Mathematics 3820H – Mathematics from medieval to modern times
TRENT UNIVERSITY, Fall 2016

Assignment #1
The Quadratic Equation
Due on Friday, 23 September, 2016.

Please read at least pp. 35–39 of the *Āryabhaṭīya* [1] and pp. 1-21 of al-Kwarizmi's *Algebra* [2], and do the following problems. You may find the discussion and commentary made by the translator to be of use in answering the questions, but don't take them as gospel – after all, in both cases previous translators and commentators get criticized ...

1. State and prove the quadratic formula in modern algebraic notation. *[3]*

2. Compare and contrast Āryabhaṭa's and al-Kwarizmi's understandings of the quadratic formula, as given in the readings, with each ther and with our understanding of it. *[7]*

REFERENCE

1. *Āryabhaṭīya*, by Āryabhaṭa, trans. by W.E. Clark, Univ. of Chicago Press, Chicago, 1930. It can be found online at:
   `http://www.wilbourhall.org/pdfs/aryabhatiyaEnglish.pdf`
2. *The Algebra of Mohammed ben Musa* [*i.e.* al-Kwarizmi], ed. and trans. by Frederic Rosen, London, 1831. It can be found online at:
   `http://www.wilbourhall.org/pdfs/The_Algebra_of_Mohammed_Ben_Musa2.pdf`

Sing me a song of the hydrogen light
Three degrees Kelvin illumine the night
Three degrees Kelvin, the infrared sky
Colors too deep for the unaided eye

Sing me a song of the hydrogen band
Whispering low since the cosmos began
Whispering low as the white light shifts red
Wavefronts of hydrogen sweeping ahead

Sing me a song of the hydrogen wall
Vector me out to that light bounding all
Vector me out in that glory to dwell
End of the universe, cosmic eggshell.

John M. Ford, from his novel *Princes of the Air.*