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Goldbach Weak Conjecture Proof

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Abstract

After proving the strong Goldbach conjecture (viXra:2006.0226), the author in this paper, proves the weak Goldbach conjecture which states that every odd integer greater than 7 can be expressed as the sum of three odd primes. The approach in the coverage of the weak Goldbach conjecture is similar to the approach used in proving the strong conjecture. The main principle for finding Goldbach partitions from a known partition is the application of the addition axiom to a Goldbach partition equation. It is shown that given an equation for a Goldbach partition, one can produce a Goldbach partition for any odd integer greater than 7. Beginning with the partition equation, 9 = 3 + 3 + 3, and applying the addition of a 2 to both sides of this equation, and subsequent equations, one obtained Goldbach partitions for 26 consecutive odd integers. In addition to the table for 26 consecutive odd integers, a second table was constructed from a table for consecutive even integers by mere addition of a 3 to both sides of the partition equations. A consequent generalized procedure also produced Goldbach partitions for the non-consecutive odd integers, 101 and 1001. Formulas derived for the Goldbach partitions shows that every odd integer greater than 7 can be written as the sum of three odd prime integers.

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Preliminaries

Introduction

The following is from the first page of the author's high school practical physics note book: Science is the systematic observation of what happens in nature and the building up of body of laws and theories to describe the natural world. Scientific knowledge is being extended and applied to everyday life. The basis of this growing knowledge is experimental work. To prove Goldbach conjecture, one would be guided by the approach for finding Goldbach partitions.

Finding Goldbach Partitions

For communication purposes, let O_n be a positive odd integer, and let P_r, P_s, and P_t be three odd prime integers, where the subscript n is an odd integer and the subscripts r and s and t are odd prime integers, Also, $O_n = P_r + P_s + P_t$. The main principle for finding a Goldbach partition for a consecutive odd integer from a known partition is the application of the addition axiom which states that if equal quantities are added to equal quantities, the sums are equal. One will begin with the Goldbach partition, $9 = 3 + 3 + 3$, and apply the addition axiom to this equation to obtain partitions for larger odd integers. In obtaining partitions for consecutive odd integers, one will add 2 to both sides of the equation. For the next consecutive odd integer, one will add a 2 to the present odd integer, and one will also add a 2 to the right side of the equation. For the addition of a 2 to the right side of the equation, there are a number of possibilities.

Possibility 1 (desirable)**:** The addition of a 2 to any of the terms results in three prime integers.

Possibility 2: One will inspect the three terms, P_r P_s and P_t to determine which term if not prime would become prime when 2 is added to it, and add to it accordingly.

Possibility 3: If on adding a 2, to say, P_r one obtains a composite integer, one may add another 2 or more 2's until one obtains a prime integer; but for compensation, one would have to subtract the extra 2 or the extra 2's (added) from one of the other terms, noting that one is adding a single 2 to the left side and a single 2 to the right side of the equation. For examples, if one repeats the addition of 2 once, one will subtract a single 2 from one of the other terms. If one repeats the addition twice, one will subtract 4 from the other terms. If one repeats the 2-addition a third time, one will subtract a 6 from the other terms. With experience, one would be able to determine which term to add a 2 or 2's to in order to avoid the extra 2-addition. For the difference in the subtraction, the resulting difference cannot be less than 3. The difference must be a prime number. An important skill for finding Goldbach partitions is changing composite integer sums to prime integer sums.

An important statement is that if one can find a formula or prodedure for producing a Goldbach partition for every even positive integer, then every even positive integer can be expressed as the sun of two prime integers

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Goldbach Partition Equations for Odd Integers

Consecutive Descendants

Two tables are presented for the construction of the partitions.
The first table will be constructed mentally, and will show that every odd integer greater than 7 can be expressed as the sum of three odd primes, because the process will not terminate, and can continue indefinitely. The second table will be constructed using the table for even integers from the author's paper proving the strong conjecture (viXra:2006.0226), For the first table, review the instructions on page 3. One will begin with the partition equation $9 = 3 + 3 + 3$, and apply the addition of 2 to both sides of the equation to produce the partition for the next odd number, 11. From the partition equation, $11 = 5 + 3 + 3$, one will repeat the 2-addition process to obtain the partition for the next odd integer, 13. From the partition for 13, the process could continue indefinitely and every odd integer would be partitioned as the sum of three odd primes. Note that an odd number can have two or more different partitions.

