MAΘ Competition Team Problem Set 13

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Problem 1. Find two distinct prime numbers whose sum is 20.

Problem 2. The sum of two prime numbers is 85. What is the product of these two prime numbers?

Problem 3. Let p and q be distinct prime numbers such that $p^2 - q^2$ is also a prime number. Find $pq + p + q$.

Problem 4. Using the digits 1, 2, 3, 4, 5, 6, 7, and 9, form 4 two-digit prime numbers, using each digit only once. What is the sum of the 4 prime numbers?

Problem 5. Find all primes p and q such that both $pq - 555p$ and $pq + 555q$ are perfect squares.

Problem 6. Find the greatest possible value of $pq+r$, where p, q, and r are (not necessarily distinct) prime numbers satisfying $pq + qr + rp = 2016$.