

MATH/FEST TALK (with slides): Truth and Beauty: A Course in Mathematics in Literature: August 5, 2011; Lexington KY

My talk is about a course that I developed and have been teaching (3 times so far) at Arcadia University in Glenside PA.

SLIDE: This is the flyer I made up advertising the course.

Are you a sci fi fan? You might also be a MATH fi fan. Maybe even a math POETRY fan?

# TRUTH AND BEAUTY: MATHEMATICS IN LITERATURE

SPRING 2010

MWF 11:00 – 12:05

INSTRUCTOR: DR. MARION COHEN

Just as, through the ages, science has influenced literature, so has math. In this course, we will explore the vast body of writings inspired by math, as well as some of the math that did the inspiring.

For example, “Inflexible Logic” is about what happens when things go, crazily, against the laws of probability. And “Division by Zero” is about a mathematician who proves, without error, that  $1 = 2$ .

This course satisfies both math and writing requirements.

For more information contact Dr. Cohen at [cohenm@arcadia.edu](mailto:cohenm@arcadia.edu), or in Boyer Hall 110

--- As you see, we study literature – fiction and poetry – that has been inspired by math. Well, science (in particular, physics) has inspired literature (science fiction, which a lot of people love)– why not math? The course satisfies both a math and a writing requirement, and has attracted undergraduates from first to last year (many creative writing and other arty majors, a smattering of math majors). The enrollment is (technically) capped at 20, and has increased, not quite exponentially – in fact, arithmetically: 16, 20, 24. (Next spring we won't be able to accommodate 28...)

So this is one way to involve literature in the teaching of math. It also involves *writing* in the teaching of math, b/c for every piece of literature studied I give, besides a math assignment, a writing assignment – open-ended questions about the literature (more about all that soon). To some extent, this could be done in other math courses (I use my own math-limericks in those...)

SLIDE (page 1 of syllabus):

SYLLABUS: Truth and Beauty: Mathematics in Literature

Professor: Dr. Marion D. Cohen

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Texts: (1) “Fantasia Mathematica”, ed. Clifton Fadiman, NY, Copernicus, 1997

(2) “Strange Attractors”, eds. Sarah Glaz and JoAnne Growney, A.K. Peters, 2008

\*NOTE: NO MATH TEXT – I just teach the math informally (sometimes handing out notes)..

Course objectives:

\*to develop an appreciation for both math and literature, and an understanding of

- the connection between the two, and as well as  
the possibilities of mathematical literature (meaning literature whose form  
and/or content relates to math in some way(s) )
- \*to learn to think and reason quantitatively, and to solve math problems (The ones  
assigned will arise from the reading selections.)
  - to express mathematical reasoning both in mathematical language (symbols) and  
in words
  - to explore issues concerning education and social justice (brought out by some of  
the readings)
  - to use quantitative reasoning to solve real-world problems (via some of the  
situations in the stories)
  - to identify problems, draw conclusions, and clearly write out solutions
  - \*to develop ideas through writing – in particular, preliminary writing (journals,  
notes...), and revision
  - \*to express verbally and on paper ideas drawn from the readings
  - \*My main objective is that this course be a sharing and a joy. I hope that you will  
all get the same pleasure from the readings as you do from a “summer  
novel”, while at the same time probing deeper and coming to appreciate  
that math is a fit subject for literature and for life.

Possible readings (These are subject to change as the semester evolves, at the discretion  
of the instructor and of the class as a whole.):

From “Fantasia Mathematica” (mathematical fiction):

- \*Young Archimedes, Aldous Huxley -- p. 3
- \*The Devil and Simon Flagg, Arthus Porges – p. 63
- And He Built a Crooked House, Robert A. Heinlein – p. 70
- \*Inflexible Logic, Russell Maloney – p. 91
- No-sided Professor, Martin Gardner – p. 99
- The University Library, Kurd Lasswitz – p. 237
- Postscript to ‘The Universal Library’, Willy Ley – p. 244

From “Strange Attractors” (mathematical poetry):

