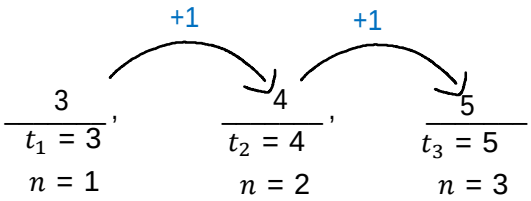
M9 - 6.1 - Patterns Notes



$d = 4 - 3$
$d = 1$

$d = 5 - 4$
$d = 1$

n	t_n
1	3
2	4
3	5

+1
+1

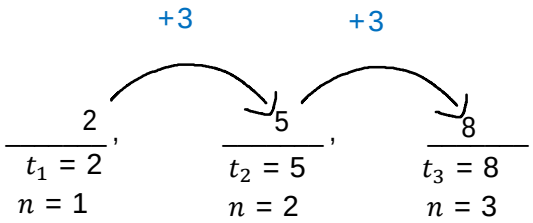
n	1	2	3
t_n	3	4	5

+1 +1

0	2
n	t_n
1	3
2	4
3	5

Equation: $t_n = n + 2$

$t_n = 1n + 2$



$d = 5 - 2$
$d = 3$

$d = 8 - 5$
$d = 3$

n	t_n
1	2
2	5
3	8

+3
+3

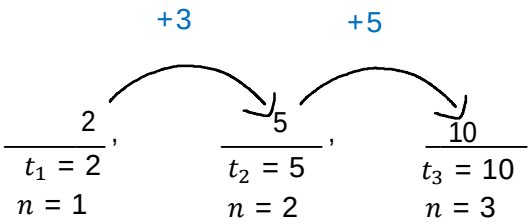
n	1	2	3
t_n	2	5	8

+3 +3

0	−1
n	t_n
1	2
2	5
3	8

Equation: $t_n = 3n - 1$

$t_n = 3n - 1$



$d = 5 - 2$
$d = 3$

$d = 10 - 5$
$d = 5$

n	t_n
1	2
2	5
3	10

+3
+5

n	1	2	3
t_n	2	5	10

+3 +5

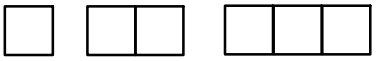
0	1
n	t_n
1	2
2	5
3	10

Equation: $t_n = n^2 + 1$

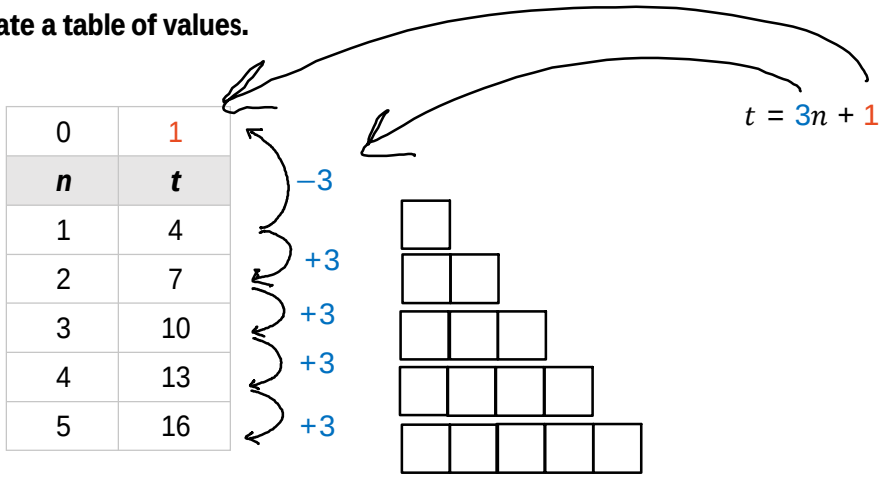
$t_n = n^2 + 1$

M9 - 6.1 - Toothpick Patterns Notes

Find the number of toothpicks of the 4th and 5th set of squares with side length 1.



Create a table of values.



0	1
n	***t***
1	4
2	7
3	10
4	13
5	16

How many toothpicks in the 50th set of squares?

$t = 3n + 1$
$t = 3(50) + 1$
$t = 150 + 1$
$t = 151$

The 50th set of squares has 151 toothpicks.

Which diagram has 91 toothpicks?

$t = 3n + 1$
$91 = 3n + 1$
$-1 \quad -1$
$90 = 3n$
$\frac{90}{3} = \frac{3n}{3}$
$30 = n$

The 30th diagram has 91 toothpicks.