

IB Mathematics Higher Level

Bellaire High School

2007-2008 Course Guide

Ed Mazzoni || bellaire.org/mazzoni || emazzoni@houstonisd.org

Please read this document carefully. You are responsible for the information contained in it.

Welcome to IB Mathematics HL at Bellaire High School!

This course will allow you the opportunity to apply your mathematical knowledge to solving problems set in a variety of meaningful contexts and be introduced to important concepts of rigor and proof. The courses that lead up to the IB Math HL exam provide a sound background for future studies in subjects which have a high degree of mathematical content, for example, engineering, physics, computer science, technology, and mathematics itself. This will be a challenging, yet rewarding course.

IB Math HL will provide you with the opportunity to greatly expand your mathematical knowledge and prepare you for further mathematical studies at the college level. The IB Math HL curriculum consists of seven core topics:

- Algebra
- Functions and Equations
- Circular Functions and Trigonometry
- Matrices
- Vectors
- Statistics and Probability
- Calculus.

These core topics are covered in Bellaire High School's PreAP Algebra II, PreAP Precalculus, AP Calculus BC, and IB Math HL courses. A significant portion of the core curriculum will be covered in the AP Calculus BC course. The further option topics on the IB Math HL exam are

- Statistics and probability (mostly covered in AP Statistics)
- Sets, relations and groups (covered in IB Math HL at BHS)
- Series and differential equations (covered in AP Calculus BC)
- Discrete mathematics (currently not covered in any BHS course).

Each student must select one further option topic for his or her exam. New for the 2008 exam, students will be required to select the option topic they will answer when signing up for exams in the Fall. Details about this will be provided in class.

With whom will you be working in this course?

You will be working with Mr. Mazzoni whose primary goal is to *guide* you as you learn. Mr. Mazzoni has earned a bachelor of science degree in Mathematics and has studied Calculus I, II, and III, Discrete Math, Linear Algebra, Abstract Algebra, Probability and Statistics, Differential Equations, Higher Geometry, Advanced Linear Algebra I and II, Graph Theory, Advanced Multivariable Calculus, and Intermediate Analysis. You will also be working with your classmates, each of whom will be making a unique contribution to this class. In turn, you will contribute to the class by sharing your ideas, mistakes, discoveries, inventions, and solutions.

Our "classroom"

Your classroom at Bellaire High School is the place where ideas are brought together and formalized. *Our classroom is a place for learning.* However, a significant amount of learning must take place outside of the classroom during individual and group studies. *Successful students spend a significant amount of time outside of class internalizing important concepts.*

Online forum

The online forum is intended to provide you with a central place for asking and answering questions about what we are learning in our class. By using this forum, you agree to adhere to the rules outlined in the student code of conduct. Any violations of the student code of conduct will result in the appropriate discipline action and your removal for the forum. Although posting to the forum will not be required or graded, I will make note of students who provide genuine and content-rich posts on a regular basis.

Homework

Homework will be assigned daily and must be completed on-time (usually the next day) to keep up with new material. In order to succeed in this course, you must complete all homework. Homework will *not* be graded on a regular basis since it is part of the learning process and mistakes and questions are expected. At this level of study, I am providing you with more flexibility and freedom. Ideally, you would solve every assigned problem each night; however I know that this is not always possible. With this freedom comes the responsibility to keep up with your work. You should consult your notes, book, and classmates as you learn, but there is no benefit from copying the work of others. As you complete your homework, remember to pay close attention to details, justify your steps, and show all of your work. (You must do all of these on class tests and the IB exam.) If you are under a time constraint, you will be better off skipping a few similar homework problems instead of rushing through all of them or copying someone's work.

Quizzes

Quizzes may be given occasionally and are designed to check your understanding of recent homework assignments. Quizzes are typically worth about 10-30 points, last 10-15 minutes, and are usually not as difficult as a major test since they may be given before concept mastery is expected. Quizzes may or *may not* be announced.

Portfolio

Portfolio assignments will be completed throughout the year. You will complete about five portfolio assignments. These assignments will give you the opportunity to explore mathematical topics and to clearly communicate your findings. 20% of your IB Math HL exam score will be based on your two best portfolio assignments. Each assignment will fall into one of two categories: Mathematical Investigation or Mathematical Modeling. *The written work that you submit must be entirely your own. Although group work can be educationally desirable in some situations, it is not appropriate for the portfolio.* You will receive a portfolio grade during the sixth grading period that is made up of your best two portfolio assignments.