--- Well, you can look at the first page of the syllabus while I talk about the course. When  
I mention to people that I teach a Math in Lit course, the first question usually asked is:  
What kinds of things do the students read? So I’ll answer that question, to within the  
limitations of 15 minutes:

Well, we *don’t* read the more commonly known pieces of “math lit”, such as Flatland,  
Alice in Wonderland, and so on. The reason is, they’re *books*; if we read entire books, we  
wouldn’t have time for much of a representative sample. So we read individual stories

and poems, some by world-famous authors like Aldous Huxley or mathworld-famous authors like Alex Kasman (who has a HUGE math fiction site – in your handout -- and a collection of his own math-stories), others not so well-known. We use two texts -- anthologies: “Fantasia Mathematica” for “math fiction” (too old and sexist but the only one available -- no time to go into that. Basically, I supplement with fiction available online), and “Strange Attractors” for “math poetry”. I’ve used no math text; I just teach the math as we go along, sometimes handing out notes.

Back to what we read: 20-odd pieces of math literature – stories and poems -- of which we have time today to focus on one story. (A short list of other math literature is in the handout.)

SLIDE (2<sup>ND</sup> page of syllabus)

\*Yes, David Brooks – p. 10

\*How Do I Love Thee? Let Me Count the Ways?, Elizabeth Barrett Browning – p. 11

\*Floating, JoAnne Growney – p. 25

\*Dialectic of the Census Taker, Karren LaLande Alenier – p. 75  
Fibonacci Numbers, Kathryn DeZur – p. 85

\*Flash Cards, Rita Dove – p. 86

Love Story, Sarah Glaz – p. 91

The Departure of the Alphabet, Jonathan Holden – p. 97

\*Geese, Agi Mishol – p. 109

\*She Considers the Dimensions of Her Soul, Young Smith – p. 114

My Number, Sandra Alcosser – p. 128

\*What Drove Me into Math, Marion Cohen – p. 138

Geometry, Rita Dove – p. 149

Number Man, Carl Sandburg – p. 185

Puzzle, unknown – p. 193

A poem of your choice, for the poem critique due at the end of the term

Individual stories, to be obtained online

\*An Old Arithmetician, Mary. E. Wilkins

<http://etext.lib.virginia.edu/toc/modeng/public/WilOldA.html>

\*Unreasonable Effectiveness, Alex Kasman

<http://math.cofc.edu/kasman/MATHFICT/unreasonable.pdf>

\*Division by Zero, Ted Chiang

<http://www.fantasticmetropolis.com/i/division/full>

\*The Gigantic Fluctuation, Arkady Strugatsky/Boris Strugatsky

[http://www.kulichki.com/moshkow/STRUGACKIE/r\\_fluct\\_engl.txt](http://www.kulichki.com/moshkow/STRUGACKIE/r_fluct_engl.txt)

The Library of Babel, Jorge Luis Borges

[http://www.cddc.vt.edu/journals/newriver/07Fall/marino/i\\_blog.htm](http://www.cddc.vt.edu/journals/newriver/07Fall/marino/i_blog.htm)

a “math memoir” which I wrote (I’ll hand out hard-copies.)

Assignments and grading (subject to change, to accommodate our needs):

For every reading (piece of fiction or poem) there will be two assignments:

(A) non-math questions (Feel free to write informally, and to use humor.

Also feel free to add your own questions and answers.)

(B) math questions (where the math either appears or is alluded to in the reading selection).

Most of the class time will be spend discussing the above-mentioned questions. (I’ll also lecture to you about the math.)

Each writing and math assignment will be graded (a letter grade, separate grades for the math and the non-math), and the grades will be averaged out at the end of the term. This grade will count approximately 65%.

