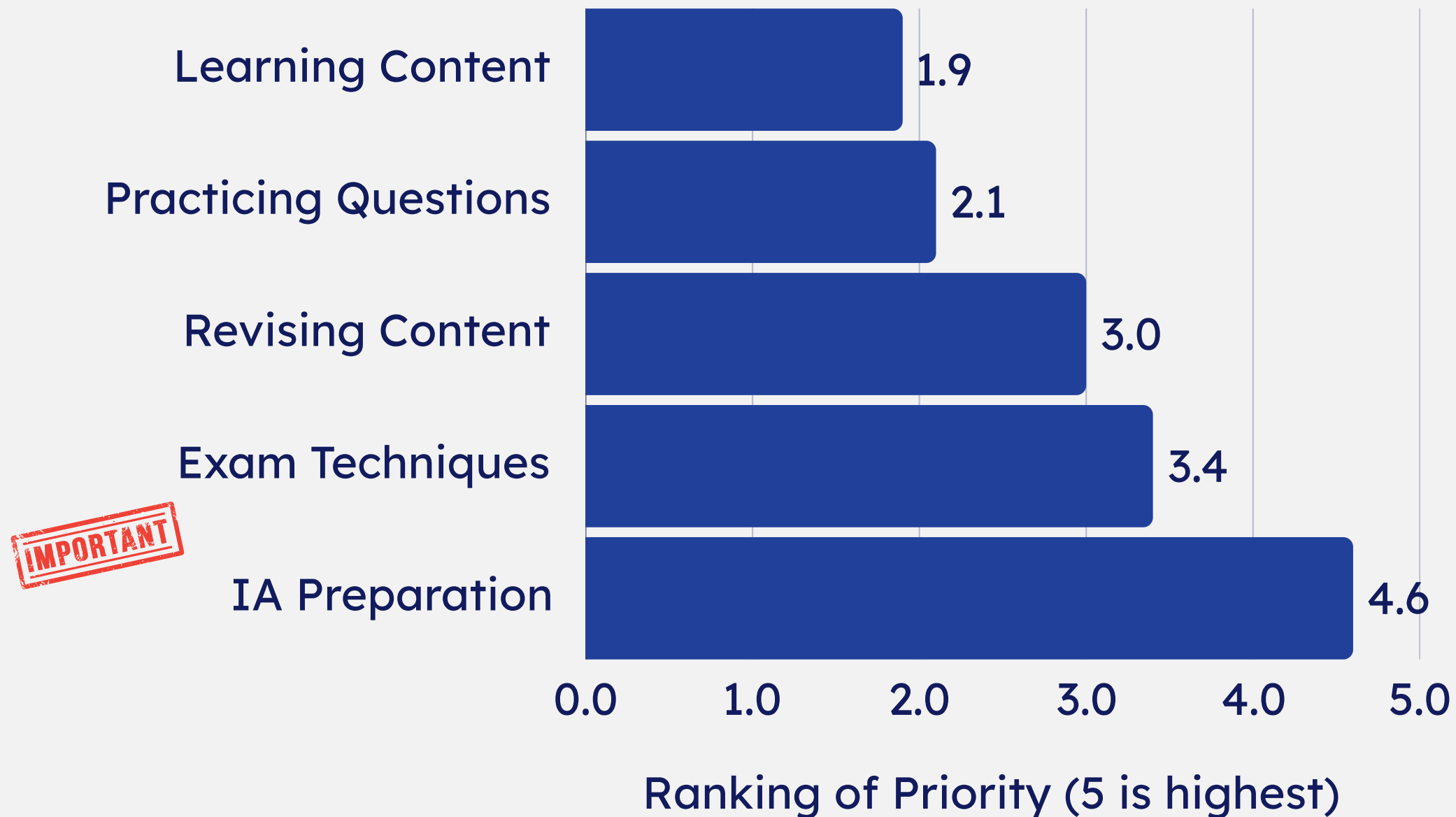
Aim for at least 25 data points by conducting five trials for five different values of your independent variable. Accurate, repeatable data is key to producing reliable and high-scoring results.

HAVE A DELIVERABLE CONCLUSION

Your conclusion should answer your research question and address your hypothesis. Clearly state whether your hypothesis was supported, explain your findings, and suggest improvements for accuracy and reliability in future experiments.



EFFECTIVE STUDY STRATEGIES



WHAT SHOULD YOU PRIORITIZE IN YOUR STUDY TIME?

According to tutor insights, IA preparation and improving exam techniques are crucial for excelling in IB Maths AA. Dedicate time to perfecting your IA by focusing on mathematical exploration, accuracy, and presentation. For exam success, prioritize problem-solving strategies and working through past papers under timed conditions. Ensure a deep understanding of concepts, but consistent practice across various question types will significantly improve your performance.