Major tests

One test will be given each six-week grading period. A detailed list of topics to be covered on each test will be provided. To be fully prepared for a test, make sure you understand all class notes/activities/discussions and complete all homework assignments. Do not limit your study time to the night before the test. Review notes, homework, and previous tests often. Practice additional textbook problems not assigned for homework. A few minutes before a test is **not** the time to ask questions or to "cram!" I will not be able to answer questions the day of a test after 7:30 a.m., between classes, or during lunch. Tests will start promptly when the bell rings and must be turned in when the class ends. *No extra time will be given on tests. It is possible that some tests may be curved and the curve is based on the assumption that every student has had the same amount of time to complete the test. There will be no opportunities to retake tests or final exams if you are not satisfied with your score.*

Tests will typically include review questions from previous test topics and will usually be divided into two parts: short response and extended response. Although some questions will be similar in nature to questions from the textbook, other questions may require you to use the knowledge that you have obtained to solve original and challenging problems. You will have to think, reason, and make decisions! In order to receive full-credit on test problems, you must *show all of your work*. Tests will generally be returned the following Monday. ***Dishonorable actions will not be tolerated under any circumstances in or out of our classroom.***

Tentative test dates and content:

Test #1 – 09/20//2007	Series, Sequences, Mathematical Induction, Binomial Theorem
Test #2 – 10/25//2007	Complex Numbers, Trigonometry, Matrices
Test #3 – 12/06/2007	Probability and Statistics
Test #4 – 02/07/2008	Vectors
Test #5 – 04/03/2008	Abstract Algebra
Test #6 – 04/17/2008	Calculus

Although major changes to this test schedule are unlikely, you will be informed of any adjustments.

Presenting solutions

This will become an important component of this course. This is not intended to be a high pressure exercise; rather it will provide you with the opportunity to occasionally present your work and for us to discuss techniques, procedures, notation, mistakes, etc. There are not a set minimum number of times that you must present solutions. However, I will keep track of how often you present and expect everyone to present an equal number of solutions.

Extra credit

There may be opportunities to earn extra credit points throughout the year. Extra credit is only available to those students who are in-class (or have an excused absence) on the day it is given. You can earn up to 4 points per grading period for return signed progress reports. *In fairness to all, no extra credit will be offered on an individual basis. **No extra credit will be awarded to students who accumulate any unexcused absences during a six-week grading period.***

Late work policy

All homework and make-up work should be completed on time. Extra credit will **not** be accepted late. The maximum percentage of points that can be earned depends on when the work is completed (an example of a 20 point assignment in which 18 of the original points were earned is shown):

on-time	up to 100% of points	18 (max 20) points = 90%
1 day late	up to 85% of points	15 (max 17) points = 75%
2 days late	up to 70% of points	13 (max 14) points = 65%
≥ 3 days late	up to 50% of points	9 (max 10) points = 45%

Grades calculations

Each six-week grade will be calculated by dividing the points you have earned (including extra credit) by the total possible points you could have earned during that grading period. Your semester grade will be the average of three six-week grades and a final exam. The Fall final exam is cumulative for the semester and the Spring final exam is cumulative for the year. *If you maintain an average below 80, it will be suggested that you drop IB Math HL if immediate improvement is not shown.* Please note that BHS policy states that you cannot transfer out of a class until the end of the first six-weeks grading period.

Final exams

The Fall final exam is cumulative for the first semester and the Spring final exam is cumulative for the entire year. Review material will be provided for the Fall semester final exam. To prepare for the Spring final exam, use the same material and procedures recommended for preparing for the actual IB exam since the format will be similar and, of course, the topics will be the same. It is my hope that all Seniors will be exempt from the Spring final exam. However, only Seniors meeting all of the requirements (85 or above average, 3 or fewer excused absences, and no unexcused absences) will be exempt. All non-exempt Seniors must take a cumulative final exam during the scheduled final exam time in May.

Progress reports

Detailed progress reports will be made available online at the midpoint and end of each six-week grading period. Progress reports must be signed by a parent and returned promptly. Two extra credit points will be given to those students who return signed progress reports on-time. Since the majority of points will be earned near the end of each 6-weeks, there may be grading periods in which only one progress report is issued at the end of the grading period.

Where can I get help when I do not understand something?

Please do **not** hesitate to ask questions ... there are **no** dumb questions while learning mathematics! Due to the amount of material we will be covering, there may not be enough time during a typical class period to answer all of your questions. You may not realize you have a question until days after we cover a particular topic. I will generally be available Tuesdays and Wednesdays 11:45 a.m. - 12:15 p.m. and as needed to answer questions. If students are interested, I can conduct test review sessions. Since you will be working with other students in your class on a regular basis, help each other! Communicate online, call someone, or meet for study sessions. Also, consult family members with math backgrounds and other outside reference materials including the Internet. *The pace of this course will be **extremely rapid** at times. This is to ensure that all of the required material is covered. **Remember:** Help does not mean copying work or having someone else do the work for you! The Bellaire High School Honor Code applies to all student in this class. Any time that you need help with academic or other matters, your teachers, counselors, and principals are available and willing to help you.*

Materials

Bring the following with you to **every** class meeting (unless told otherwise):

- Loose leaf paper (or a spiral notebook) and a pencil
- Graphing calculator
- A three-ring binder might be helpful to keep notes, tests, handouts, etc. (1 - 1.5" binders seem to work well)
- All assignments completed

A textbook (soft cover) has been issued to you for this course. You are responsible for maintaining it and returning it in good

condition at the end of the year (or if you drop the course). Please keep the textbook at home unless I request you bring it to class.

