April 2009 Problems

Please send your solutions or questions to Janet Vassilev (jvassil@math.unm.edu) or Dimiter Vassilev (vassilev@math.unm.edu). We are looking forward to hearing from you.

Problems from *Second Junior Balkan Mathematical Olympiad Athens, Greece, June, 1998*

1) Prove that the number $\underbrace{11...11}_{1997}\underbrace{22...225}_{1998}$ is a perfect square.

2) Let $ABCDE$ be a pentagon so that $AB = AE = CD = 1$, $\angle ABC = \angle DEA = 90^o$ and $BC + DE = 1$. Find the area of the pentagon.

3) Find all the pairs (x, y) of positive integers so that $x^y = y^{x-y}$.

4) Can one find sixteen three digit numbers, using only three digits, without having two of them with the same remainder when divided by 16?