

Crossing the Equal Sign

Marion D. Cohen
Mathematics/Computer/Physics Department
University of the Sciences in Philadelphia
600 South 43rd Street
Philadelphia, PA 19104, USA
mathwoman199436@aol.com

Abstract

The frustration, satisfaction, joy, elegance, and dead ends of doing mathematics are in some ways like those same responses to other arenas in life. In other ways they are different. As a poet, mathematician, and human being, I have had the privilege and anguishes of both. There are many ways in which poetry and mathematics can be linked. One way is to view mathematical concepts and insights as metaphor for life, and vice versa. Indeed, life and mathematics can make fascinating dual metaphors. Math research in itself represents the quest for knowledge, of the most precise kind. Like any other quest, it can be only partially completed. This incompleteness (not unlike that discovered by Godel) can, in some sense, be compensated for by expressing it and this can afford some peace. Not every mathematician feels the need for or pull of this, just as not every of poetry about mathematics. Writing it has helped me visualize, clarify, and in general PLACE the mathematics in my own life, in particular mathematics that did not work out. Indeed, "math poetry" can be a perfect union of life and work.

1. Introduction

Does it come as any surprise that it's possible to have emotions about mathematics? And that, for a mathematician, it's possible to have emotions about the process of doing math research or about the math itself? Further, that it's possible for a NON-mathematician to have emotions which connect with mathematics?

One way to see this is to view the situation in our society with respect to science fiction. People who aren't scientists are still, via science fiction, rendered able to connect in emotional ways with science, and even to understand science to a certain extent. Moreover, people in our society LIKE science fiction, and therefore, again to a certain extent, science itself. Why is this not the case with math?

The purpose of this paper is not to answer that question (except to say that perhaps it is or can be). Rather, the purpose of this paper is to show, via selected "math poems" of my own, what the possibilities might be. Readers of these poems who are not mathematicians -- indeed, are often people who have claimed to not like math -- have said that these poems "grabbed" them. And people have felt that, in the words of one of the poems, "SOMething is going on."

People who have math anxiety need to know that mathematicians are not cold and unfeeling, nor need math be. Even if they themselves do not feel or understand "math feelings", it can be helpful to them to see that others do. My own students have told me that they can relate to me as a teacher because they see that I relate to them as human beings -- and one student said, "I see that you relate to me as a writer." Perhaps this alone shows how math poetry can do its part in bridging the gap between math (or science) and humanity. What follows, first, are some "math poems" which were written about, and while in, the throes of working on a problem which had to do with ordered sets and graph theory. The poems are all part of a single sequence and are thus untitled:

2. Math Poems

Points were blinking.
Lines were beckoning.
How was I to know?
What could I have done?

I heard some voices.
I had some time.
There was a tenderness.
There was a weeping.

How was I to know
the points would not point?
How was I to know
the lines would not line up?

* * *

I could think about those twittery lines
while brushing my teeth
or washing the floor
so why do I want to just stand here
preferably sit here
maybe even curl in a crooked ball?

Why do I bend?
Why do I roll?
Why do I need to identify
my head with my knees?

I am not crying.
I am only thinking.
So why do I need
to be so small?

* * *

Someone wrote a book called The Joy of Math.
Maybe I'll write a book called The Pathos of Math.
For through the night I wander
between intuition and calculation
between examples and counter examples
between the problem itself and what it has led to.
I find special cases with no determining vertices.
I find special cases with only determining vertices.
I weave in and out.
I rock to and fro.
I am the wanderer
with a lemma in every port.

* * *

There is a sibling rivalry
between this conjecture and its negation
and I, poor mother
throw up my hands.
“Anything, anything
“whatever you decide.
“Just please
“hurry up
“and make up your minds.”

* * *

After awhile making a proof is like making a calculation.
There are certain things you automatically do.
You move with closed eyes, clenched eyes, unseeing eyes, no eyes.
You move, sometimes, with no brain.
After awhile crossing the implication sign is like crossing the equal sign.
After awhile a proof is collapsed to a point.

* * *

Today Devin catches me at it.
“Mommy, what’re you trying to do?”
“Oh,” I say, “well, these lines.
“I’m trying to fix these lines.”
And then I explain triangles.
And then I explain transitive.
“Sometimes it can’t be done,” I tell him, “and other times it can.
“I’m trying to figure out when it can.”
“I get it,” he says. “I get it, Mommy.”
And later he catches me at it again.
“THAT one WORKED, right?”

‘Cause maybe, if that one worked, we can go play Parchesi.
Or cards. Or ice cream.
Or at least Mommy won’t
keep staring at those lines.

* * *

I have to admit it: These lines are abusing me.
Or something or someone is wielding these lines.

Yes, the dentist has placed extra teeth in my mouth
and the night has placed extra lines in the plane.

When nails grow too long you bite them.
When a man gets violent you leave him.
But when lines take aim
and form a fence

or when points zing far and away
what
do you do?

* * *

It's a kind of transitive law
when, in a house of growing children
two people who pet the same cat are petting each other.
Especially if one of them is holding the cat.
Especially if both of them are holding the cat.
And if Devin gets under the blanket with Mirage
and lets only their heads stick out
and smiles up in that way
if the pug of Devin's nose is close to that spot between Mirage's ears
and if I grab hold of it all
and kiss it all. . .

well Devin also knows
and Mirage also knows
that something is necessary
something is sufficient
and something else is scared.

