

Historie of Mathematiks Example Sheets

or

A Glorious Concatenation of Questions to Test the audience and make sure they were Paying Attention to the LECTURER, at least Between Glasses of Whisk(e)y, during those Lectures Bothe Historicall and Historic (and occasionally Hysterical), held in the Centre for Mathematical Sciences, in which the Severall and Various Topics are Pursue'd in Detail, Including but not limited to THE GREEKS, THE ARABES, THE RENAISSANCE, and THE NEWTON (and a multisequilinear title). And a Drinking Game, for those of the Audience who do not consider themselves Drunk Enough by the end of the lecture by Attending it in the Usual Fashion.

Piers Bursill-Hall*

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*quidquid doctor dit, inferte alcohol et venerare ei
usque Mathematicae vosque venite Historia!*

Chappers

1 History of Maths Example Sheet 1: Greeks, Greeking, Greekiness. General Greek-out.

1. Explain carefully why the Egyptians clearly had Simpson's Rule.
2. Calculate $\sqrt{2}$ to 10 sexagesimal places, in cuneiform. Compare this with the Root-two tablet.
3. Recall the following quotation, from Bertrand Russell's History of Western Philosophy:¹

The combination of mathematics and theology, which began with Pythagoras, characterized religious philosophy in Greece, in the Middle Ages, and in modern times down to Kant. Orphism before Pythagoras was analogous to Asiatic mystery religions. But in Plato, St Augustine, Thomas Aquinas, Descartes, Spinoza, and Leibniz there is an intimate blending of religion and reasoning, of moral aspiration with logical admiration of what is timeless, which comes from Pythagoras, and distinguishes the intellectualized theology of Europe from the more straightforward mysticism of Asia. It is only in quite recent times that it has been possible to say clearly where Pythagoras was wrong. I do not know of any other man who has been as influential as he was in the sphere of thought. I say this because what appears as Platonism is, when analysed, found to be in essence Pythagoreanism. The whole conception of an eternal world, revealed to the intellect but not to the senses, is derived from him. But for him, Christians would not have thought of Christ as the Word; but for him, theologians would not have sought logical *proofs* of God and immortality. But in him all this is still implicit.

Identify all errors in this paragraph. Comment on Bertrand Russell's understanding of historiography.

(*) identify the rest of the errors in Chapter 3.

^{*}Compiled by Chappers

¹Which you have of course all read ...

4. Answer Parmenides.
5. Save the phenomena.
6. Use Archimedes's Mechanical Method to find the area under the parabola. Now use Method of Exhaustion to show that the answer is correct.
7. Construct a working copy of the Antikythera Mechanism.
 - (*) using only tools and materials available to the Ancient Greeks.
8. Determine what the "men from not long before" that Pappus described thought they were doing.

2 History of Maths Example Sheet 2: Arabs and Medieval Europe.

1. Derive a theory of arm-waving, extended arm-waving, and multi-jointed arm-waving.
2. Read *The Name of the Rose*. Summarise the political situation.
3. Find MMMDCCLII * MMCDLXXXIV. Now do the same calculation using Hindu-Arabic numerals and find the mistakes you made. Now check it with a calculator and remember that you are a mathmo.
 - (*) Then write a program in Assembly² to calculate with Roman numerals.
4. Go to Florence, Pisa, Venice, Siena and Rome. Make sure to laugh at the stupid tourists who don't understand what they're looking at.
5. Write the libretto to an *opera buffa* about the discovery of the general solution to the cubic.
 - (*) Write the music.
6. Build the Renaissance Kindle. Bonus points for making it portable.
7. Speculate on the history of the world since the Renaissance if the Mechanical Method had survived.

3 History of Maths Example Sheet 3: Not discovering the Calculus.

1. Investigate the lesser-known Kepler Problem: drink the barrel of wine, then determine its volume.
 - (***) Free PhD: investigate the early Italian users of infinitesimals. What were they doing; what did they think they were doing?
2. Build a refracting telescope and investigate the phenomena considered by Galileo. These include:
 - The Milky Way,
 - Mountains on the Moon,
 - Sunspots,
 - The phases of Venus,
 - The moons of Jupiter.

Avoid getting locked up over political disputes.
3. Read *La Géométrie*. Committing suicide is not permitted.
4. Why did Newton write in Latin? [Actual question out of an History of Mathematics textbook]
5. Read one calculation in the *Philosophæ Naturalis Principia Mathematica*. Re-evaluate your sense of Newton's godhood.

