Title: Goldbach Conjecture – A Proof

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Abstract: The Goldbach Conjecture may be stated as follows:

Every even number greater than 4 can be written as the sum of two primes.

Examples:

6 = 3+3
8 = 3+5
10 = 3+7; 5+5

We will call the two primes summing to a particular number a Goldbach Pair (GP) for that number.

Consider the following identity for all positive even numbers N:

$$N = (N-u) + (N-v) - (N-u-v) \quad \{u, v; N>v>=u\} \qquad (1)$$

Assuming all even numbers less than N are GP's

Then (N-u), (N-v), (N-u-v) are GP's
And (N-u-v) >=6

We must show N is also a GP.

Assume N = (A+B) {A, B, a, b prime; < N-2} (2)
Thus from (1) (A+B) = (A+a) + (B+b) – (N-u-v)
Where (N-u) = (A+a)
(N-v) = (B+b)
(N-u-v) = (a+b)

Giving N = (u+v) + (a+b) (3)

(2) and (3) impose constraints on {u, v}

Using N = 12 as an example the following table displays eligible values

N	**a+b**	**u**	**v**
12	6	2	4
12	8	2	2

Therefore (1) occurs in 2 ways:

12 = 10 + 8 – 6
= (7+3) + (5+3) – (3+3) = (7+5)

12 = 10 + 10 – 8
= (7+3) + (5+5) – (5+3) = (7+5)

This method may be used for any N apparently.