Mathematics

Delprov C

1a

Elevens namn och klass/grupp

Skolverket

Instructions – Part C

Time for the test 60 minutes for Part C.

Aids Allowed aids on Part C are digital devices, formula sheet and ruler.

Tasks This part consists of one large task. The solution is to be written on separate paper, which is to be submitted together with the test booklet. In your work it is required of you to

- show your solutions
- explain and motivate your thinking

Grading limits The test (Part A–D) gives a total maximum of 75 points.

Limit for test grade

E: At least 19 points.
D: At least 33 points of which at least 12 points at level C or higher.
C: At least 41 points of which at least 18 points at level C or higher.
B: At least 53 points of which at least 6 points at level A.
A: At least 60 points of which at least 9 points at level A.

Name: _____

Date of birth: _____

Programme:_____ Class: _____

Also write your name, date of birth, programme and class on the sheets you hand in.

Illustration: Jens Ahlbom

16. Patterns of cubes (3/4/4)

Li Shanlan was a Chinese mathematician who lived in the mid 19th century.
He constructed regular figures using small cubes according to the following pattern:

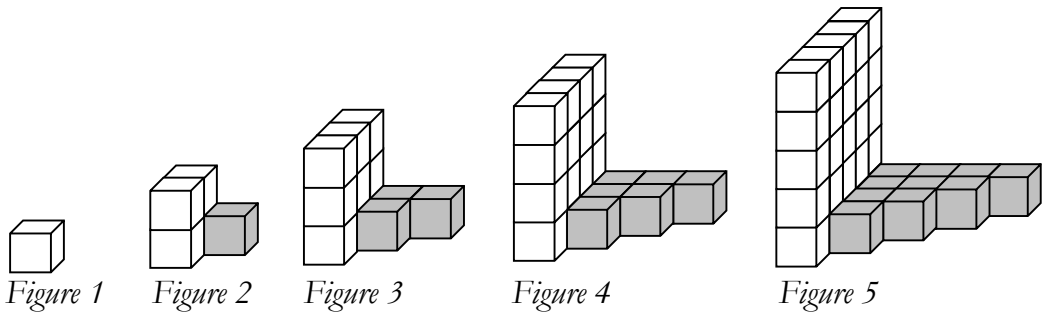

Figure 1 *Figure 2* *Figure 3* *Figure 4* *Figure 5*

Figure	White cubes	Grey cubes	Total number of cubes
1	1	0	1
2	4	1	5
3	9	3	12
4	16	6	22
5		10	

- How many white cubes are there in figure 7?
- How many grey cubes are there in figure 7?
- Describe in words and/or a formula how to calculate the number of white cubes in figure n.
- Describe in words and/or a formula how to calculate the number of grey cubes in figure n.
- To calculate the total number of cubes in figure n Li Shanlan used the formula

  $\frac{n(3n-1)}{2}$ = total number of cubes in figure n

  Is this formula valid for all values n? Motivate.

PRIM gruppen