Addendum to Appendix #13 on Perrin Pseudoprimes

As an corollary to the conjecture (Theorem 1) below:

Theorem I:

For any number X, a prime number may occur within the numbers 14*X +6, 14*X +10, 14*X +12, and 14*X +14 (or 14*(X+1)). If a prime does not occur in this range then it will occur in the range 14*(X+a) +6, 14*(X+a) +10, 14*(X+a) +12, and 14*(X+a) +14 where a is a small integer (a can also be a negative integer). This sieve can be represented as a binary sieve of 14 digits [00000100010101] spanning the integers.

Corollary 1:

No Perrin pseudoprime is divisible by 14 or by any number 14*X +6, 14*X +10, 14*X +12 where X is any integer.

It is also shown that for the 14 by 14X grid presented in Appendix 13, all primes > 13 are found in columns 14X+1, 14X+3, 14X+5, 14X +9, 14X +11 and 14X +13 where X is any integer > 1 or equivalently 1,3,5,2,4 and 6 modulo 7. If p_1, p_3, p_5, p_2, p_4, and p_6 are the first primes found in the respective column, then In each column the next prime is found at $p_1 +14k_1$, $p_3+(14/3)*3k_3$, $p_5+(14/5)*5k_5$, $p_9+(14/9)*9k_9$, $p_{11}+(14/11)*11k_{11}$, and $p_{13}+(14/13)*13k_{13}$., where the k_i are integers greater or equal to 1.

*Example: p1(1) = 29, p1(2)= 29+14=43, p1(3) = 43+ 14*2 = 71, p1(4) = 71 + 14*3 = 113, p1(5) = 113 +14*1 = 127. At 14X +1 = 15,57,85,99, the numbers are composites. Also, P13(12) = 41 + (14/13)*13*27 = 419.*

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Observations with other Primes

Mersenne primes are prime numbers of the form 2^n -1. OEIS A000668 lists these primes. The location of these numbers on the 14X grid shows them to populate bin 1(14X+1) and bin 3 (14X+3) with exception of the second Mersenne prime of 7.

Fermat Primes.

Primes of the form $2^{\wedge}2^n$ +1. OEIS A019434 indicates only 5 are known. These primes populate alternate between bin 3 and bin 5.

Composite Fermat pseudo-primes are listed in OEIS A000215. It is interesting to note that the cycle between bin 3 and bin 5 continues for the first few composites that can be calculated with a desktop computer.

Carmichael Numbers

These numbers are very large numbers of the form $a^{(n-1)}$ = 1 mod n for (a,n)=1. The first Carmichael number is > 10^{168} for n=561. It is noted that the value of n are composite but these composites (several divisible by 7) occupy the following bins: 7,7,1,7,11,7,9,7,11,7,13…indicating they make up prime gaps in bins 1,9,11,and 13. Are any values of n found in bins 3 or 5?

RT August 27, 2015