--- So here’s some more syllabus for you to look at while I talk about the story, “Division by Zero”. It was written by Ted Chiang, in the 1970’s; it’s about a mathematician who proves, without dividing by zero, that  $1 = 2$ . (YIKES!) It affects her mental and marital life, and her psyche. There are some wonderful passages about that, and how it relates to math, math culture, and human concerns. Also, the story provides opportunity to ask probing homework questions – both math and “non-math”. But first I need to talk about the structure of the course:

The material we read can vary over the semesters (but hasn’t very much b/c the students say different things each time; I’m not bored yet...). Students can suggest readings if they like. (That’s happened, but not much...) For each reading there are two homework assignments: “non-math” -- open-ended questions about the reading, asking for opinions and ideas concerning the piece, or ways in which the reading relates to students’ own lives, experiences, and feelings (I’m big on feelings.); I invite students to be informal or humorous in their writings, and to make up their own questions if I haven’t hit upon what the story or poem means to them. the second assignment is “math” -- actual math problems based on the math that inspired or connects with the particular reading. Besides written work, we have group and class conversations (which are wonderful...) We spend about a week on each reading.

SLIDE (last page of syllabus):

The last week of the term, a longer paper will be due, on a topic of your choice. (Again, I'll give you a list of suggestions.) The ideas in this longer paper should draw from the ideas discussed throughout the term (and should include consideration of social issues, if appropriate to the reading that you chose). Your term paper may also be something literary, such as a short story. The grade on this paper will count approximately 20%.

Also due the last week of the term are (1) a poem critique, on a poem of your choice (Feel free to write about a poem which you DON'T like, and why.) and (2) a poem of your own ( not graded)

There will also be a "math final", which counts approximately 15%.

--- Now for the end of the term (and the end of the syllabus...): Besides the math final (counting 15%), there are three "big" writing assignments – a critique of a poem of their choice (from our text or not), an actual "math poem" that they write (ungraded), and an 8-or-more-page term paper, on any topic they want (related to the course).

SLIDE (suggestions for term paper):

#### IDEAS FOR TERM PAPER– YOU NEED ONLY

CHOOSE ONE – Remember, feel free to use humor, and to connect it with your own lives and concerns, but also make it "universal". Remember also: since this is a longer paper than your usual assignments, it is more important that it be well-organized, and that you have it clear just what your paper is about.

\*1) the Oulipo School of poetry, and how it connects with math (Google it.) Be sure to include some examples.

2) ONE of the following readings; be sure to include the role of math in the reading you have chosen:

The Nachman Stories, by Leonard Michaels (appearing in "The Collected Stories of Leonard Nachman") ("The Nachman Stories" don't take up an entire book, only about 50 – 60 pages.)

(my book), "Crossing the Equal Sign", Marion Deutsche Cohen – of poetry about the experience of mathematics( (available in the Arcadia Library, some Barnes and Nobles, or quickly gotten from Amazon)

Check out Alex Kasman's site on math fiction; if you can find a book or several stories there that interest you, choose that. Also, Kasman has his own book of "math fiction", "Reality Conditions"

JoAnne Growney's collection of math-poems, titled "My Dance Is Mathematics".

It's available online on her site ([joannegrowney.com](http://joannegrowney.com)).  
Use the link on the above site to access her article, "Mathematics Influences Poetry", in *Journal of Mathematics and the Arts*.  
(novel) "Uncle Petros and the Goldbach Conjecture"  
Choose two or three chapters from "Flatland"  
(novel) "The Curious Incident of the Dog in Nighttime" (The main character is an autistic teen-ager.)  
Pick twenty poems from our text "Strange Attractors"; try to find connections among them.  
Anything else not listed here that you have at least 8 pages to say about (But first consult with me about it.)

- 3) Pick a concern, theme, interest, or passion in your own life (perhaps something you've already shared in this course) and relate it to various readings from our course.
- 4) The mathematical life and contributions of Lewis Carroll (author of *Alice in Wonderland*).
- 5) How has your view of both math and literature shifted as a result of your experience in this course?
- 6) Write your own story, or 8 pages of poems.

I HOPE YOU CAN PICK SOMETHING YOU'RE EXCITED ABOUT.

