

# A Fifth Smarandache Friendly Prime Pair

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Abstract

A Smarandache friendly prime pair is a pair of prime numbers  $(p, q)$ ,  $p < q$ , such that the product  $pq$  is equal to the sum of all primes from  $p$  to  $q$  inclusive. Previously four such pairs were known: (2,5), (3,13), (5,31) and (7,53). A fifth one is found by a brute force search.

## Introduction

Given any sequence  $a_1, a_2, \dots$ , two elements of the sequence  $a_n, a_m$  are called a Smarandache Friendly Pair with respect to the sequence if

$$a_n a_m = \sum_{i=n}^m a_i$$

For example, if the sequence is the natural numbers then there are an infinite number of friendly pairs<sup>[1]</sup> and all such pairs can be determined<sup>[2]</sup>.

Where the sequence is the prime numbers, four friendly pairs were previously known<sup>[3]</sup> (2,5), (3,13), (5,31) and (7,53).

Using a brute force calculation a fifth pair has been found to be (3536123, 128541727).

It is not known whether any other pairs exist, or if there are finitely many.

## References

[1] A. Murphy, "Smarandache friendly numbers and a few more sequences", Smarandache Notions Journal, Vol 12 N, 1-2-3 Spring 2001

[2] Maohua Le, "The Smarandache friendly natural number pairs", Smarandache Notions Journal, V13, Issue 1-2-3 (Spring 2002)

[3] Felice. Russo, "On a problem concerning the Smarandache friendly prime pairs", viXra:1004.0125, Smarandache Notions Journal, p56-58, 2002