²Well-known to be the programming language the Romans used.

6. Write down 20 common misconceptions about Newton.
7. Find a justification for the physical use of *force*.
8. Find 50 things you'd rather do in Paris than take lessons from Huygens.

4 History of Maths Example Sheet 4: All hell breaks loose; your turn, guys.

1. Suppose I have a box of volume V containing the N Bernoulli at temperature T . If I remove one Bernoulli, by how much does the temperature decrease?
2. Come up with a Fluids joke that isn't "Fluids".
3. Estimate the ratio of the length of Euler's oeuvre to the current length of, say, the English Wikipedia. Be impressed. Compare and contrast their content. Be very impressed.
4. Using compass and straightedge, construct a solution to the Euler-Cauchy equation. Deduce that it is unique.
5. Does there exist any world in which $1 - 1 + 1 - 1 + \dots \neq \frac{1}{2}$?
6. If Kant had not existed, would Gauss have been Riemann? Discuss. Answers should be typeset in Gothic, with points awarded for the obnoxiousness of the font.
7. Summarise the contributions of the nineteenth century to mathematics. Candidates are reminded to write on one side of the paper, ...

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if we did not wish to inform about that.

History of Maths Drinking Game: only for the extremely hard-of-stomach

Take a drink if any of the following occur:³

- The scale is non-linear.
- Induction is abused.
- Pythagoras did not exist.
- “On a scale of 1 to 10, ...”
- “So obviously therefore the Egyptians/Babylonians/anyone before Newton had the calculus ...”⁴
- “Last time you were in Italy/Rome/Florence/Pisa/&c”
- An anecdote that lasts for more than five minutes
 - And ends with confusion about what the subject was before.
- “One should always start a lecture with a beer/shot of Jack Daniels/glass of wine, etc..”
- Underwater basket-weaving, knitting, crochet, sewing, etc.
- Bullshitting
- “You see these pearls I have here ...?”
- The word “topology” is used incorrectly.
- Huge calculations
- “Aristotle, who’s a biologist! (and therefore a mathematical moron)”
- Any of:
 - Dope-smoking
 - Cactus-sucking
 - Toad-licking
 - Lebanese red
- “...penis/manhood/codpiece *this* big ...”
- “ N Bernoulli and solve for N ”
- “...and the Moon is made of green cheese(!)”
 - “And if you believe that then I’ve got a bridge in Brooklyn you might like to buy”
- “And you think I’m joking.”
- “As you recall, because you’ve read x ” (x being somewhere between obscure, very obscure and the dude’s mother buying the only copy)
- “God, when She ...”
- Cambridge being cold, soggy, and so dark in February as to be indistinguishable from the inside of The Cave.
- The hierarchy of purity is invoked.⁵

³You are strongly advised to use non-alcoholic drink to avoid untimely death.

⁴Of course, Newton didn’t have the calculus either.

⁵See <http://xkcd.com/435>. Note that Applied Mathematics <<<< Pure Mathematics at the right-hand end.

- String theory is insulted.
- Wikipedia is declared wrong.
- “You see, the lightning hasn’t struck me, so it’s okay to say it.”
- Swearing. More points/pints for more gratuity.
- Confusion of days.
- Strange abbrev., such as GAGToC.
- “You know the sort, hair down their foreheads, knuckles drag on the ground ...”
- “So you give up and go and do Sociology” is used as a solution to a mathematical difficulty.
- “pumps”
- “...normal, subnormal, Magdalene undergraduate”⁶
- “...mosquitoes, Tripos Exams, Cambridge drivers ...”
- Godwin’s Law
- Count the order of asides reached, square it, then drink that many measures.
- Asperger’s. Count the symptoms and drink the square.
- Mathmos and their lack of social everything.
- Exaggeration in general.
- Inconceivable work backlog.
- Detailed stereotypes.
- General geekiness.
- “One, two, three, ∞ ”
- Just drink continuously throughout the Descartes lecture; otherwise, every time he is mentioned outside it.
- Your mind gets blown.⁷

⁶The completion of this old saw is “Magdalene undergraduate studying land economy through the bottom of a Pimm’s glass”.

⁷This is rather subjective, but by this point you’re either on the toilet or drunk out of your mind anyway, right?