--- Here we see a page of ideas for the term paper. Note the last two options. Of course I loved it when students chose the next-to-last option, and increasingly students chose the very-last option, which I also loved. (Last spring everybody without exception chose it.) Students get very excited about the term paper. And sometimes on the last day of the course we have a poetry reading – taking part in it is optional. (We usually get about six takers, including me.)

SLIDE (homework for "Division by Zero"):

## DIVISION BY ZERO

### Non-math

- 1) To what extent is, or is not, the story ABOUT "division by zero" ?
- 2) Is division by zero metaphoric of anything? (that is, a symbol of something bigger or more important, or just different)

\*3) Which would you prefer, to have made an error or to have discovered a paradox?

4) If you have ever, for any reason, had hallucinations that you knew, at the time, to be impossible, feel free to share that.

5) I confess that I don't understand the ending of this story. If YOU understand it, I'd love to hear your explanation (or partial explanation).

## Math

\*1) Assuming that  $1 = 2$ , prove that  $2 = 3$ .

2) Assuming that  $1 = 2$ , prove that  $2 = 4$ .

3) Assuming that  $1 = 2$ , prove that  $1 = 1/2$ .

\*4) What else can you prove assuming that  $1 = 2$  ? (Logically, by the way, a false statement implies ANYTHING AT ALL.)

\*EXTRA CREDIT; Assuming that  $1 = 2$ , and given distinct numbers  $a$  and  $b$ , prove that  $a = b$ .

--- I've been promising you examples of the homework questions. As I said, I'm focusing on the story "Division by Zero", and I'll remind you that the mathematician suffered because she'd proven something which shook the very foundations of her passion, maybe her life. She hoped so much that one of her colleagues would find a mistake in her calculations. One "non-math" homework question for that story asked, "What would you rather do – make a mistake or discover a paradox?" Students were about equally divided on that one; some said discovering a paradox would be disturbing to them, as it was to the mathematician in the story (and that they were okay with making and admitting mistakes). Others felt more positive about paradoxes; they viewed them as signaling new and exciting discoveries. For math homework I asked things like: Assuming  $1 = 2$ , prove  $2 = 4$ . (Most multiplied by 2, some took a more circuitous route, and a few needed another try at understand the meaning of the problem – but then did get it, and they knew it for the Final.) And for extra credit: Assuming  $1 = 2$  prove  $a = b$  – for any  $a$  and  $b$ , equal or not... (Nobody got that one.)

SLIDE (math topics studied):

## PARTIAL LIST OF MATH TOPICS TAUGHT IN THE COURSE

Probability

Expected Value

Peano's axioms

Some of Gödel's theories

How to find "Pythagorean triplets"

FLT

Prime decomposition

Modular arithmetic (including "divisors of zero")

Jordan Curve Theorem

The Cantor set, and some variations

Fractals in general

My own research, if it came up

--- Here's a shortened list of the math studied throughout the course (and it all came up naturally from the material we read). I strive to choose math not too difficult for non-majors, yet not boring for majors. Also, the more advanced math I didn't test on, and I told the students that. I like to share math I love but don't plan to test on. That way students can realize that the purpose of math isn't only to be tested; we can just have relaxing enjoyable conversations about it.

So – probability, expected value, Peano's axioms, some of Gödel's theories (These last two came from the story "Division by Zero", and I didn't test on them.), how to find "Pythagorean triplets" (tested on), Fermat's Last Theorem (extra credit: What about  $n = -1$ ?), Zeno's paradox (Most didn't understand the explanation.), prime decomposition, modular arithmetic (and I couldn't resist talking about "divisors of zeros"; some of the math-majors were getting to that in their Abstract Algebra classes so got some heads up,

but the non-majors got it too – in fact, before I told them which modular multiplications had divisors of zero, several shouted out, “ $n$  can’t be prime”)., Jordan Curve Theorem (relating to a poem of mine – no test), The Cantor set (test), fractals in general (no test). I also share, if it comes up, my own research, and sometimes I think of ideas *during* class. I like students to see some of the *process*, math research in action.