UNDERSTAND
THE CONTENT

1

MEMORIZE
SMARTLY

2

PRACTICE,
PRACTICE,
PRACTICE!

3

THE 3-STEP REVISION STRATEGY

1. UNDERSTAND THE CONTENT

The first step in your revision is mastering the key mathematical concepts. Building a strong theoretical foundation will help you approach questions with confidence and avoid relying solely on memorization.



STRUGGLING WITH CONTENT?

WE CAN HELP

Using a tutor is a great way to understand complex content and prepare effectively.

Lanterna Tutors have received a 7 in the subject they are teaching and are able to break-down complex tasks so that they become more understandable and relatable.

They also know exactly what the IB requires and can guide you on what's most important for exams.



2. MEMORIZE SMARTLY



Active Recall

The most effective way to memorize. Test yourself regularly on key concepts without looking at your notes.

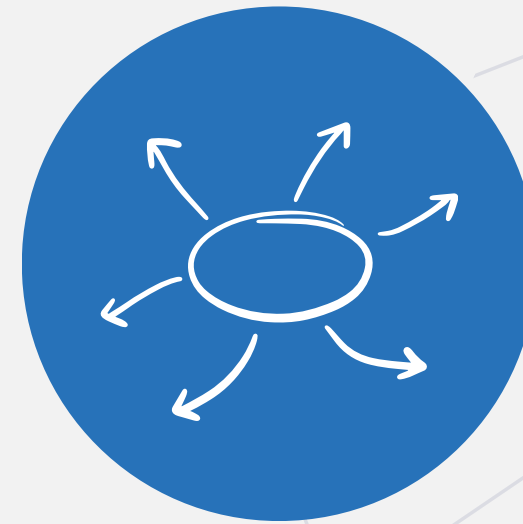
Use apps like Anki or Quizlet to quiz yourself on processes and definitions



Spaced Repetition

Spread your review sessions over increasing intervals to transfer information into long-term memory.

Example: Study a topic today, review it after 3 days, then after a week, and so on.



Mind-Maps

Organize and link key concepts visually to see the "big picture" and how topics connect.



Teach Someone Else

Teaching forces you to explain concepts clearly and identify areas where you lack understanding.

Pro Tip: Even talking out loud to yourself works!



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3. PRACTICE, PRACTICE, PRACTICE!



The most important part of your revision is practice. 80% of your entire grade comes down to just a few hours of exams, so mastering how to answer questions is key. Think of exams like video game levels—repeat them enough, and they’ll become second nature. The more past papers you practice, the more confident and efficient you’ll be.

LEARN IB’S “CRYPTIC” LANGUAGE

This is where the markscheme is your best friend. It shows you exactly what the examiners expect in each answer. If you train yourself to write responses based on the markscheme, you’ll know precisely how to get full marks every time. Our tutors fast-track students to master this skill, teaching them how to break down questions, understand command terms like describe, explain, and evaluate, and write answers that hit full marks every time.

TIMING MATTERS TOO

Simulate real exam conditions by practicing under timed settings, focusing on data-based questions and longer responses. Review your mistakes, check how your answers compare to the markscheme, and adjust your strategy. With enough practice, exams will no longer feel like a challenge—they’ll feel like second nature.



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BEST RESOURCES: WEBSITES



Revision Village ([revisionvillage.com](https://www.revisionvillage.com))

Comprehensive resource with past paper questions, topic-based practice, and in-depth video solutions. Great for exam preparation.



Save My Exams ([savemyexams.com](https://www.savemyexams.com))

Offers practice questions at various levels, ideal for targeted revision and improving exam technique.



Kognity ([kognity.com](https://www.kognity.com))

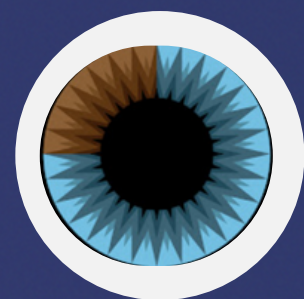
Offers a digital curriculum with in-depth explanations and interactive learning resources tailored to the IB syllabus.

BEST RESOURCES: YOUTUBE



The Organic Chemistry Tutor

Detailed explanations of advanced topics like differentiation, integration, and matrices. Excellent for complex concepts, though videos are longer.



3Blue1Brown

The best resource for understanding the theory and concepts behind calculus with intuitive visual explanations.



Khan Academy

Clear and concise explanations on core math concepts, perfect for filling in knowledge gaps.



