

Pseudorandom Ensemble
Talking Maths in Public
August 2025

Lyric Book

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1 Questionnaire

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Verse: Curtain up and lights down, the band runs on the stage
They take up their positions, ready to engage
The front man grabs the microphone, he pauses to take stock
And asks the town of Warwick if it's ready to rrrroooooock
And everyone around me throws their hands into the air
But me, I need a checklist, a rock-ready questionnaire

Refrain: Your rock- ready questionnaire

Verse: I'm not sure what you're asking, or what you hope to find
I don't know rock-readiness is clear and well-defined
The more you get specific, the deeper you can dive
Ask how much do we agree on scales from one to five
Then you'll start to tease out who is properly prepared
By asking pointed questions on your rock-ready questionnaire

Refrain: Your rock- ready questionnaire

Verse: I have some suggestions, though maybe you're not fussed
To make your rock conclusions more statistically robust
You might not want to publish, but certainly you'd see
More reliable results with better methodology
You're going to need hypotheses and some people who don't care
To make up the control group for your rock-ready questionnaire

Refrain: Your rock- ready questionnaire

Verse: Now the show is over and it's time to call it quits
Although somehow you've forgotten to play your greatest hits
You finally respond to all the stomping and "encores"
And goofily solicit if we'd like to hear some more
The redundancy of the question drives me to despair
You should already know from your rock-ready questionnaire

Refrain: Your rock- ready questionnaire

2 The Mathematical Villain

Lyrics copyright Sam Hartburn and Colin Beveridge 2025, all rights reserved

Verse: Greetings, greetings, welcome – what a thrill to have you here
From scientific circles and the mathematics sphere
My name is unimportant, irrelevant, obscure
But I'm sure you've felt my influence in work you've done before
I seek no notoriety, no fortune, no acclaim
But when maths becomes unmanageable, I'm the one to blame.

Prechorus: Who foxed you with a paradox too toxic to explain?
The psychopathic polymath who paralysed your brain
Who's behind the check-in desk at the Hilbert Grand Hotel?
Who took the fun from functions, put the nerd in ne'rdowell?

Chorus: It was me (Call me reprehensible)
It was me (I'm the one responsible)
The malarkey an the muddling, the mischief and the meddling (It was)
Me – and you'll never prove anything

Verse: A rustle from the bookcase and a glimmer in the light
But by the time you turn your head, there's nobody in sight
And twenty minutes later when you go to take a look
The citation that you're searching for has vanished from the book
And never mind the reference unexpectedly removed
You notice in a footnote your whole theory's been disproved

Prechorus: Who threw out your notebooks, citing lack of space
(But keeps a stack of obsolescent papers just in case)?
Who wiped off instructions saying "PLEASE DO NOT ERASE"?
Who stole all the markers and left Sharpies in their place?

Chorus: It was me (Sharpies are incredible)
It was me (Practically indelible)
And now you find them smothering the truths you were discovering (It was)
Me – and you'll never prove anything

Verse: A response to your research note I have ruthlessly reviewed
A collection of corrections and suggestions to include
Some of it's pedantically dismantling semantics
And some of it is butchering your structure and schematics
Changes by tomorrow please (the deadline we agreed)
I know you sent it weeks ago. It was too long. Didn't read.

Prechorus: Who went through all your spreadsheets turning data into dates?
Who hid all the typos until a click too late?
Who bollocksed up the brackets so your LaTeX won't compile?
And sweetly sends back emails saying "Couldn't read the file"?
(*Spoken*) (Could you send it in Word, please?)

Chorus: It was me (Figures separately if possible)
It was me (Who cares if it's illogical?)
Switching up the lettering and ruining your editing (It was)
Me – and you'll never prove anything

Verse: Sometimes you find your manuscript is tricky to decrypt
Your hieroglyphic penmanship – a symbol slipped, a signal skipped,
Parentheses unemphasised, a character unclear
A fraction mis-subtracted, a denominator disappeared
And your calculation's catastrophic cancellation comes...
From maths's Mephistopheles, the saboteur of sums

Prechorus: Who erased the minus sign you jotted down, you swear?
Who removed the cross term from your algebraic square?
Who woke you with an insight so you'd scrawl yourself a note
But when the morning rolls around you can't read what you wrote

