

Belgium Flanders Mathematical Olympiad 2005

- 1 For all positive integers n , find the remainder of $\frac{(7n)!}{7^n \cdot n!}$ upon division by 7.
- 2 We can obviously put 100 unit balls in a $10 \times 10 \times 1$ box. How can one put 105 unit balls in the same box? How can we put 106 unit balls in the box?
- 3 Prove that 2005^2 can be written in at least 4 ways as the sum of 2 perfect (non-zero) squares.
- 4 Find all natural numbers n for which $\sqrt{n} + \sqrt{n+2005}$ is a natural number.