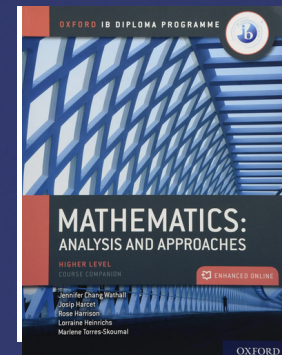
Revision Village

short videos going through all the topics in the syllabus



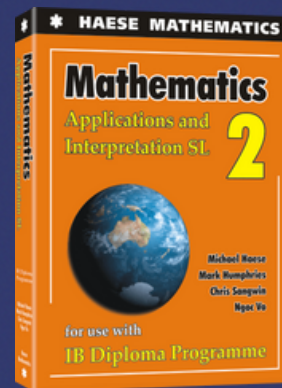
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BEST RESOURCES: BOOKS



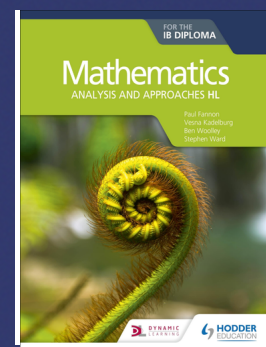
Oxford IB Math AA Course Companion

Well-organized with detailed explanations and plenty of practice problems aligned with the syllabus.



Haese Mathematics Books

Known for structured content and clear teaching style, making them great for step-by-step learning.



Cambridge and Hodder Textbooks

Comprehensive resources with varied phrasing and examples, catering to different learning preferences.

BEST APPS & TOOLS

MASTER ACTIVE RECALL

Use these flashcard apps to memorize effectively. Spaced repetition ensures key concepts stick in your long-term memory. Perfect for mastering definitions and tricky processes.



Quizlet



Anki

PRACTICE MAKES PERFECT

Familiarize yourself with IB-style questions and learn how mark schemes are structured. Regular practice will help you refine your answers and boost confidence for exam day.



IB Questionbank & Past Papers

ADVICE FROM EXPERT TUTORS

“

"Exam prep is a marathon, not a sprint. Start early, work a little every day, and don't hesitate to ask for help—explaining concepts to a friend solidifies your own understanding too."

MARATHON, NOT A SPRINT



ADVICE FROM EXPERT TUTORS



“

"Practice past paper questions as much as possible, but don't just glance at the solutions if you get something wrong. Revisit the question later and solve it independently to truly master it."

MASTER PAST PAPERS:

ADVICE FROM EXPERT TUTORS

“

"Time management is key—aim for one mark per minute to stay on pace during the exam. Practice this timing early to reduce stress and build confidence."

TIME MANAGEMENT



ADVICE FROM EXPERT TUTORS



“

"Math is a skill that improves with consistent practice. Self-assess after every test, track mistakes, and seek guidance on how to correct them efficiently to save time in exams."

CONSISTENT MATH PRACTICE



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FINAL THOUGHTS

IB is challenging but totally achievable if you work smart. It's a content-heavy subject that requires consistent effort, but with the right strategies—like understanding concepts, building connections, and practicing effectively—you'll be on track for success.

WHAT IF I FEEL STUCK?

Sometimes all you need is a little extra guidance to save countless hours of frustration. Lanterna's tutors are IB experts who've been exactly where you are. More than just teaching content, they'll coach you on how to study smarter, manage your time, and build habits that lead to top marks. We've helped students go from 4s to 7s in a few months, and you can do the same with the right support.

WHO IS TUTORING FOR?

1

IF YOU FEEL STUCK AND DON'T KNOW HOW TO CATCH UP

When you've fallen behind, it can feel overwhelming. Having a tutor who's recently done your subject—and aced it—means you get targeted, personal guidance to catch up quickly and focus on what matters most. They'll help you minimise wasted time and maximise your chances of top grades.

2

IF YOU LACK GUIDANCE ON HOW TO STUDY OR TACKLE IAS

If you're unsure how to approach your IA, EE, or even how to revise effectively, a tutor can make all the difference. A lot of stress and time-waste comes from not knowing exactly what you're supposed to do and how to do it. Our tutors guide you step by step and make sure that things are done right the first time, and avoid the frustration later on.

3

IF YOU STRUGGLE WITH MOTIVATION, STUDY SKILLS, OR HABITS

Sometimes it's not about content—it's about knowing how to work efficiently. That's where our tutors at Lanterna stand out. With over 300 tutors, all recent IB graduates who scored 7s in their HL subjects, we know exactly how to help you best.

We don't just teach content—we coach you on building smart habits, managing your time, and studying effectively.



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SEE YOU AT THE TOP!

We hope you found this
guide useful.

Be sure to check out other our
study guides, as well as our
world class tutors.



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