Table 1 **Basis:** $n = 2k + 1 = 9$,

1. $9 = 3 + 3 + 3 \Downarrow$ Begin	
2. $11 = 5 + 3 + 3$	$\Leftarrow$ (Add 2 to 9, and add 2 to the first 3.
3. $13 = 7 + 3 + 3$	$\Leftarrow$ (Add 2 to 11, and add 2 to 5.
4. $15 = 7 + 5 + 3$	$\Leftarrow$ (Add 2 to 13, and add 2 to the first 3.
5. $17 = 7 + 7 + 3$	$\Leftarrow$ (Add 2 to 15, and add 2 to 5. keep the 3
6. $19 = 7 + 7 + 5$	$\Leftarrow$ (Add 2 to 17, and add 2 to 3
7. $21 = 7 + 7 + 7$	$\Leftarrow$ (Add 2 to 19, and add 2 to 5.
8. $23 = 11 + 5 + 7$	$\Leftarrow$ (Add 2 to 21,add 4 to the first 7, subtract 2 from the second 7.
9. $25 = 13 + 5 + 7$	$\Leftarrow$ (Add 2 to 23, add 2 to 11.
10. $27 = 13 + 7 + 7$	$\Leftarrow$ (Add 2 to 25,add 2 to 5
11. $29 = 17 + 5 + 7$	$\Leftarrow$ (Add 2 to 27, add 4 to 13, subtract 2 from the first 7.
12. $31 = 19 + 5 + 7$	$\Leftarrow$ (Add 2 to 29, add 2 to 17,keep 5 and 7
13. $33 = 19 + 7 + 7$	$\Leftarrow$ (Add 2 to 31, add 2 to 5.
14. $35 = 23 + 5 + 7$	$\Leftarrow$ (Add 2 to 33, add 4 to 19,subtract 2 from the first 7.
15. $37 = 23 + 7 + 7$	$\Leftarrow$ (Add 2 to 35, and add 2 to 5
16. $39 = 23 + 11 + 5$	$\Leftarrow$ (Add 2 to 37, add 4 to the first 7 and subtract 2 from the second 7.
17. $41 = 23 + 13 + 5$	$\Leftarrow$ (Add 2 to 39, add 2 to 11
18. $43 = 23 + 13 + 7$	$\Leftarrow$ (Add 2 to 41, add 2 to 5.
19. $45 = 29 + 13 + 3$	$\Leftarrow$ (Add 2 to 43, add 6 to 23, subtract 4 from7
20. $47 = 29 + 13 + 5$	$\Leftarrow$ (Add 2 to 45, and add 2 to 3.
21. $49 = 29 + 13 + 7$	$\Leftarrow$ (Add 2 to 47, and add 2 to 5.
22. $51 = 31 + 13 + 7$	$\Leftarrow$ (Add 2 to 49, add 2 to 29.
23. $53 = 31 + 17 + 5$	$\Leftarrow$ (Add 2 to 51, add 4 to 13 and subtract 2 from 7.
24. $55 = 31 + 17 + 7$	$\Leftarrow$ (Add 2 to 53, add 2 to the 5
25. $57 = 31 + 19 + 7$	$\Leftarrow$ (Add 2 to 55, add 2 to 17, keep the 7.
26. $59 = 31 + 17 + 11$	$\Leftarrow$ Add 2 to 57, add 4 to 7, subtract 2 from 19

About the above explanations: When one adds a 4, one has added an extra 2, and one subtracts appropriately a 2 from one of the other addends. If one adds a 6, one has added an extra 4 which must be subtracted from one (or both) of the other addends, noting that the addition and subtraction of a 2 or 2's is to produce only primes on the right side of the partition equation.

Above, beginning with the partition equation , 9 = 3 + 3 + 3 , page 4, the partition equations #2 to #26 were produced. Also, knowing partition #5, above, one can also obtain partition #24 and vice versa. In the table, there are twenty-six Goldbach partition equations. As shown below, if one skips partitions for 11-59, above, one can produce a partition for **1**01 as well as partitions for 1001, and 400,000,001,001,

The second table, Table 2 presented below, was produced from Table 3, page 6, the table for the even numbers in Goldbach's strong conjecture. By mere addition of a 3 to both sides of the partition equations in Table 3, Table 2 was constructed.

Table 2
Goldbach Partition Equations for Odd Integers.

