

Mathematics 3820H – Mathematics from medieval to modern times

TRENT UNIVERSITY, Fall 2012

Assignment #4

Due on Tuesday, 9 October, 2012.

Read pp. 207-276 of [1] and do the following:

1. On the basis of the reading and the related material in our textbook, briefly describe the background and course of the dispute between Tartaglia and Cardano and try to assess who was in the right. [5]
2. State and prove the cubic formula, that is the formula for the solutions of the general cubic equation $ax^3 + bx^2 + cx + d = 0$ in terms of the coefficients a , b , c , and d . (You may do this in any way you like, but using modern notation and algebraic techniques is strongly recommended ...) [5]

REFERENCE

1. *Jerome Cardan: The life of Girolamo Cardano, of Milan, physician*, Vol. I, by Henry Morley (London, 1854), which can be found (pdf and epub) online at:
<http://books.google.ca/books?id=lskVAAAAYAAJ>

Love and Tensor Algebra

Come, let us hasten to a higher plane,
Where dyads tread the fairy fields of Venn,
Their indices bedecked from one to n ,
Commingled in an endless Markov chain!

Come, every frustrum longs to be a cone,
And every vector dreams of matrices.
Hark to the gentle gradient of the breeze:
It whispers of a more ergodic zone.

In Riemann, Hilbert or in Banach space
Let superscripts and subscripts go their ways.
Our asymptotes no longer out of phase,
We shall encounter, counting, face to face.

I'll grant thee random access to my heart,
Thou'lt tell me all the constants of thy love;
And so we two shall all love's lemmas prove,
And in our bound partition never part.

For what did Cauchy know, or Christoffel,
Or Fourier, or any Boole or Euler,
Wielding their compasses, their pens and rulers,
Of thy supernal sinusoidal spell?

Cancel me not for what shall then remain?
Abscissas, some mantissas, modules, modes,
A root or two, a torus and a node:
The inverse of my verse, a null domain.

Ellipse of bliss, converge, O lips divine!
The product of our scalars is defined!
Cyberiad draws nigh, and the skew mind
Cuts capers like a happy haversine.

I see the eigenvalue in thine eye,
I hear the tender tensor in thy sigh.
Bernoulli would have been content to die,
Had he but known such $a^2 \cos(2\phi)$!

Stanislaw Lem, from his novel *The Cyberiad*, trans. from Polish by Michael Kandel.