Observation on the lenght of the period of the rational number which is the sum of 1÷(ni-1) where ni are odd semiprimes not divisible by 3

Abstract. In this paper I make the following observation: let n1, n2,..., ni be the ordered set of the odd semiprimes not divisible by 3; then the period of the rational number which is the sum 1/(n1 – 1) + 1/(n2 – 1) +...+ 1/(ni - 1) seems to be always (for any i) divisible by 48. This is not the fact when the semiprimes n1, n2,..., ni are not the ordered set of such semiprimes but few randomly taken (even consecutive) such semiprimes.

Observation:

Let n1, n2,..., ni be the ordered set of the odd semiprimes not divisible by 3; then the period of the rational number which is the sum 1/(n1 – 1) + 1/(n2 – 1) +...+ 1/(ni – 1) seems to be always (for any i) divisible by 48. This is not the fact when the semiprimes n1, n2,..., ni are not the ordered set of such semiprimes but few randomly taken (even consecutive) such semiprimes.

Note:

For the sequence of odd semiprimes not divisible by 3 take out from the sequence A046388 on OEIS the numbers divisible by 3 (I understand by semiprimes the product of two distinct primes). The sequence is: 35, 55, 65, 77, 85, 91, 95, 115, 119, 133 (...).

Verifying the observation:
(true up to i = 10)

: for n1 = 35 and n2 = 55 we have the lenght of the period of the number 1/34 + 1/54 equal to 48;
: for n3 = 65 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 equal to 48;
: for n4 = 77 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 equal to 144 which is 48*3;
: for n5 = 85 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 equal to 144 which is 48*3;
: for n6 = 91 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 + 1/90 equal to 144 which is 48*3;

: for n7 = 95 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 + 1/94 equal to 3312 which is 48*69;
: for n8 = 115 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 + 1/94 + 1/114 equal to 3312 which is 48*69;
: for n9 = 119 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 + 1/94 + 1/114 + 1/118 equal to 96048 which is 48*2001;
: for n10 = 133 we have the lenght of the period of the number 1/34 + 1/54 + 1/64 + 1/76 + 1/84 + 1/94 + 1/114 + 1/118 + 1/132 equal to 96048 which is 48*2001.

Note:

As I mentioned in Abstract, the observation doesn’t apply when semiprimes n1, n2,..., ni are not the ordered set of such semiprimes but few randomly taken (even consecutive) such semiprimes.

Examples:

: for [n1, n2] = [35, 65] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) equal to 16 which is not divisible by 48;
: for [n1, n2] = [35, 91] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) equal to 16 which is not divisible by 48;
: for [n1, n2] = [35, 95] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) equal to 368 which is not divisible by 48;
: for [n1, n2] = [35, 119] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) equal to 464 which is not divisible by 48;
: for [n1, n2, n3] = [35, 65, 91] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) + 1/(n3 – 1) equal to 16 which is not divisible by 48;
: for [n1, n2, n3] = [35, 65, 95] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) + 1/(n3 – 1) equal to 368 which is not divisible by 48;
: for [n1, n2, n3] = [55, 65, 77] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) + 1/(n3 – 1) equal to 18 which is not divisible by 48;
: for [n1, n2, n3] = [35, 119, 133] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) + 1/(n3 – 1) equal to 464 which is not divisible by 48;
: for [n1, n2, n3] = [114, 119, 133] we have the lenght of the period of the number 1/(n1 – 1) + 1/(n2 – 1) + 1/(n3 – 1) equal to 522 which is not divisible by 48.