By the way, the idea of the course is *not* specifically to teach math using lit (as per the title of this session...); it’s more to teach appreciation and respect for math. However, most students *do* learn math (and do well on the math final); the spirit of literature (plus our class spirit) seems to translate into some sort of *math* spirit.

SLIDE (some “non-math” questions)

EXAMPLES OF “NON-MATH” QUESTIONS:

Have you ever felt as though the laws of probability for you are different from those for everybody else?

Is it possible for the devil (or God) to not know certain aspects of absolute truth?

If you came face to face with a servant of God, what questions would you ask?

Can you think of things that have been scientifically well-explained but that still feel mysterious to you?

Have you ever had a math dream?

--- So here are some of the “non-math” homework questions which invited writings about emotions, personal experiences, and philosophical ponderings: Have you ever felt as though the laws of probability for you are different from those for everyone else? (This came from the stories “Inflexible Logic” and “The Gigantic Fluctuation”.) Many students

answered yes to that question. I was surprised; I know I've felt that way on several occasions, when things aren't going my way for a long time. And there have been occasions like that in my life – which I've shared with the students but have no time to share with you – sorry...) Another question, coming from “The Devil and Simon Flagg” was: Is it possible for the devil (or God) to not know certain aspects of absolute truth. How absolute are absolute powers? (And there have been several religious students, and some atheists, and those who wanted to shared about that. There was no judgment either way.) Also, from the story “Unreasonable Effectiveness”: If you met an employee of God, what questions would you ask? And finally: Can you think of things that have been scientifically explained but that still feel mysterious to you? That came from my own poem, “The Mystery of the Known”; that's one of my main messages, in this course and in general. We thought of examples like the moon and certain machinery.

Since literature is often about “life stuff”, it's important to try to increase students' awareness of it. In the process we become close as human beings, laughing and lamenting together. Students get the idea, how math, literature, and life interconnect. They open up quite a bit – about their fears, dreams, conflicts with parents, siblings, teachers, and peers (and sometimes even about their love and, yes, sex lives – though more in their written homework than in class conversations).

LAST “SLIDE” (examples of students writings):

#### SOME STUDENT WRITINGS

Poems:

Today is the youngest you're ever going to be.  
But today is also the oldest you have ever been...  
Time is not your friend...

---

Love is never cold.

But it is calculating...

---

Dear Math...

How you taunt me with your infinite problems.

I'd much rather be in a bubble bath

than solve your imaginary numbers,

algebra, and more...

Love, me

---

Answer to the question, about the poem, 'She Considers the Dimensions of Her Soul',

What do you think YOUR soul is shaped like?:

I think that my soul is probably shaped like a star. To be completely honest, I'm not really sure why but I think it has something to do with this feeling I have... of being poked and prodded to always strive to be the best I can, to be a "star". I feel these sharp points, they're hungry...

---

Answer to the question, why can't the center of a circle be outside the circle?

...By removing the point from the circle, placing it somewhere else on the plane without moving the circle itself and insisting it's still the center contradicts the laws that make it the center of the circle in the first place.

---

Answer to the question, can you explain Zero's "paradox"?

If I take a step you could say that I have to take half a step, and half of that step, and etc. But that's not the reality. I just take a step...

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Answer to the question, "What IS math, anyway?":

The dictionaries all say different things. I guess I'd say I'll know it when I see it.

--- What I really want to do is read some of the writings by students. Of course, I have to make choices. we have time for only a few excerpts. Here's a poem excerpt:

Today is the youngest you're ever going to be.  
But today is also the oldest you have ever been...  
Time is not your friend...

Another poem excerpt (They write a lot about love...):

Love is never cold.  
But it is calculating...

And then this adorable hysterical student – great teeny-bopper clothes -- different color hair every class, usually some variant of blue or purple – wrote this:

Dear Math...  
How you taunt me with your infinite problems.  
I'd much rather be in a bubble bath  
than solve your imaginary numbers,  
algebra, and more...  
Love, me.

