

An Investigation into Number Triangles integer sides with Perimeter n by Robert Goodhand

By direct investigation I established the table

n	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
t	1	0	1	1	2	1	3	2	4	3	5	4	7	5	8	7	10	8	12	9	14	12	16	14	19	16

By examination I can see that this is two identical (shifted by 3) sequences covering odd and even perimeters.

n	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53
t	1	1	2	3	4	5	7	8	10	12	14	16	19	21	24	27	30	33	37	40	44	48	52	56	61	65

n	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
t	0	0	1	1	2	3	4	5	7	8	10	12	14	16	19	21	24	27	30	33	37	40	44	48	52	56

Concentrating on "odd" n sequence I can see from the triangle patterns, the totals come from these additions.

So I can see a repeated alternating pattern of triplets.
The overlap also alternates.

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n	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51
$\text{mint}\{(n+3)^2/48\}$	1	1	2	3	4	5	7	8	10	12	14	16	19	21	24	27	30	33	37	40	44	48	52	56	61

 $\propto rg$ $\propto rg$