3. The Mathematician's World

It's possible for a mathematician to have emotions about, or recollections of, math while NOT doing math. Of course, it varies with the individual, but it happens often. The following poems attempt to describe a mathematician's view of the world, or perhaps even a non-mathematician's sometimes-mathematical view of the world.

FIRST DAY AT THE BEACH

After the heat of the day I get past the breakers to where I can graze, where I become aware that we are all of us in the lap of Mother Earth, where and when I can believe in Earth as a mother, playing with us children, playing with us kindly.

But then I catch sight of the horizon, its slight frown. And I see that i am looking down at it, not across.

I see that Earth is a CONVEX mother; we are on, not in, her belly; we are, in fact, on top of her belly; it is not us she is in labor with.

Not that we'll fall, not that we'll fall off.

Only that there is that peripheral vision, there are those two wings and they bend, then sway.

And perhaps we are the balancers rather than the balanced, perhaps we are tightrope walkers bearing the x-axis.

FALLING IN LOVE

Like any learner I am slow
No matter how long before I say something
there is a pause before it is true.

Like any learner I am afraid.
Points are blinking, lines are shimmering
and I cannot yet touch.

Like any learner I am stupid.
Like any learner I am tired.

Like any mathematician I have to sleep on it.
Go through my days, my weeks on it.
I cannot be given.
I must first prove.

Like any neighborhood this is not a point.
It's bigger than epsilon
bigger than delta
bigger, even, than one.

SYMPATHETIC CLAUSTROPHOBIA

I feel so sorry for the insides of things.
I imagine them sweating and cramping.
I hear them trying to flex.

I know from Complex Analysis that sometimes outsides determine the insides.
And I think maybe the insides are tired of being determined.

And MOST things are inside.
Most things are encased.
I am afraid most things are alive.

I would like to go around rescuing all the insides.
I would like to dig into everything and pull the insides outside.
But there is not enough outside to go around.

If I can't rescue them, maybe I can put them out of their misery.
I know I can't shoot them.
But I can try to squash them.
Or I can go around injecting poison into them
But what kind of poison works
for this form of life?

ALONE

When I leave the house in the morning cats can't lock me out, cats can't even follow me into the vestibule.

Cats can only stay behind the glass y-z plane
as I move further into the rain.

When I come home and ring the bell cats can't run to let me in, cats can only bounce around the first octant

buzz, shiver, sizzle, and shriek
as I fumble inside my purse so bleak.

And if I fall asleep reading cats can only lie down beside me
sleeping with me in too much glare
in the lonely king-sized unit square.

4. Quest for Order

Mathematicians sometimes say that the attraction of math is order. However, even when order does not result from mathematical work, there can still be an attraction. Perhaps the mere QUEST for order, which math ALWAYS provides, can be enough. The last selection of poems is about this quest for order, as represented by mathematics:

DREAM THAT THE BINARY FUNCTION DISTANCE BETWEEN IS NOT SYMMETRIC

There are human condition metaphors.
It takes longer to return than it does to leave.
And i move closer to someone who moves further from me.
But mostly, I stand at the top of a slide and look down.
Then I stand at the bottom of the slide and look up.
Or I take a stick and twirl it, watch it changing size.

I dream the distance between a point and itself is not zero.
Each point shivers.
Each pont is exiled
from its small country.
There are preferred directions.
There is a great wind.
A general current
has begun.

This is not the dragging of inertial frames.
This is the racing of inertial frames.
Space is proven not to exist.
Everything looks for a place to go.

GLISSANDO

I don't invent math.

I don't discover math.

I only play math.

Like playing the piano

Playing PDE is like playing Liszt, playing Complex Analysis is like playing Mozart, and playing Abstract Algebra is like playing Vivaldi.

Or perhaps I practice math.

I practice and practice until I'm ready to preach.

Then I preach and preach until I'm ready to perish.

Is there phrasing?

Is there dynamics?

No, but there's fingering.

And there's running out of fingers.

And there's shaking out my hands
and starting anew.

FAITH

When what worked for years suddenly plays
when what played for years suddenly dies
when insides are not all that need to be rescued

when the ports in which we deposited our lemmas
suddenly become portals

when a theorem has neither application nor implication

when the easiest lemma to prove
the one you were not even proving
the one you were saving for the end
when that lemma isn't true

a mathematician doesn't give up
a mathematician insists on insisting
"SOMETHING is going on."

5. Humanity

The last two poems seem to me to connect math and mathematicians with ALL of humanity.

PERISH

Not only is life a math problem
that I have to do.
Life is a math problem
that fate has already done WRONG.

When a student gets a problem wrong
she believes me and fixes it.
But THIS is a bad student.
This student won't make it right.

I mark up the paper again and again.
And again and again it comes back wrong.
He is off by a factor of two
to some very large power.

Sometimes he lets me write in his notebook.
But he won't erase what HE wrote.
He sends it off to a journal
and publishes it under my name.

YOU CAN DRAW

You can draw pictures without analytic geometry.
Straight lines don't need $ax + b$.
Circles don't need x -square plus y -square.
Loops and scallops don't need polar coordinates.

But they wouldn't be as pretty.
They're prettier with axes running through them and equations running along them.
Spirals aren't as pretty without θ .
Four-leaf clovers aren't as pretty without \sin -square θ .
Beauty isn't as pretty without truth.

Acknowledgements

The author would like to thank the following publications for their kind permission to reprint some of the poems:

The Mathematical Intelligencer
The American Mathematical Monthly
Facets
Big City Lit
Meridian Anthology