And finally, we have time for one very short one (There's more in your handout.):

(This was in answer to the homework question, "What IS math, anyway?")  
The dictionaries all say different things. I guess I'd say I'll know it when I see it.

(QED)

(NOTE: The handout for the talk begins on the next screen.)

## HANDOUT FOR MATHFEST TALK

### SHORT LIST OF MATH LITERATURE

#### Books:

##### Fiction and creative non-fiction

Flatland, George Abbott Abbott  
Alice in Wonderland, Lewis Carroll  
A Mathematician's Apology, G. H. Hardy  
The Housekeeper and the Mathematician, Yoko Ogawa  
The Curious Incident of the Dog at Nighttime, Mark Haddon  
Uncle Petros and the Goldbach Conjecture, Apostolos Doxiadis  
Reality Conditions, Alex Kasman (collection of math fiction)  
Fantasia Mathematica, edited by Clifton Fadiman  
The Mathematical Magpie, edited by Clifton Fadiman

##### Poetry

Strange Attractors: Poems of Love and Mathematics, edited by Sarah Glaz  
and JoAnne Growney  
Verse and Universe: Poems about Science and Mathematics, ed., Kurt Brown  
Against Infinity, edited by Ernest Robson and Jet Wimp  
Crossing the Equal Sign, Marion Deutsche Cohen  
My Dance Is Mathematics, JoAnne Growney  
NOTE: Check out JoAnne Growney's blog: [poetrywithmathematics.blogspot.com](http://poetrywithmathematics.blogspot.com)

Individual stories (not in the anthologies mentioned above – all available online)

NOTE: For a huge list see Kasman's site: [kasmana.people.cofc.edu/MATHFICT](http://kasmana.people.cofc.edu/MATHFICT)

An Old Arithmetician, Mary E. Wilkins – set in the late 19<sup>th</sup> century, about an old village woman, uneducated, who happens to love and be very good in math, which she calls “sums” – perhaps my very favorite of math stories: It's heartening to see how the other villagers love, admire, and respect the “old arithmetician” (and that she's a woman, and old – thus a counterexample to Hardy's “Mathematics is a young man's game”). It also depicts, in simple ways through the voice of the woman, how and why math is so wonderful.)

Division by Zero, Ted Chiang – A mathematician proves, without division by Zero, that  $1 = 2$ . It affects her mental and marital well-being.

The Gigantic Fluctuation, by two brothers, Arkady and Boris Strugatsky – A man is a “gigantic fluctuation”; that is, unlikely things very often happen in his presence; for example, when he tosses a coin it comes up heads 98 times out of 100.

## MATH & LIT WRITINGS BY STUDENTS

### POETRY

#### MATH IS MY GIVING TREE

When you are young math  
Gives you addition  
To add the different pieces of candy  
After Halloween.

You grow up and get smarter  
So you ask math to give you multiplication  
Because obviously you need to know  
How much TV time you have a week.

Time passes and you get a job  
So you can get the new Mario game  
So then you ask math for the knowledge of percentages  
Because all cashiers need to know their percentages.

Senior year in high school  
You beg your teacher for a higher grade in Pre Calc  
But the teacher can't do anything so poof.  
Just like that you go running to math  
And he/she teaches unit circles.

First day of college  
You have yet to decide a major  
But wait math has been helping you all your life  
You ponder a little but your friends interrupt and  
Tell you it's too hard.  
So you enroll in Dr. Cohen's Calculus class  
And the rest is history.

[NOTE: This student was in both my classes that term – Math & Lit, and Calc I.)

#### ABSOLUTE ZERO

Today is the youngest you're ever going to be.  
But today is also the oldest you have ever been...  
Time is not your friend...

## DEAR MATH, LOVE ME

Dear Math,  
Math, how you taunt me with your infinite problems.  
I'd much rather be in a bubble bath  
Than solve your imaginary numbers,  
Algebra, and more. Oh! how I loathe your spiteful wrath.

