Mathematics 3820H – Mathematics from medieval to modern times
Trent University, Winter 2018
Assignment #π
To Bee or Not To Bee
Due on Monday, 2 November.

Bhaskara II (1114-1185), also known as Bhaskaracharya ("Bhaskara the Teacher"), was an Indian mathematician and astronomer who continued the Indian tradition of writing mathematics in verse. Here are two problems, in a prose translation, from his book on arithmetic, *Lilavati*, which was named after and dedicated to his daughter. "Lilavati" apparently means "playful", and a number of the problems in the book fit the title. Here are two such problems from *Lilavati*, taken from the translation by Henry Colebrooke [1].

> *54. Out of a swarm of bees, one-fifth part settled on a blossom of Columba; and one-third on a flower of Silínd'hrí; three times the difference of those numbers flew to the bloom of a Cutaja. One bee, which remained, hovered and flew about in the air, allured at the same moment by the pleasing fragrance of a jasmin and pandanus. Tell me, charming woman, the number of bees.*

> *68. The square-root of half the number of a swarm of bees is gone to the shrub of jasmin; and so are eight-ninths of the whole swarm; a female is buzzing to one remaining male that is humming within a lotus, in which ihe is confined, having been allured to its fragrance at night. Say, lovely woman, the number of bees.*

1. Solve problem 54, given above. *[5]*

2. Solve problem 68, given above. *[5]*

For full credit, please write up your solutions as poems.

REFERENCE

1. *Algebra, with Arithmetic and mensuration, from the Sanscrit of Brahmegupta and Bhàscara*, Henry Thomas Colebrooke, 1817, which can be found online at:
    https://archive.org/stream/algebrawitharith00brahuoft#mode/2up
    [Accessed 2019-02-12.]

NOTE: This is an extra assignment which would give you a larger pool from which the best ten are chosen to count towards the final mark. Really, though, it's just to have something fun to do over Reading Week! :-)