Converted from binary to ternary by addition of a 3 to both sides of the equations in Table **3**

1. 9 = 3 + 3 + 3	**26.** 59 = 53 + 3 + 3 = 37 + 19 + 3
2. 11 = 5 + 3 + 3	**27.** 61 = 53 + 5 + 3 = 41 + 17 + 3
3. 13 = 7 + 3 + 3	**28.** 63 = 53 + 7 + 3 = 43 + 17 + 3 = 41 + 19 + 3
4. 15 = 7 + 5 + 3	**29.** 65 = 59 + 3 + 3 = 43 + 19 + 3
5. 17 = 7 + 7 + 3 = 11 + 3 + 3	**30.** 67 = 59 + 5 + 3 = 47 + 17 + 3
6. 19 = 11 + 5 + 3 = 13 + 3 + 3	**31.** 69 = 59 + 7 + 3 = 47 + 19 + 3
7. 21 = 13 + 5 + 3	**32.** 71 = 61 + 7 + 3
8. 23 = 13 + 7 + 3	**33.** 73 = 67 + 3 + 3 = 59 + 11 + 3
9. 25 = 17 + 5 + 3 = 11 + 11 + 3	**34.** 75 = 67 + 5 + 3 = 59 + 13 + 3
10. 27 = 19 + 5 + 3 = 13 + 11 + 3	**35.** 77 = 71 + 3 + 3 = 61 + 13 + 3 = 67 + 7 + 3
11. 29 = 19 + 7 + 3 = 23 + 3 + 3 = 13 + 13 + 3	**36.** 79 = 71 + 5 + 3 = 59 + 17 + 3
12. 31 = 23 + 5 + 3 = 17 + 11 + 3	**37.** 81 = 71 + 7 + 3 = 61 + 17 + 3
13. 33 = 23 + 7 + 3 = 17 + 13 + 3	**38.** 83 = 73 + 7 + 3 = 61 + 19 + 3 =
14. 35 = 29 + 3 + 3 = 21 + 11 + 3	**39.** 85 = 79 + 3 + 3 = 59 + 23 + 3
15. 37 = 31 + 3 + 3 = 29 + 5 + 3	**40.** 87 = 79 + 5 + 3 = 61 + 23 + 3
16. 39 = 31 + 5 + 3 = 29 + 7 + 3	**41.** 89 = 79 + 7 + 3
17. 41 = 31 + 7 + 3	**42.** 91 = 83 + 5 + 3
18. 43 = 37 + 3 + 3 = 29 + 11 + 3	**43.** 93 = 83 + 7 + 3
19. 45 = 37 + 5 + 3 = 29 + 13 + 3	**44.** 95 = 89 + 3 + 3
20. 47 = 37 + 7 + 3 = 31 + 13 + 3	**45.** 97 = 89 + 5 + 3
21. 49 = 41 + 5 + 3 = 29 + 17 + 3	**46.** 99 = 89 + 7 + 3
22. 51 = 43 + 5 + 3 = 29 + 19 + 3	**47.** 101 = 79 + 19 + 3
23. 53 = 43 + 7 + 3 = 31 + 19 + 3	**48.** 103 = 83 + 17 + 3
24. 55 = 47 + 5 + 3 = 29 + 23 + 3	**49.** 105 = 83 + 19 + 3
25. 57 = 47 + 7 + 3 = 31 + 23 + 3	**50.** 107 = 97 + 7 + 3

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Table 3

Goldbach Partition Equations for Even integers. (viXra:2006.0226)

