Tri-Numbers of Even Numbers and Pythagoras Theorem

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1. Introduction

Research is a careful and scientific inquiry into every subject, subject matter or area, which is an endeavor to discover valuable information which would be useful for further application. Thus, research is a process of a systematic and in-depth study or search of any specific are of investigation. The research would result in formulation of new theories, discovery of new techniques, an improvement in old concept of an exiting concept, theory, method or technique.

In this present research researcher has taken pure research related to mathematical formula. The aims of pure research or basic research are to unravel the mysteries of nature, acquire knowledge for its own sake and extend the frontiers of knowledge. The basic research of today may become the applied research of tomorrow. In our study of numbers we have so far used whole numbers, fractional numbers, and rational numbers, positive and negative numbers. The natural numbers are sign less numbers which we use for counting and, of course, they from a sequence. The fractional numbers and rational numbers would correspond to lying between the points representing integers. The set of integers written in order is sequence. Each element in a sequence is called a term, and in general terms we say that the n^{th} term is n, where n can have values like 1,2,3,…..n. The natural numbers which we are use for counting and, of course, they from a sequence. If we examine this sequence of a natural numbers we will find the other sequence inside it, the most two obvious being the sequence of odd numbers and the sequence of even numbers. If we examine the even numbers we can see that the sequence of even numbers is twice to its position number. From this example mathematics is able to answer the question like what would be the 20^{th} term? The 25^{th} ? The 30^{th} ? The 50^{th} ?....the n^{th}? It can be easy to understand the what is meant by the general term. If we try to represent the even numbers with the help of dot, it is noted that each number of the sequence has a rectangular dot pattern.

2. Arithmetic progression

A sequence is an arrangement of numbers in a definite order to some rule. An arithmetic progression is a sequence in which term increase or decrease regularly by the same constant. This constant is called the common difference of the progression (series). In other words, we can say that list of numbers in which the first term is given and each term is obtained by adding a fixed number to the preceding term.

3. Pythagoras theorem

Pythagoras theorem is as follows.
The square on the hypotenuse of a right-angled is equal to the sum of the squares on other two sides.
The triangle ABC is right-angled at C and the sides are enclosing the right-angled are the component of the vector which is the hypotenuse. If BC=a; CA=b and AC=c then
$AB^2 = BC^2 + CA2$
$C^2 = a2 + b^2$

4. Tri-Numbers of Even Numbers and Pythagoras Theorem

In this, present research paper investigator has try to focus on the Tri-Numbers of Even Numbers and Pythagoras Theorem by using the arithmetic progression and Pythagoras theorem by a new innovative

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formula.

5. Formula developed by the investigator:

Formula developed by the investigator is given as under.

$$(2n+2)^2 = (n^2+2n+2)^2-(n^2+2n)^2 \quad \text{and}$$
$$(2n+2)^2 = ((n+1)^2+1)^2-((n^2+1)^2-1)^2$$

Where n > 0

It can be represented by the Pythagoras Theorem is as folloes.

$$(2n+2)^2 + (n^2+2n)^2 = (n^2+2n+2)^2$$

Where, $(2n+2)^2$ = First Side;
$(n^2+2n)^2$ = Second side and
$(n^2+2n+2)^2$ =Hypotenuse

Above two formula can be understand by the given table.

Table no. :1

Sr. No.	Possible Progressive Even Numbers	$(2n+2)^2$ First Side	$(n^2+2n+2)^2$ Hypotenuse	$(n^2+2n)^2$ Second Side
1	P(1)=4	4^2	5^2	3^2
2	P(2)=6	6^2	10^2	8^2
3	P(3)=8	8^2	17^2	15^2
4	P(4)=10	10^2	26^2	24^2
5	P(5)=12	12^2	37^2	35^2
6	P(6)=14	14^2	50^2	48^2
7	P(7)=16	16^2	65^2	63^2
8	P(8)=18	18^2	82^2	80^2
9	P(9)=20	20^2	101^2	99^2
n	P(n)=(2n+2)	$(2n+2)^2$	$(n^2+2n+2)^2$	$(n^2+2n)^2$

Table no. :2

Sr. No.	Possible Progressive Even Numbers	Possibility Order $[P(n)+1]^2$	$(2n+2)^2$ First Side	Hypotenuse	Second Side
1	P(1)=4	$[1+1]^2=2^2$	4^2	$2^2+1=5^2$	$2^2-1=3^2$
2	P(2)=6	$[2+1]^2=3^2$	6^2	$3^2+1=10^2$	$3^2-1=8^2$
3	P(3)=8	$[3+1]^2=4^2$	8^2	$4^2+1=17^2$	$4^2-1=15^2$
4	P(4)=10	$[4+1]^2=5^2$	10^2	$5^2+1=26^2$	$5^2-1=24^2$
5	P(5)=12	$[5+1]^2=6^2$	12^2	$6^2+1=37^2$	$6^2-1=35^2$
6	P(6)=14	$[6+1]^2=7^2$	14^2	$7^2+1=50^2$	$7^2-1=48^2$
7	P(7)=16	$[7+1]^2=8^2$	16^2	$8^2+1=65^2$	$8^2-1=63^2$
8	P(8)=18	$[8+1]^2=9^2$	18^2	$9^2+1=82^2$	$9^2-1=80^2$
9	P(9)=20	$[9+1]^2=10^2$	20^2	$10^2+1=101^2$	$10^2-1=99^2$
n	P(n)=(2n+2)	$(2n+2)^2$	$(2n+2)^2$	$((n+1)^2+1)^2$	$((n+1)^2-1)^2$