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 pair of primes summing to a particular number a Goldbach Pair (GP) for that number.

Consider the following identity for positive even numbers:

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

If we require (N-u), (N-v), and (N-u-v) to be GP's for all values of u and v and N also to be a GP then

$$N = (A+B), \qquad \{A, B \text{ prime}; < N-2\}$$
$$(N-v) <= (N-u)$$
$$(N-u-v) >=6$$

From (1) $\quad N = (A+a) + (B+b) - (N-u-v) \qquad \{a, b \text{ prime}\}$

Where $\quad (N-u) = (A+a)$

$(N-v) = (B+b)$

This requires $\quad N = (u+v) + (a+b)$

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) may be written 2 ways

$$12 = 10 + 8 - 6$$
$$= (7+3) + (5+3) - (3+3) = (7+5)$$

$$12 = 10 + 10 - 8$$
$$= (7+3) + (5+5) - (5+3) = (7+5)$$

Thus there are two different paths to the only GP for 12.

This method may be used for any N apparently .