Math ia format

Continue

DATA COLLECTION

MALE

Height (X)	Shoe Size (Y)	X^2	Y^2	XY
1'73	9	29929	81	1557
1'68	9.5	28224	90.25	1596
1'90	10.5	36100	110.25	1995
1'77	11.5	31329	132.25	2035.5
1'80	10	32400	100	1800
1'68	10.5	28224	110.25	1764
1'77	10	31329	100	1770
1'72	12	25984	144	2064
1'82	11	33124	121	2002
1'80	12	32400	144	2160
1'85	11.5	34225	132.25	2127.5
1'84	11	33856	121	2024
1'72	10	25984	100	1720
1'65	10	27225	100	1650
1'78	10.5	31684	110.25	1869
		462017	**1696.5**	**28134**

FEMALE

Height (X)	Shoe Size (Y)	X^2	Y^2	XY
1'70	7	28900	49	1190
1'72	8	25984	64	1376
1'67	7.5	27889	56.25	1252.5
1'60	7	25600	49	1120
1'60	7	25600	49	1120
1'77	7.5	31329	56.25	1327.5
1'55	9	24025	81	1395
1'70	7	28900	49	1190
1'75	9	30625	81	1575
1'60	7	25600	49	1120
1'70	9	28900	81	1530
1'70	8	28900	64	1360
1'46	5	21316	25	730
1'55	6	24025	36	930
1'67	9	27889	81	1503
		409082	**870.5**	**18719**

IB Chemistry Lab Report Format

DESIGN (D) = steps 1-5 + setup for 6 and possibly 7
DATA COLLECTION & PROCESSING (DCP) = steps 6 & 7
CONCLUSION & EVALUATION (CE) = step 8

(NOTE: Labs should be done on computer. Do not # your steps as above in the final typed report.)

1. **Descriptive Title** (ex: "Effect of Concentration on Reaction Rate"; not: "Concentration Experiment")

INTRODUCTION

2. **Research Question** (should be focused & should identify the relevant variables; Ex: "How does solute concentration affect reaction rate for double replacement reactions of ionic salts?")

3. **Variables Chart**
   IDV: (What is the independent variable? → What did you change or manipulate?)
   DV: (What is the dependent variable? → What type of data did you measure/collect?)

Variables to be Controlled (state the variable; you can & should have more than 3 if appropriate!)	**How Method Allows for the Control of these Variables** (explain how you will control this variable!!!)
X: ex. - volume of solution	**5 mL of each solution will be combined for each reaction**
Y	
Z	

MATERIALS AND METHOD

4. **Detailed Procedure**
   *complete materials list
   *Remember, procedures should be written for someone who has never done the experiment. Include # of trials, how solutions are made or their concentrations; sizes and numbers of materials, etc.
   *Include a sketch (with labels, informative title and figure #) of any lab equipment that must be set up.
   *Your procedure must allow for the collection of sufficient relevant data (ex: if calculating standard deviation or running a regression line you would need a sample size of at least 5).
   *At minimum if I am not requiring you to determine a procedure: "Reference Teacher Handout."

RESULTS

5. **Data Table(s) and Data Collection**
   - Recording Raw Data
     -each data table has a number and an informative/descriptive title
     -all raw data (qualitative and quantitative) are recorded appropriately & clearly
     -metric units are used
     -all rows and columns have complete headings (measurement, unit, estimation of uncertainty [+/- 0.05g])
     -sig figs used in data and uncertainty must be consistent (sig figs must reflect precision of measurement)
     -data tables are boxed-in with straight lines
     -the independent variable (IDV) is in the left column, the dependent (DV) is in the middle column (subdivided into trials), and calculated data are in the right-hand column or separately labeled table
     -each sketch/drawing has labels, a number and an informative figure title

During the lab you record your raw data by hand in your pre-made data table(s); make lab sketches; etc. After the lab, you complete the last section under "Results" and then proceed to the Conclusion & Evaluation.

IB Physics Data Presentation and Processing Scoring Guide

Lab Title: ____________ Name: ____________

Total Raw Score = ______

Lab Skills and Performance

Logistics/Final Draft Quality

DCP Aspect 1: Presenting Raw Data

DCP Aspect 2: Processing Raw Data

DCP Aspect 3: Presenting Processed Data

John Frontczak

Period 8 IB SL Math

1/04/10

Infinite Summation:

The aim of this task is to investigate the sum of infinite sequences, of the mathematic statement:

$$t_n = \frac{(xlna)^n}{n!}$$

Investigation:

Calculating t_n where x=1, a=2, and $0 \leq n \leq 10$

X	A	n	t
1	2	0	1.000000
		1	0.693147
		2	0.240226
		3	0.055504
		4	0.009618
		5	0.001333
		6	0.000154
		7	1.52527E-05
		8	1.32155E-06
		9	1.01781E-07
		10	7.05491E-09

As n get larger, t_n get exponentially smaller.