... love, me

## THE VALUE OF MY MIND

I have a value inside my head  
That cannot be written, nor seen, nor said.  
It is something that I hold most dear  
Yet has kept me restless for years.

I have felt it creep in my sleep  
Dancing and teasing without skipping a beat.  
I try to grasp it within my brain  
But I cannot reach it; this brings me pain.

It's like a door with a broken latch  
Or that tickle on your back that you just can't scratch  
As I try to comprehend, time slows down  
And my world goes chaos without a sound.

When I wake up I can't recall what's occurred.  
All I know is that the value is blurred.  
I remember that it connected all of life's wonders  
Like a glistening sky when God thunders.

This value is love, this value is sorrow.  
This value will haunt me even tomorrow.

ANSWER TO THE QUESTION, ABOUT THE POEM, "SHE CONSIDERS THE DIMENSIONS OF HER SOUL": What do you think your soul is shaped like?

I think that my soul is probably shaped like a star. To be completely honest, I'm not really sure why but I think it has something to do with this feeling I have... of being poked and prodded to always strive to be the best I can, to be a "star" I feel these sharp points, they're hungry...

“ANSWER” TO THE QUESTION, WHY CAN’T THE CENTER OF A CIRCLE BE OUTSIDE THE CIRCLE:

...By removing the point from the circle, placing it somewhere else on the plane without moving the circle itself and insisting it’s still the center contradicts the laws that make it the center of the circle in the first place.

“ANSWER” TO THE QUESTION, CAN YOU EXPLAIN ZENO’S “PARADOX”?

If I take a step you could say that I have to take half a step, and half of that step, and etc. But that’s not the reality. I just take a step. Time isn’t going to infinitely slow down by a process of halves anytime anything tries to travel anywhere. Really the paradox, in the way it is commonly presented, is just a word game, where “half” is presented as a legitimate unit of distance.

ANSWER TO THE QUESTION, HOW WOULD YOU DEFINE MATH?

“...I’ll know it when I see it...”

\*ONE CREATIVE WRITING MAJOR WROTE ME A NOTE, BEFORE HER STORY-EXCERPT:

Dr. Cohen – I’ve been working on this all semester and it is still not finished because I’ve been struggling to find an ending I want to use. This is the incomplete story so far, and I’m going to try to develop it more over the summer. I’ll bring it back to you when I know what happens in the rest of the story, and whether the world will end. Thank you for giving a creative option for the final [paper]. This was the only creative writing I was able to do this semester.

NUMBERS: A SERIES OF NUMEROLOGICAL VIGNETTES

The section titles were as follows: 1 is the loneliest number – 2 can play at that game – 3’s a charm – 4 play – take 5 – 6 and stoned – 7 minutes in heaven – L8 bloomer – on cloud 9

JUST A DREAM

... All sorts of odd things were making him nauseous. The round dials for the radio in his car, the taunting red, yellow, and green on the traffic lights, the steering wheel... All Darin wanted to do was get off the roads and head back home, go to sleep.... He remembered the dream.... The feeling of being encased inside the powerful evil being, having no way out... nowhere to hide. The giant spherical bubble of his nightmare was creeping its way into his real life...

When Darin reached home, he quickly ran inside and locked the door behind him... [his] newfound fear pushed him to his feet so that he could get to work on making his home safe, free from all of the perilous circular objects... finally Claire returned home from

work. Her jaw dropped to the floor... Claire found Darin in the dining room surrounded by dozens of their household appliances, trinkets... that he was burying, one by one, into a giant cardboard box.... Bowls, plates, apples, oranges, circular wall clocks and picture frames... Claire's pearl earring, doorknobs, lightbulbs... "It's... it's the circles... the circles need to be rid of?" stammered Darin... "They're bad. They can trap you and ... keep you confined forever! The circles!"...