Chorus: It was me (Nocturnal stroke of genius)
It was me (That I have rendered meaningless)
And now it's just a scribbling that isn't worth considering (It was)
Me! and

Outro: There's no point in getting pissed at me
It's been the same through history
While you persist ham-fistedly
In missing twists consistently
I'm giggling sadistically
You'll hear the hiss of "It was me!"
And you'll never prove anything

3 The Ant's Lament

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Verse: Oh I was working on a sunny afternoon
Finding provisions with the rest of my platoon
Working together, an inspirational commune
The finest bunch of ants in all the land

All of a sudden, a situation quite bizarre
No time to argue, no time to whisper au revoir
A mathematician caught me up inside a jar
And dumped me down upon a rubber band

Chorus: Oh mathematician, why'd you do it, why'd you take me from my home
Leave me stranded on this rubber band, confused and all alone
Separated from my fellows and their guiding pheromones
An ant isn't born to be alone
An ant isn't born to be alone

Verse: *Mathematician* Oh little anty, please stop moping for your friends
Now listen closely, I'll tell you just what I intend
Walk in a straight line, keep going till you reach the end
And then I'll take you back to your abode

Ant I started walking, no other option could I see
This mathematician held all the power over me
But as I started I saw the warped reality
The band was getting longer as I strode

Chorus: Oh mathematician, why'd you do it, why'd you take me from my home
Leave me stranded on this rubber band, confused and all alone
Separated from my fellows and their guiding pheromones
An ant isn't born to be alone
An ant isn't born to be alone

Verse: Oh mathematician, what is this trickery you play?
Although I'm walking, the ends just get further away
Mathematician Oh little anty, that's something I forgot to say
I'm stretching out the band as you progress

Ant Oh mathematician, how could you do this thing to me?
The time I spend here, well it might be infinity
I wish you'd tell me, is there a chance that of going free?
Will I ever find my way back to my nest?

Chorus: Oh mathematician, why'd you do it, why'd you take me from my home
Leave me stranded on this rubber band, confused and all alone
Separated from my fellows and their guiding pheromones
An ant isn't born to be alone
An ant isn't born to be alone

4 How Many Centres?

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Verse: My centre is a sacred point, my spirit and my core
It defines me as a circle, I've no need for any more
Between my centre and circumference is a space for peace and calm
A meditative zone designed with minimalist charm

But recently another shape invaded my domain
Inscribed herself inside me and she won't hear my complaints
A triangle whose presence I really can't ignore
'Cause she brought with her more centres than I've ever seen before

Chorus: How many centres does a triangle need?
What's the incentive for this sensational greed?
She keeps on adding new ones, they almost seem to breed
How many centres does a triangle need?

Verse: She had a centroid and an incentre, a circumcentre too
A mittenpunkt, a Fermat point, the collection grew and grew
Some of them formed patterns, stacked up neatly in a line
But others seemed just random, with no structure or design

And I think I could have held it in, I could have borne the mess
If it weren't for one small thing that brought me hours of distress
It could all have stayed quite civil if I only thought she'd tried
But she couldn't even keep them all within her own three sides

Chorus: How many centres does a triangle need?
What's the incentive for this sensational greed?
She keeps on adding new ones, they almost seem to breed
How many centres does a triangle need?

Verse: I couldn't stand it any longer, I just had to be alone
So I came up with a plan to bring the peace back to my home
In an effort to transform her into something more compatible
I nudged her wonky corners round to make her equilateral

And now her centres all line up in their right and proper place
We can coexist together in our contemplative space
The change has brought back harmony into my little shrine
Because her sixty thousand centres all live right on top of mine

Chorus: How many centres does a triangle need?
What's the incentive for this sensational greed?
She can keep on adding new ones, I don't care if they breed
How many centres does a triangle need?
How many centres does a triangle need?