IB Math Studies Internal Assessment:

What is the Relationship between SAT Scores and Family Income of the Test Takers around the World?

Exam Session: May 2012

School name: International School Bangkok

Teacher: Mrs.Goghar

Date: November 8th, 2011

Course: IB Math Studies SL

Word Count: 1,832

Name: Abel T. Koster

IAs take way too long to get done, and are the easiest of things to procrastinate on. Think about it: You can literally leave a blank word document open for days and justify to yourself that you're doing more important stuff. Like all that coursework you actually have to do.The Math IA is the king of this procrastination. It seems so irrelevant amidst your science DCP and CEs, your Written Tasks, and ALL your actual coursework. You've always been used to writing English essays, when was the last time you ever wrote a Math Essay? Utilizing the correct terminology and applying it effectively to a real-life example requires a new framework for thinking, one that has to be learnt from scratch. This is a complete guide to the Mathematics AA and AI Internal Assessment. Follow these steps to ensure your IA meets a high standard.Table of ContentsBig Takeaway: Methodology First, Topic SecondHow do I find and choose my mathematical method?Plan? Purpose? Personal Engagement?Use of MathematicsReflection: More Than Just A ConclusionWith very little practical information available online and teachers barely helping us with IAs, the process is such a struggle now. On top of that, the Maths IA has become a VERY significant part of your final grade in the last year (especially non-exam route).So I put together a complete guide to the Math IA mixed in with a bunch of personal advice to make this entire project a lot easier. These are the steps you need to ensure your IA meets a high standard.I'm going to presume you know the basics but, if not, go properly read the IA section in the Mathematics AA or AI guides. You are being assessed on 5 criteria for the Internal Assessment. If you can truly understand how the whole assignments graded, you won't do useless things like including irrelevant maths or creating a fictional story about your love for linear regression (please don't...)1. Big Takeaway: Methodology First, Topic SecondFind the mathematical method that will lead you to a final number or equation and THEN think about the topic you want to apply that method to.Contrary to what everyone says, the way you start the IA is very important. Most of us just use a topic like football shots or a piano composition and make some maths up about it. But this only forces irrelevant math into your IA and weakens your entire exploration.Remember the reason the IB wants you to do an IA is so that you can "develop a wider appreciation for mathematical concepts and processes". So let's do exactly that.Instead of thinking about the topic first, find and deeply understand a mathematical technique or method that is an extension of the concepts in the maths course. Learn about this topic and its common applications in the world. Then, brainstorm the ways you can apply this method to investigate a different topic/application that you're interested in.For me, I knew wanted to explore ordinary differential equations and after learning advanced ways to use them I decided to focus on modelling tumor growth in the brain. Another friend of mine used integration and La Grange multipliers to find the most efficient way to lose calories on a treadmill.Both of us scored 7s and as you can see we started off by researching calculus-based techniques and took time to understand all of the math behind them before thinking about the topic that we'd want to investigate using mathematical method/s.Other successful mathematical concepts include the volume of revolution (calculus) based IAs because you can learn to plot multiple curves for difficult objects with a large potential for further application. Moreover, statistical methods such as correlation + regression or testing for normality (eg. in certain fashion or food products) can also score highly if you go in-depth with the techniques and analysis.How do I find and choose my mathematical method?Start with Khan Academy's Mathematics page and read through the chapters and topics for calculus and statistics (those are the main ones). On top of all the IB-related topics, there is a nice compilation of different techniques and applications beyond the scope of the course that you can use for your IA too.Research the chosen mathematical method further and actually try to fully understand and appreciate how it is used. Use books, PDFs, and find obscure YouTube videos to help with exploring the topic. Ensure that you only pick a topic once you are 100% sure you can understand and apply it.Shortlist 2-3 topics and go through how your researched mathematical technique will be applied and how you will actually explore it. Flesh each topic out as much as possible and scope what your IA will look like before deciding on one. I, personally, shortlisted both modelling the growth of the GBM tumor and modelling the spread of different infectious diseases (different topics using similar mathematical methods and concepts).2. Plan? Purpose? Personal Engagement?Make the RIGHT Start: Thoroughly Scope and PlanBefore starting, it is crucial that detailed notes are made on a) the mathematical approach specific to your topic b) the analysis of the maths and c) your overarching aim.The trend the IB examiner reports mention is that students present difficult math concepts and equations without knowing how to properly apply them or without even having a clear purpose for their investigation. You can easily avoid this by properly scoping out the investigation before you start typing.Research and plan the important details of the method you're using and the analysis you want to conduct. Ensure that you connect every part of the whole exploration to the purpose.Just starting after finding a topic isn't wise for this IA. I made this mistake and had to restart after writing 3 full pages on one topic without realising that my entire mathematical approach would be better suited to the topic I previously ruled out. It is so important to design the right framework for the idea, you shouldn't just wing it because a lot of people do and get stuck in the middle.The First Section is