

# Mathematics

Delprov C

1b

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Elevens namn och klass/grupp



## 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 88 points.

Limit for test grade

E: At least 20 points.

D: At least 35 points of which at least 12 points at level C or higher.

C: At least 45 points of which at least 20 points at level C or higher.

B: At least 57 points of which at least 6 points at level A.

A: At least 66 points of which at least 11 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. Playing a game of marbles

(3/5/3)

In a school playground, the children are playing a game of marbles. The children throw marbles at pyramids consisting of four marbles. The following rules apply:

Rules of the game:

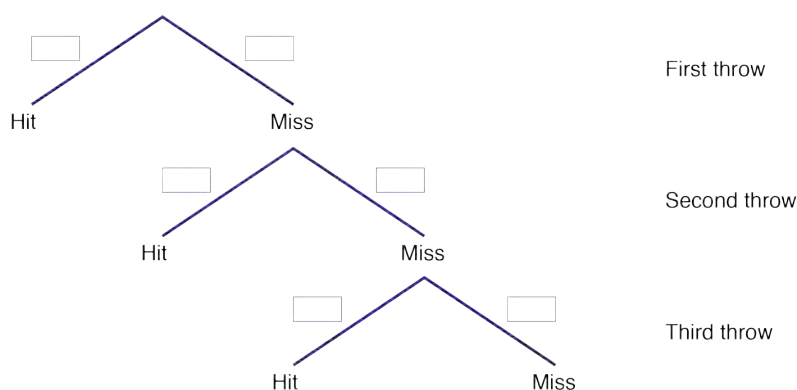
- The game is played in pairs. One person builds a pyramid (builder) and one person throws marbles at the pyramid (thrower).
- The thrower throws one marble at a time.
- A round of the game continues until the thrower hits the pyramid.
- If the thrower hits the pyramid she/he wins the four marbles that make up the pyramid.
- The thrower always loses the marble she/he throws. This applies whether she/he hits the pyramid or not.



Over the course of a day, Camilla has observed her younger brother Niklas when he throws his marbles. Out of 150 throws, Niklas has hit the pyramid 15 times and missed 135 times.

Answer the following questions based on the rules of the game and Camilla’s observations of how often Niklas hits or misses.

- I. What is the probability of Niklas hitting the pyramid in the first throw of a round of the game?
- II. Draw the tree diagram and state the probability of hits and misses in the first three throws.



If Niklas has more marbles after a round of the game than before, that is referred to as being “in the black”.

If Niklas has less marbles after a round of the game than before, that is referred to as being “in the red”.

- III. How many marbles can Niklas be “in the black” by in one round of the game? State all the possible scenarios.
- IV. What is the probability of Niklas being “in the black” by *exactly two* marbles in one round of the game?
- V. What is the probability of Niklas being “in the black” by *at least one* marble in one round of the game?
- VI. What is the probability of Niklas being “in the red” by *at least one* marble in one round of the game? Motivate.







