Dutch Mathematical Olympiad 1982

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by moldovan

1   Which is greater: $17091982!^2$ or $17091982^{17091982}$?

2   In a triangle ABC, M is the midpoint of AB and P an arbitrary point on side AC. Using only a straight edge, construct point Q on BC such that P and Q are at equal distance from CM.

3   Five marbles are distributed at a random among seven urns. What is the expected number of urns with exactly one marble?

4   Determine $\gcd(n^2 + 2, n^3 + 1)$ for $n = 9^{753}$.