

MATHEMATICS ENRICHMENT CLUB.
Problem Sheet 15, August 25, 2015¹

1. How many distinct prime factors does 2^{32}

Senior Questions

1. Seventeen primes $p_1 < p_2 < \dots < p_{17}$ have the property that the sum of their squares is also a square. Prove that $p_{17}^2 - p_{16}^2$ is divisible by p_1 .
2. Integers $1; 2; \dots; 100$ are written in a circle, not necessarily in that order. Can it be that the absolute value of the difference between any two adjacent integers is at least 30 and at most 50?
3. Twelve knights $k_1; k_2; \dots; k_{12}$ are seated in anti-clockwise order around a circular table. What is the minimal number of swaps required to change their order to a clockwise one, if any swap can be made only between adjacent knights? What is the answer if there are thirteen knights?