Basis: $n = 2k = 6$,

1. 6 = 3 + 3	**26.** 56 = 53 + 3 = 37 + 19
2. 8 = 5 + 3	**27.** 58 = 53 + 5 = 41 + 17
3. 10 = 7 + 3	**28.** 60 = 53 + 7 = 43 + 17 = 41 + 19
4. 12 = 7 + 5	**29.** 62 = 59 + 3 = 43 + 19
5. 14 = 7 + 7 = 11 + 3	**30.** 64 = 59 + 5 = 47 + 17
6. 16 = 11 + 5 = 13 + 3	**31.** 66 = 59 + 7 = 47 + 19
7. 18 = 13 + 5	**32.** 68 = 61 + 7
8. 20 = 13 + 7	**33.** 70 = 67 + 3 = 59 + 11
9. 22 = 17 + 5 = 11 + 11	**34.** 72 = 67 + 5 = 59 + 13
10. 24 = 19 + 5 = 13 + 11	**35.** 74 = 71 + 3 = 61 + 13 = 67 + 7
11. 26 = 19 + 7 = 23 + 3 = 13 + 13	**36.** 76 = 71 + 5 = 59 + 17
12. 28 = 23 + 5 = 17 + 11	**37.** 78 = 71 + 7 = 61 + 17
13. 30 = 23 + 7 = 17 + 13	**38.** 80 = 73 + 7 = 61 + 19 =
14. 32 = 29 + 3 = 21 + 11	**39.** 82 = 79 + 3 = 59 + 23
15. 34 = 31 + 3 = 29 + 5	**40.** 84 = 79 + 5 = 61 + 23
16. 36 = 31 + 5 = 29 + 7	**41.** 86 = 79 + 7
17. 38 = 31 + 7	**42.** 88 = 83 + 5
18. 40 = 37 + 3 = 29 + 11	**43.** 90 = 83 + 7
19. 42 = 37 + 5 = 29 + 13	**44.** 92 = 89 + 3
20. 44 = 37 + 7 = 31 + 13	**45.** 94 = 89 + 5
21. 46 = 41 + 5 = 29 + 17	**46.** 96 = 89 + 7
22. 48 = 43 + 5 = 29 + 19	**47.** 98 = 79 + 19
23. 50 = 43 + 7 = 31 + 19	**48.** 100 = 83 + 17
24. 52 = 47 + 5 = 29 + 23	**49.** 102 = 83 + 19
25. 54 = 47 + 7 = 31 + 23	**50.** 104 = 97 + 7

Goldbach Partition Equations for Odd Integers.

From 9 to 101

A

$$9 = 3 + 3 + 3$$
$$9 + (101 - 9) = 3 + 3 + [(3 + (101 - 9)]$$
$$9 + 92 = 3 + 3 + (3 + 92)$$
$$101 = (3 + 4) + (3 + 2) + (95 - 6)$$
$$\mathbf{101 = 7 + 5 + 89.}$$

Note: 89 is prime

From 101 to 9

D

$$101 = 7 + 5 + 89$$
$$101 + (9 - 101) = 7 + 5 + (89 + (9 - 101)$$
$$101 - 92 = 7 + 5 + (89 - 92)$$
$$9 = 7 + 5 + (89 - 92)$$
$$9 = 7 + 5 - 3$$
$$9 = (7 - 4) + (5 - 2) + (-3 + 6)$$
$$\mathbf{9 = 3 + 3 + 3}$$

From 29 to 53

B

$$29 = 17 + 5 + 7$$
$$29 + (53 - 29) = 17 + 5 + (7 + (53 - 29)))$$
$$29 + 24 = 17 + 5 + (7 + 24)$$
$$\mathbf{53 = 17 + 5 + 31}$$

From 53 to 29

C

$$53 = 17 + 5 + 31$$
$$53 + (29 - 53) = 17 + 5 + (31 + (29 - 53))$$
$$53 - 24 = 17 + 5 + (31 - 24)$$
$$\mathbf{29 = 17 + 5 + 7}$$

From 9 to 1001

E

$$9 = 3 + 3 + 3$$
$$9 + (1001 - 9) = 3 + 3 + [(3 + (1001 - 9)]$$
$$9 + 992 = 3 + 3 + (3 + 992)$$
$$9 + 992 = 3 + 3 + 995$$
$$\left.\begin{aligned}1001 &= (3 + 2) + (3 + 2) + 991\\ 1001 &= 5 + 5 + 991\end{aligned}\right\}$$

or

$$\left.\begin{aligned}1001 &= (3 + 4) + 3 + 991\\ 1001 &= 7 + 3 + 991\end{aligned}\right\}$$

Note: 991 is prime

From 9 to 400,000,001,001

F

$$9 = 3 + 3 + 3$$
$$9 + (400{,}000{,}001{,}001 - 9) = 3 + 3 + [(3 + (400{,}000{,}001{,}001 - 9)]$$
$$9 + 400{,}000{,}000{,}992 = 3 + 3 + (3 + 400{,}000{,}000{,}992)$$
$$9 + 400{,}000{,}000{,}992 = 3 + 3 + 400{,}000{,}000{,}995$$
$$400{,}000{,}001{,}001 = 3 + 3 + (400{,}000{,}000{,}963 + 32)$$
$$400{,}000{,}001{,}001 = 19 + 19 + 400{,}000{,}000{,}963.$$

The repetition in the above partition processes (Table1, Table 2, Table 3), is similar to compound interest calculations, except in the operations involved. For example, to find the amount at the end of 20 years in a compound interest calculation, one can find the interest for the first year, add the interest to the principal, followed by finding the interest on the new amount, and repeat the process 20 times. However, since there is a formula for determining the amount after 20 years, one does not have to use a repetitive process. Similarly, in Goldbach partition determination, if one can find a formula which can be used to find a Goldbach partition for every odd integer, one would not have to perform the consecutive calculations in the tables on pages 4-6.
Therefore, on the next page, one will derive a formula or formulas for finding a Goldbach partition for every odd integer greater than 7.