5 I Like The Pope

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Verse: I like the Pope
The Pope's got notes on polytopes
I like the Pope
He's got a maths degree
When he integrates
He adds a holy C
I like the Pope
I like the Swiss Guard and all
He's number one But he transcends the cardinals
I like the Pope
But it's always a mess
To do topology
With his holiness
Is it some kind of joke that you can't be Pope
Unless you're a bloke?
If you're not a Catholic, you're out of luck
If you're gay or you're married or you
Fail to find a rhyme – you get stuck
I like the Pope
And here's your big spoiler
He's called himself Leo
After Leonhard Euler
I like the Pope
The Pope's got notes on polytopes
The Pope's got notes on polytopes
The Pope's got notes on polytopes

6 A Well-drawn Curly Brace

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Intro: I've travelled far and wide, and seen some truly wonderful sights

The pyramids of Egypt

Uluru

The Grand Canyon

Victoria Falls

I've looked up to the skies and gazed on the Northern Lights

But

Nothing has the elegance, the style or the grace to compare to a well-drawn curly brace

Verse: A curly brace is truly divine

It reminds me of a sweet summer wine

With a gently curving sweep to a cusp that makes me weep

It's the bracket I would choose every time

Verse: A curly brace is tricky to draw

It needs a hand that is steady and sure

Only an artist most proficient will have the skills sufficient

To draw a curly brace with no flaw

Prechorus: Anyone can scribble a bracket

Anyone can rush it or race

But it takes a little time and attention and care

To draw a perfect curly brace

Chorus: Nothing has the poetry, the polish or panache

Nothing has the flourish, nothing is so flash

No, nothing has the elegance, the style or the grace

To compare with a well-drawn curly brace

Verse: A curly brace deserves an award

But alas, it is often ignored

Sadly underrated and unappreciated

When it should be universally adored

Prechorus: Of course there are alternative brackets

Of course there is a round or a square

But why choose parentheses so run of the mill

When you could go for debonair

Chorus: Nothing has the dazzle, nothing has the zazz
Nothing has the richness or the razamatazz
No, nothing has the elegance, the style or the grace
To compare with a well-drawn curly brace

Outro: No, nothing has the elegance, the style or the grace
To compare with a well-drawn curly brace

7 The Dual of Me

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Verse: The harmonies of the world foretold
That we were meant to be
together for eternity
From the moment we met we realised that
I belong to you
And you belong to me

All the lessons we've learned together
The places we've been
The changes we've seen and
Through all the ups and downs of our history
You remained my constant friend
And I'll be yours to the end

Chorus: You're the dual of me, like a jewel inside me
My partner in crime, my destiny for all of time
We go together like hand and glove
Eternally united by our ... geometry

Verse: Where one of us has a corner
The other has a face that pairs
They go together with no spares
Edge-to-edge we're one-to-one
And I fit inside of you
And you can fit in me too

We demonstrate different perspectives
On the same symmetry
People say we're complementary
Locked together in solid friendship
Depend on it

Chorus: You're the dual of me, like a jewel inside me
My partner in crime, my destiny for all of time
We go together like hand and glove
Eternally united by our ... corresponding one-to-one arrangement of faces and
vertices

Bridge: I sometimes wonder what our lives would be
If I didn't have you
And you didn't have me
If we were free to choose, would we have chosen to be together?

Maybe I'd have met some topological curiosities
Explored their properties
Before I realised that none of them correspond to me
Like you do

Chorus: You're the dual of me
Like a jewel inside me
My partner in crime
My destiny for all of time
I couldn't face life without your vertices
You're the dual, the dual of me
The dual of me
The dual of me

8 A Totally Normal Song

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Chorus: There are many kinds of normal, more than I can say
If you try to learn them all it'll take a hundred days
The word has been exploited and over-engineered
There are many kinds of normal, and all of them are weird

Verse: I know a kind of normal that will never disappoint
It's the vector that's orthogonal to a surface at a point
If you modify its length to make it unit sized
You'll find your normal vector has now been normalised

(repeat chorus)

Verse: I have a kind of normal that I'd like to reveal:
The set of normal numbers contains almost every real
You write out all the digits and pick a random string
– it's just as likely to have been any other thing

Verse: Pi and e and gamma, the seventh root of 4,
We think they're likely normal, but we don't know for sure
I'm not convinced it matters, it's nothing to be feared
The only thing we've proved is that it's normal to be weird

(repeat chorus)

Verse: By smoothing out your normals you can make a mesh look curved
The polygons are finite yet slick lighting is observed
But when you choose which way to cross there is no room for doubt
If you get the sign wrong then your surface will be inside out

(repeat chorus)

Verse: To find more kinds of normal I looked on wikipedia
I thought that it would help, but it only made me needier
So many definitions that I never ever knew
But what the little critters mean I haven't got a clue!

