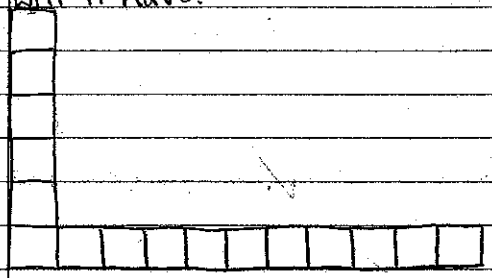
⑧ Understanding the Problem

What will the sixth figure look like and how many cubes will it have?



6th figure

The 6th figure has 16 cubes.

Devising A Plan

I will make a chart and find a pattern so that I can find a functional equation or expression.

Carrying Out The Plan

nth figure	# of cubes vertical	# of cubes horizontal	TOTAL # of cubes
1	1 → 1	0 → 2	1 → 3
2	2 → 1	2 → 2	4 → 3
3	3 → 1	4 → 2	7 → 3
4	4	6	10
5	5	8	13
6	6	10	16
7	7	12	19

a. Yes, I chose a method of finite differences to determine the number of cubes in the sixth figure in the table above. There are 16 cubes in the 6th figure.

Let $A_n = n^{th}$ term

$$\begin{cases} A_1 = 1 \\ A_n = A_{n-1} + 3 \end{cases}$$

b. There would be 100 vertical cubes and 198 horizontal cubes, making it a total of 298 cubes in the 100th figure.

c. The first term is 1 and each succeeding term is 3 more than the previous term. $\boxed{A_n = A_{n-1} + 3}$

(26) a. 3, 7, 13, 21, 31, 43, 57

4 6 8 10 12 14

57 is the next number in the sequence.

b. 215, 124, 63, 26, 7, 0

-91 -61 -37 -19 -7

30 24 18 12

-6 -6 -6

0 is the next number in the sequence.