"The simplest solution is usually the best solution"---Albert Einstein

Goldbach Weak Conjecture Proof

Given: **1**. A known Goldbach partition of the odd integer $O_1 = P_1 + P_2 + P_3$, where P_1 and P_2, and P_3 are prime odd integers. **2**. The odd integer, O_n, ($n > 7$) whose partition is to be determined..

Required: To show that the odd integer O_n has a Goldbach partition ,

Plan: Let $O_n = P_r + P_s + P_t$, where P_r and P_s and P_t are prime odd integers. The proof would be complete after finding a general formula for O_n for a Goldbach partition equation.

Proof

Statements

1. O_n is an odd integer

2. P_1, P_2 and P_3 are prime odd integers

3. $O_1 = P_1 + P_2 + P_3$

4. $O_1 + (O_n - O_1) = P_1 + P_2 + [P_3 + (O_n - O_1)]$

5. $O_n = P_1 + P_2 + [P_3 + (O_n - O_1)]$

6. In statement 5, above, P_1, P_2 are odd prime integers

7. **Case A**: $[P_3 + (O_n - O_1)]$ is prime (desirable),

$P_r = P_1$, $P_s = P_2$, $P_t = [P_3 + (O_n - O_1)]$

$O_n = P_r + P_s + P_t = \boxed{P_1 + P_2 + [P_3 + (O_n - O_1)]}$; and the proof is complete.

Case B: $[P_3 + (O_n - O_1)]$ is **not** prime. The addition or subtraction of a 2 or 2 's would make $[P_3 + (O_n - O_1)]$ become prime, However, the 2 or 2's added or subtracted must be subtracted from or added to P_1. or P_2

Case B1: $P_1 = 3$; $P_2 = 3$, $p_t = [P_3 + (O_n - O_1)] - 2t$; $p_r = 3 + 2t_1$, $p_s = 3 + 2t_2$, where $2t_1 + 2t_2 = 2t$ and $2t_1$ or $2t_2$ may be zero but not both and where t is the number of times 2 is subtracted before primality occurs.

$$\boxed{O_n = (3 + 2t_1) + (3 + 2t_2) + [P_3 + (O_n - O_1)] - 2t}$$

Case B2: $P_1 > 3$, $P_2 > 3$; $P_r = (P_1 \mp 2t_1)$, $P_s = (P_2 \mp 2t_2)$; $P_t = [P_3 + (O_n - O_1) \pm 2t]$ & where $2t_1 + 2t_2 = 2t$ and $2t_1$ or $2t_2$ may be zero but not both. After the changes in P_1 , P_2 and $[P_3 + (O_n - O_1)]$,

$$\boxed{O_n = (P_1 \mp 2t_1) + (P_2 \mp 2t_2)[P_3 + (O_n - O_1) \pm 2t]}$$

Reasons

1. Given

2. Given

3. Given

4. Addition axiom (Equals added to equals) $O_n - O_1$ = difference between odd integers.

5. Simplifying the left-side

6. Given

7. There are infinitely many primes and the addition or subtraction would ultimately make $[P_3 + (O_n - O_1)]$ become prime.

Note: O_1, O_n, P_1, P_2, P_3, P_r, P_s, and P_t are all positive integers. $[P_3 + (O_n - O_1)]$ is also a positive integer.

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As $n \to \infty$, the general Goldbach partition equations, above, for O_n, would still be given by the above equations which would always be defined and never zero; and where O_1, P_1, P_2, and P_3 are from a known Goldbach partition equation. Therefore, every odd integer, O_n $(n > 7)$ (can be expressed as the sum of three odd primes; and the proof is complete.

