Euler's lucky number*

PrimeFan†

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A prime number p is one of *Euler's lucky numbers* if $n^2 - n + p$ for each $0 < n < p$ is also a prime. Put another way, a lucky number of Euler's plus the nth oblong number produces a list of primes p-long. There are only six of them: 2, 3, 5, 11, 17 and 41, these are listed in A014556 of Sloane's OEIS.

41 is perhaps the most famous of these. We can verify that 2 + 41 is 43, a prime, that 47 is also prime, so are 53, 61, 71, 83, 97, and so on to 1601, giving a list of 41 primes. Predictably, 1681 is divisible by 41, being its square. For $n > p$ the formula does not consistently give only composites or only primes.

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