Mathematics

Part C

Student Booklet

1b

Elevens namn och klass/grupp

Skolverket

Instructions – Part C

Time for the test

90 minutes for Part B and Part C. You will get both parts at the same time. We recommend that you use no more than 45 minutes for work on Part B. When you have handed in Part B you may start using digital devices.

Aids

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

Tasks

This part consists of one large task. In your work it is required of you to

- show your solutions
- explain/motivate your thinking
- draw figures when required.

Grading limits

The test (Part A–D) gives a total maximum of 90 points.

Limit for test grade

E: At least 18 points.
D: At least 35 points of which at least 13 points at level C or higher.
C: At least 47 points of which at least 24 points at level C or higher.
B: At least 59 points of which at least 7 points at level A.
A: At least 69 points of which at least 12 points at level A.

Name: _____

Date of birth: _____

Secondary program: _____ Class:_____

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

13. Patterns of cubes

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

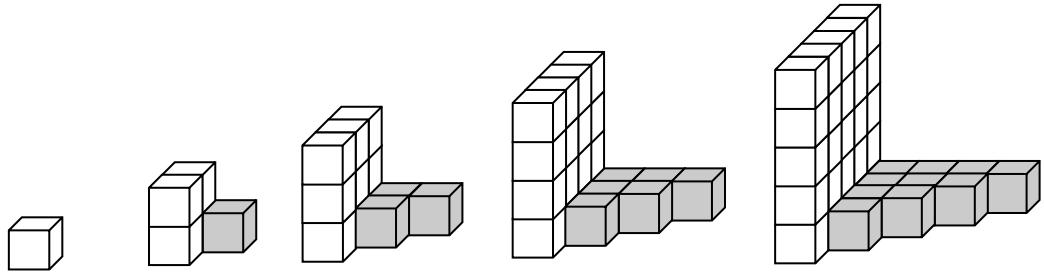

Figure 1 *Figure 2* *Figure 3* *Figure 4* *Figure 5*

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 your answer.

(3/4/4)

In assessing your work the teacher will take into account

- what mathematical knowledge you have shown and how well you have carried out the task
- how well you have explained your work and given reasons for your conclusions
- how well you have presented your work.

PRIM gruppen