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Discussion

From above, generally, $\boxed{O_n = P_1 + P_2 + [P_3 + (O_n - O_1)]}$, where O_1, P_1, P_2, P_3 are from any known Goldbach partition $O_1 = P_1 + P_2 + P_3$. If $[P_3 + (O_n - O_1)]$ is prime, there is no more work to be done, and one would have found a Goldbach partition for the odd integer O_n. However, if it is not prime, one has to apply cases B1 and B2, above. It is to be noted for example that in the table on page 4, one can obtain Goldbach partition #23 from partition #11 and vice versa as illustrated on page 7 Box B-C

For examples on Case A of the proof, see Example B, p. 7. For Case B1, see Example B, p.7. For Case B2, see Example A, p.7

Interestingly, one can also obtain the partition equation $9 = 3 + 3 + 3$ from any other partition equation, as in example Box D, p.7. Such a result is very convincing that every odd integer can be written as the sum of three odd primes. Thus, given a Goldbach partition of an odd integer, by hand, one can find, without exception, a Goldbach partition for any other odd integer, within minutes.

Conclusion

It has been shown in this paper that every odd integer greater than 7 can be expressed as the sum of three odd primes. The proof was guided by the approach the author used in finding Goldbach partitions. The approach for finding the partitions led directly to evidence that every odd integer greater than 7 is the sum of three odd primes. The main principle for finding Goldbach partitions from a known partition is the application of the addition axiom to a Goldbach partition equation. It was shown that given an equation for a Goldbach partition, one can produce a Goldbach partition for any odd integer greater than 7. Three tables for the construction of Goldbach partition equations were covered. The first table began with the partition equation, $9 = 3 + 3 + 3$, and applying the addition of a 2 to both sides of this equation sequentially and repeatedly, one obtained Goldbach partitions for 26 consecutive odd integers. Also, a derived formula was used successfully to find partitions for the non-consecutive odd integers, 1001; 10001; and 400,000,001,1001. The second table was constructed from a two-prime integer partitions by mere addition of a 3 to both sides of the partition equations.

It is concluded that, knowing a single Goldbach partition equation for an odd integer, one can by hand, find a Goldbach partition quickly for any other odd integer.

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References

1. The approach used in covering Goldbach conjecture in this paper is similar to the approach the author used in proving Beal Conjecture (vixra: 2001.0694).

2. In covering the Goldbach conjecture, one must have quick access to the list of the prime numbers, Some places on the web for the lists of prime numbers are at: 1.www.mathsfun.com; 2. CalculatorSoup.com.

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Extra
Integer Humor

Conversation Between the Odd Integers 29 and 53

Mr. 53 speaks: Mr. 29. I can see that you have a Goldbach partition. Can you help me get my own Goldbach partition?

Mr. 29 answers: Yes, I can help you using my own Goldbach partition as in box **A** below:

A $29 = 17 + 5 + 7$	**B** $53 = 17 + 5 + 31$
$29 + (53 - 29) = 17 + 5 + (7 + (53 - 29)))$	$53 + (29 - 53) = 17 + 5 + (31 + (29 - 53))$
$29 + 24 = 17 + 5 + (7 + 24)$	$53 - 24 = 17 + 5 + (31 - 24)$
$\mathbf{53 = 17 + 5 + 31 =}\ 5 + 17 + 31$	$\mathbf{29 = 17 + 5 + 7 = 5 + 7 + 17}$

Mr. 53 speaks: Thank you Mr. 29.

A week later, Mr.53 meets Mr. 29 and Mr. 29 has no Goldbach partition.

Mr. 53 speaks: Mr. 29, where is your Goldbach partition?

Mr. 29 answers: I lost my partition.

Mr. 53 speaks without hesitation: Mr. 29, I can help you get your Goldbach partition back as in box **B** above.

Mr. 29 speaks: Thank you very much, Mr. 53. I got my Goldbach partition back.

Mr. 53 speaks: Don't mention. You were kind to me, the first time we met.

Mr. 53 speaks: Here, comes my neighbor, Mr. 51, without a Goldbach partition. From my partition, I can easily get Mr. 51 a partition as in box **C** below.

C $53 = 5 + 17 + 31$
$53 + (51 - 53) = 5 + 17 + (31 + 51 - 53)$
$53 - 2 = 5 + 17 + (31 - 2))$
$\mathbf{51 = 5 + 17 + 29}$

Mr. 51 speaks: Thank you Mr. 53. I have a Goldbach partition for the first time.

Mr. 29 speaks to Mr. 51: I can see from our partitions that my name is the same as your year of birth, 29.

Mr. 51 speaks: Yes. I was born in 1929.

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