General Mathematics and Computational Science I

Exercise 13

October 25, 2007

1. It is believed that 2 genes A and B may play some part in the susceptibility of an individual to a disease. Of 100 patients investigated, 17 carry gene A, 33 carry gene B and 67 carry neither. Find the probability that a patient carries only gene A, only gene B or both.

2. Prove the *arithmetic-geometric-mean inequality* for $n = 3$.

   Note: This is Problem 9 from Ivanov, p. 48, which contains a sketch of a proof. The task here is to write out a complete self-contained solution without reference to Ivanov.

3. Show that
   $$a^2 + b^2 + c^2 \geq ab + bc + ca$$
   for arbitrary real numbers a, b and c. When does equality holds?