Easy Tick-boxingThere is no template and no perfect structure for your IA. But I'd suggest dividing the first section up into an Introduction, Rationale, and Aim/Plan of Action for clarity. Always make it a habit to clearly "show" the examiner the ways in which you are fulfilling the criteria. Make it easy for them to give you marks.These are a few important questions to ask yourself as you write the first section up:Is the aim of the exploration clear and explicit for anyone reading?Are the key terms, main variables, and constraints defined (where required)?Have you given a step-by-step plan of action and explanation of how you will explore your question/aim? (incl. description of data collection)Don't Over-Engineer Your Personal EngagementAvoid cheesy background stories. Please. Students believe that the 3 marks for PE are only awarded if they talk about the overwhelming curiosity they've had about Pascal's triangle their whole life. Do not add blatant lies like these, examiners see right through them and it undermines your investigation.The PE criterion C is most misunderstood. Instead of creating an unnatural backstory, show the examiner authentic personal engagement. Show them that you have "driven the exploration forward in a creative way". Make sure the topic has some personal importance to you but add layers of complexity to your investigation to exhibit organic engagement. Every bit of extra effort you put to further your investigation is evidence of your personal involvement.In my IA, there was no experimental data for certain variables in my tumor growth model so I learned how to use the Matlab software to optimise and find estimations of the unknown parameters myself. Learning a new skill and finding a creative solution for the missing variables was a very strong example of my personal engagement. Keep in mind this is just what I did and there are much simpler ways to achieve the PE marks too.Did you do preliminary experiments to ensure your exploration makes sense? After you accomplished the purpose, did you further your aim by testing the equation against other variables too? How did you manipulate the final results to further analyse them? Adding new and unique levels of complexity is the key.3. Use of MathematicsIt is better to do a few things well than a lot of things not so well."If the mathematics used is a) relevant to the topic being explored, b) commensurate with the level of the course and c) understood by the student, then it can achieve a high level in criterion E."How Much Math is Enough Math?The mathematics used needs to be relevant to a topic in the course obviously and we shouldn't be using any maths that we don't understand. Usually, students use "overly abstract and sophisticated concepts beyond their course" without truly understanding the math. Examiner reports reveal that a lot of IAs force these complicated methods in the hopes of gaining extra marks but end up losing marks because they couldn't clearly link every part of the exploration to their investigation. This is the official feedback given by the IB:"Students should be discouraged from using difficult mathematics beyond the HL syllabus if this cannot lead to some creativity or personalised problem."A cascade of formulas taken from some online journal without citation isn't the way you score in criteria E. Using mathematics beyond the HL syllabus will often lack thorough understanding and will make it "difficult for students to demonstrate Personal Engagement or Reflection too". You need to ensure that you deeply understand the mathematical methods being used in your IA. Everything included should be thoroughly justified and should be helping you build towards your aim.Demonstrating Understanding VS Getting a Correct AnswerThese are two very different things. Obtaining the correct answer isn't even enough to demonstrate "some understanding" and won't even guarantee getting a 2/6 in Criteria E. Clearly, demonstrating understanding is a big deal.It's one of the reasons I've constantly emphasised the fact that you need to gain a deep understanding of the mathematical methods and concepts before even starting. Instead of just adding calculations onto your IA, explain every step and justify everything you do to solve the problem."Illustrating with examples or practical applications" within your explanations is the strongest way to demonstrate your knowledge of the mathematics. Be explicit, excruciatingly clear, and don't shorten this part of your IA.Reflection: More Than Just A ConclusionThe biggest mistake people make with their "reflection" is believing this criterion can be fulfilled with a few paragraphs summarising their exploration at the end of their IA. The IB examiner's report for the IA confirms this: Many students just discuss "the scope and limitations of the work done and include no meaningful or critical reflection."The IB wants to see your growth throughout the IA. They assess how the student reviews, analyses, and evaluates their exploration at different stages. Reflective elements should be present throughout.For example, in the introduction itself, you can briefly reflect on the method you've chosen. Why is this the best way to address the aim of your investigation? During data collection, you can question the credibility and room for errors in the data and results. Discuss ways in which you can address or account for that. Continuously examine the strength of your investigation and include reflective elements throughout.For the higher achievement levels make sure you do these:Implications of the results: linking your results to the aim of the exploration and the real impact these conclusions can make.Consider further explorations: there are always better methods or more advanced maths that can be used to solve the problem you are addressing. Evaluate and compare them against your own approach in 1 or 2 paragraphs.Compare strengths and weaknesses of the mathematical methods and data analyses you conducted.Bonus: Brainstorm the topic from a different perspective (use technology such as software for model development).Throughout IB we're literally trained to critically evaluate and reflect on all of our work and progress. It's an inherent advantage we have compared to most other students. Let's use it well.

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