Calculator use in this class and on the IB exam

I recommend that you use a TI-83 or TI-84 Plus or Plus SE graphing calculator. TI-85 and TI-86 calculators will also work well, but I have had little experience with those and will not be able to answer many questions about how to use them. If enough students have their own calculators, I have TI-83 Plusses that students can check out for the year. Please bring your graphing calculator to class every day. Although you will not need your calculator every day, there are many times in which I will spontaneously use the calculator. In fairness to all, TI-89s or any calculator with a computer algebraic system (CAS) will not be allowed for class tests (they are not allowed on the IB exam). We will be using graphing calculators frequently during class and, although it is not necessary to have your own to complete homework, it can be very helpful.

Classroom procedures

Attendance. It is very important that you are present every day. However, if extenuating circumstances arise and you must be absent, I will allow you to make-up any missed work if the absence is excused. *It is your responsibility to obtain material from me or classmates and to arrange any needed make-up times.* Typically, you will be allowed two nights to make-up work. Consult the *Student Handbook* for consequences of unexcused absences. Skipping will *not* be tolerated and will result in an unexcused absence and a call to your home. If you are aware of an upcoming absence ahead of time, please let me know.

Tardy. Students are expected to be seated and have materials ready when the tardy (second) bell rings. This includes your book, notebook, binder, calculator, and sharpened pencil on your desk. If you will be arriving late, you must obtain a tardy permit. Please enter the room quietly and “tune-in” to the lesson quickly.

Written Excuses / Permits. I will designate an area in your classroom for you to leave permits. *Notes to excuse absences must be given to the attendance office the day you return.* If you must leave campus early or arrive late during my class, you must provide a note signed by a parent and the attendance office. Additionally, you must sign out/in at the attendance office when you leave/arrive. Please do not disrupt the class with notes or permits.

Conduct grades

I anticipate no conduct problems. Everyone in this class has the right to learn, free from any fears of being harmed, intimidated, or embarrassed. Any conduct issues that do arise will be dealt with swiftly. I have the right to help you and your classmates learn without disruption or interference. Thus, you are expected to adhere to the following rules of conduct:

- Respect everyone and everything - no exceptions
- Participate, concentrate, listen, and follow directions from “bell to bell”
- Follow the rules and policies of Bellaire High School as listed in the *Student Handbook*

E = 0-1 infractions, S = 2-3 infractions, P = 4 infractions, U = 5 or more infractions. Infractions include, but are not limited to, working on non-calculus work in class, excessive tardiness, writing on desks, playing games on calculators, phones, or PDAs, and showing disrespect. Arrive to class on-time, ready to work when the bell rings. I reserve the right to assign conduct grades according to overall conduct and attitude demonstrated during each grading period.

The IB Math HL Exam

Assessment dates:

Thursday, March 13, 2008 – Portfolio (Internal Assessment)

- Completed throughout the academic year
- 2 written papers (20 marks each) chosen from all papers completed during the year
- 40 marks total
- 20% of IB Math HL score

Wednesday, May 7, 2008 (PM) – Paper 1

- 2 hours
- Calculator NOT allowed
- Compulsory short-response questions based on the core of the syllabus (60 marks)
- Compulsory extended-response questions based on the core of the syllabus (60 marks)
- 120 marks total
- 30% of IB Math HL score

Thursday, May 8, 2008 (AM) – Paper 2

- 2 hours
- Calculator required
- Compulsory short-response questions based on the core of the syllabus (60 marks)
- Compulsory extended-response questions based on the core of the syllabus (60 marks)
- 120 marks total
- 30% of IB Math HL score

Monday, May 19 (PM) – Paper 3

- 1 hour
- Calculator required
- Answer one option topic (out of four) that consists of a small number of extended-response questions involving sustained reasoning and typically an incline of difficulty
- 60 marks
- 20% of IB Math HL score

Additional details about the IB exam will be provided during class throughout the year.

Please note that the IB Math HL curriculum will be completed in mid-April to allow for about two weeks of review before the first exam. *Although some students might not be taking the IB Math HL exam, it is required that all students participate in the review process.* Reviewing for the exam will benefit everyone as a last chance to solidify math concepts before graduating and it will help in case it is necessary to take the final exam at the end of May.

What happens after the IB Math exam?

Since the IB Math exam begins quite early in May, there are numerous class days remaining after the first exam. The period between the Paper 2 and Paper 3 tests will be used to review the option topic. Many of you will miss some class days while taking other AP and IB exams. Bring materials to class so that you can study for other exams. The exam questions are released a few days after the administration of the exam and we will go through these together during class. This allows me the opportunity to obtain feedback from you about specific questions and problem areas and allows you to form a preliminary assessment of your exam performance.

Please note that changes to the information contained in this document may occur at any time. You will be informed of any changes during class.

Last Revision: 08/03/07