## HALO: MATHEMATICS EVOLVED!

It is my belief that everyone in the world has at least one passion or desire that has influenced their life in some way. Unlike most people, my passion is a particular videogame. The name of this game is Halo: Combat Evolved... The beauty of playing Halo is that one could play on xbox live. Xbox live enables the user to play and talk over the internet with millions of people all over the world. Through xbox live, I have made so many friendships and bonds. Not only that, but the relationship between me and my brother has grown substantially... without this passion of Halo, I could very well not be the same person I am today. After taking Math and Literature I realized how much mathematics ties into my passion...

When the game first starts, the weapon called the battle rifle has seventy two bullets but is capable of gaining an additional thirty six adding up to a max of 108. Each clip of the battle rifle holds thirty six bullets, thus meaning you can reload a full clip up to three times when maxed out.  $108 \text{ bullets} / 36 \text{ bullets per clip} = 3 \text{ times to fully reload}...$

The kill to death ratio can be viewed at the end of each game to see how much a player has killed versus how much they died. A positive k/d spread happens when you have more kills than deaths and a negative k/d spread happens when there are more deaths than kills. The k/d ratio is so important because you can evaluate a team's performance, see how long each player was alive during the match and how much time they were waiting to re-spawn. To evaluate a k/s spread you simply add up all the spreads of all four teammates....

After finishing Truth and Beauty: Math in Literature I have realized how much my passion has revolved around numbers. From understanding this justification, I can now use my abilities to my fullest potential... This is my passion, this is my legacy, this is Halo: Mathematics Evolved!

## WAYS IN WHICH I USE WRITING IN OTHER MATH COURSES

- 1) On the first day I ask students (It's optional) to write down anything about themselves they'd like me to know – e.g., how they feel about math, how they perceive their strengths and weaknesses as students, how they spent their break (or summer), any stresses or disabilities they'd like to share with me, etc. (I have already shared things about myself with them.) (In my History of Math course the first assignment is to write a math memoir – the history of THEIR math.)
- 2) I invite students to write, on test papers, any troubles they're having, and why.
- 3) On the final, I sometimes tell the class I'll give them extra-credit if they write a (reasonable) math-limerick.
- 4) Towards the end of the term students who perceive that they're not doing as well as they'd like ask whether they may do extra credit. Since there has already been extra-credit on the tests and final (interesting or challenging problems), I usually say no. However, last semester I said that, if they can think of a truly creative math problem or math idea, I'll give extra credit. (I say that I don't know how much...) The three students who took me up on this used writing in their extra-credit projects (which were indeed very creative, and they did get A's.)
- 5) I do not REQUIRE writing in a non-writing course; one reason is, I feel that some, but NOT ALL, students benefit from it, and that many view it (at least at first, which I think counts...) as getting in the way – just another thing to keep track of; also, there are only 24 hours in the day and writing takes up time; I think it's a great idea to cut down on the syllabus, but that's not always within a professor's power. Finally, there are other ways (besides students' writing about their learning experience) to stay in continuous touch with students. (I've written about this in my review of "Using Writing to Teach Mathematics", MAA Online.)
- 6) An idea I just today thought of, which of course I haven't yet tried: Mention some math concepts or mathematical objects, and ask students (in class, just for fun) to try to think of creative names for them (as mathematicians have).

POSSIBLE WAYS IN WHICH TO USE LITERATURE IN OTHER MATH COURSES (Note: We of course can't ask the students to do the same amount of reading as in this Math/Lit course...)

1) I don't use literature in any systematic way in my other courses. I might simply SUGGEST or MENTION stories or poems, or book excerpts, that pertain to the current topic. (E. g., Flatland, if dimension comes up....Flexible Logic, if it's a probability course)

2) The main thing I do is hand out, and SOMETIMES recite or refer to, the limericks I write (a set for every course I've taught – EXCEPT for Math in Lit; there's enough lit in THAT course!)

3) I believe in being as non-invasive (low-key) as I can/may. I don't really want to give students what they might perceive as extra-work or assignments (unless, of course, it's for extra CREDIT...). This can lead to negative feelings, which in turn can lead to less interest and poorer performance. (I realize this is only one factor, but it's an important one for me.)

