"Math is Cool" Championships – 2014-15

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9th & 10th Grade – October 22, 2014

Pressure Round Contest

1	How many positive integers less than 60 are relatively prime (no common factors) to 60?
2	Find the sum of the squares of the zeros (roots) of the polynomial: $$-x^4 + 3x^3 + 2x^2 + 1$$
3	If p and q are positive prime numbers such that $x^2 - px + q = 0$ has distinct positive integer solutions, find the value of $p^2 + q^2$.
4	If $a_1, a_2, a_3, \ldots$ is an arithmetic sequence with common difference d, $\sum_{k=1}^{100} a_k = 100$, and $\sum_{k=101}^{200} a_k = 200$, find the value of $\log_{10} d$.
5	What is the smallest positive prime factor of the number N, where $\log_{2010}(\log_{2011}(\log_{2012}(\log_{2013}(\log_{2014} N)))) = 0$.

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