(repeat chorus)

9 The Tumbledown Squares

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Verse: If you have a load of squares that are all the same size
What's the smallest square they'll all fit inside?
You might think that you'd have to pack them neat everywhere
But wait until you see the tumbledown squares

Chorus: With their ramshackle look and their pieces that slip
The quirky little gaps where nothing'll fit
The mangled up angles like they've fallen down stairs
The ones I love are the tumbledown squares
The swervy, topsy-turvy tumbledown squares

Verse: I don't want my squares packed neat in a grid
And I don't want balance, never said that I did
For elegance and symmetry I really don't care
The only ones I want are the tumbledown squares

Chorus: With their ramshackle look and their pieces that slip
The quirky little gaps where nothing'll fit
The mangled up angles like they've fallen down stairs
The ones I love are the tumbledown squares
The erratic, enigmatic tumbledown squares

Bridge: Now I have to declare that these tumbledown squares
Are the smallest arrangements found
But nobody knows if that's as small as it goes
There could be another, still to be discovered
A better yet set of tumbledown squares

Outro: With their ramshackle look and their pieces that slip
The quirky little gaps where nothing'll fit
The mangled up angles like they've fallen down stairs
The ones I love are the tumbledown squares
It don't get sweeter than the tumbledown squares

10 Tangent Line

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Verse: I am a simple polynomial
You're a tangent line
Following the paths of the graphs that our functions define
I amble and meander
You stride straight across the plane
A fleeting touch
Then we'll never meet again

Verse: We adhere to our coordinates
Stick to the rules we must apply
Following our formulae relating x to y
A serendipitous point
Where our place and slope are both the same
A fleeting touch
Will we ever meet again?

11 Dear Mr Rubik

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Verse: Dear Mister Rubik
Forgive my stream of invective
I recently scrambled one of your cubes
And now it seems to be defective

Refrain: Mister Rubik: I'm not the type to complain
But Mister Rubik: one star, would not buy again

Verse: Dear Professor Singmaster
I recently purchased your boook
I read it from cover to cover
I'm afraid it's gobbledy-gook

Refrain: Professor: I'm sure you have a fabulous brain
Singmaster: One star, would not buy again

Verse: Dear Mr Jperm,

I recently binged your YouTube
And all of its camera trickery –
While you pretend to solve the cube

Bridge: If you claim to solve it
You're obviously cheating or lying
My cube's never been near to solved
In almost 50 years of trying

Refrain: Mr JPerm: why'd you even try to explain?
Mr JPerm: thumbs down, would not watch again

Verse: Dear Mister Zemdeg
A career as a fraudster beckons
You really expect anyone to believe
You can solve that thing in under four seconds?

Bridge: Who do you think you're fooling?
It's clear to see it cannot be done
The odds against you solving it
Are 43 quintillion to one

Refrain: Mr Zemdeg: we can't have a villain at large
Mr Zemdeg, the jury finds you guilty as charged.

12 KMAG

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Verse: Sometimes you meet somebody
It seems you've always known
You get closer as your time together grows
Sometimes if you're lucky
They become your cornerstone
And baby, I've gotta tell you: you're not one of those

Verse: We plotted charts of our affection
Everything looked hunky-dory
We were bound to rise and keep on risin'
But then we subtly changed direction
I soared up in search of glory
You went sloping off to the horizon

Chorus: It's clearly time we both say "backsies"
Head off for our different axes
You'll be "ex" and never work out "why"
Sorry, babe, you don't come close
So I'm saying adios
You can kiss my asymptote goodbye

Verse: You did not reciprocate
My offer of eternity
When my love for you was off the chart
And I did not anticipate
The scale of our antipathy
Or the rate at which our feelings grew apart

Verse: These days when you see me
I pretend there's something urgent
And there's somewhere else I really have to be
And making like Houdini
I insist on paths divergent
And swiftly head off for infinity

Chorus: Yah boo sucks to those outsiders
Who said nothing could divide us
Maybe not, but I'd still like to try
Toodlepip and cheerio
Sayonara, off you go
You can kiss my asymptote goodbye

Chorus: Though you tried to keep me down
I don't have an upper bound
You went low, so I am going high
Auf Wiedersehen, farewell
Arrivederci, go to hell

Outro: You can kiss my as-
My astronomic, monotonic, supersonic, hyperbolic as-
You can kiss my asymptote goodbye