International Mathematical Competition "European Kangaroo"

Aria: Mathematics

Style of Competition:

- First round (regional) – The competition is "inclusive" (open for all) and is intended for students of average mathematical abilities.
- Second round – The competition is "exclusive" (by invitation only) and it is targeting talented students that have achieved highest scores during the Regional round (10 students for each age group).
- Both rounds are "multiple-choice" and each problem is supplied with five answers, from which the competitor has to find (or guess) the only one correct.
- Both rounds are "presence" and the participants are working on the solution of problems in the presence of other competitors.
- Both rounds are for individuals and what counts finally is the score of the individual participant.
- The first round is an International competition with the participation of more than 3,5 million of students from about 40 countries. The participants from all countries solve the same problems (18 problems for the first age group – 2^{nd} grade, 24 problems for the second age group – 3^{rd} and 4^{th} grade, 30 problems for the remaining age groups) on the same day and in the same hour. Each country has the right to change up to 5 problems for each age group following the peculiarities of the curricula.

Target Group: The competition is open for all students. Average mathematical abilities are suffiient.
Age of Participants: 7 – 20.

School level of Participants: Primary Schools, Secondary schools, High schools, Colleges

Number of Participants: 11 354 in 2005, 12 943 in 2006, over 16 265 in 2007.

History of Competition: The initiative is of Prof. Andre Deledicq from France. Principal organizer of the first and subsequent editions of the event is the International Association "Kangourou sans Frontiers" (registered in France).

Financial Basis of the competition: Financially the competition is self-supported by participation fee.

Competition Problems:

Compiled by Sava Grozdev

International Mathematical Competition
"EUROPEAN KANGAROO"

March 24, 2007

PAPER for grade 2

There are 5 answers after each question and only one of them is correct. Each correct answer is worth 5 points. Calculators and tables are not allowed. Duration of the competition: 75 minutes. We wish you a successful work!

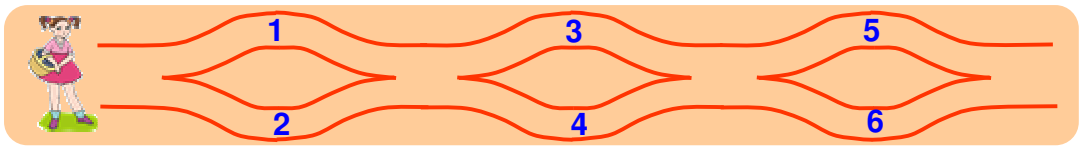
1. Angel, Boris, Vasko, Gogo and Daniel entered a stationer's shop. Angel bought 1 notebook, Boris bought 2 notebooks, Vasko bought 3 notebooks, Gogo bought 4 notebooks, while Daniel bought 5 notebooks. How many notebooks bought all the five?

A) 5 **B)** 8 **C)** 10 **D)** 15 **E)** 16

2. There are 5 trees in the school yard and 7 birds have landed on each tree. After awhile 5 birds have flied away. How many birds have remained on the trees?

A) 35 **B)** 30 **C)** 25 **D)** 20 **E)** 10

3.

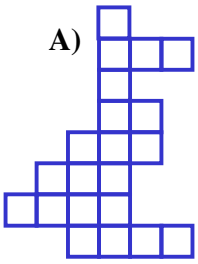


The Red Riding Hood is walking from the left to the right on the shown alleys and gathers numbers in her basket. Which of numbers are gathered in the basket?

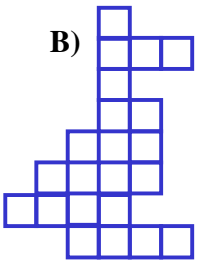
A) 1, 2 and 4 **B)** 2, 3 and 4 **C)** 2, 3 and 5 **D)** 1, 5 and 6 **E)** 1, 2 and 5

4. In which figure the small squares are at most?

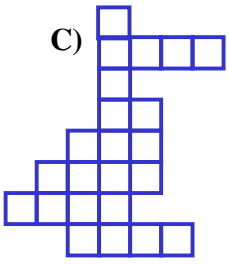
A)



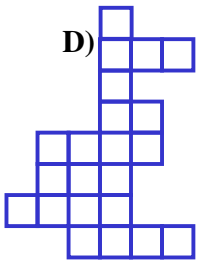
B)



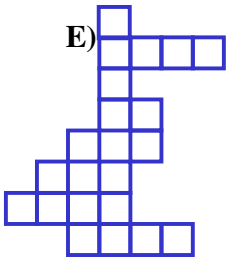
C)



D)



E)



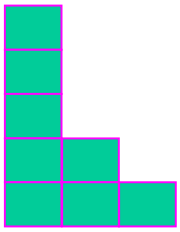
5. Ho many are the common letters in the English words *KANGAROO* and *PROBLEM*?

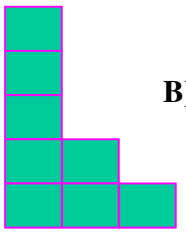
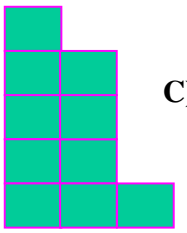
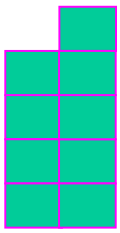
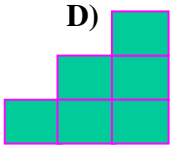
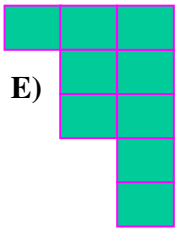
A) 1 **B)** 2 **C)** 3 **D)** 4 **E)** 5

6. There are 9 electric garden lamps on one of the alleys in the park. The distance between any two neighboring lamps is 8 m. Krassimira has run from the first to the last electric garden lamp. How many meters has she covered?

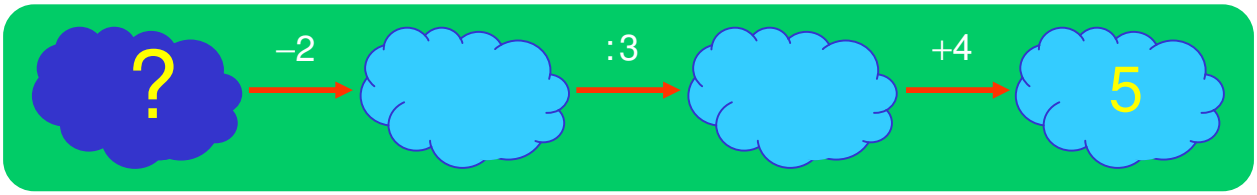
A) 48 **B)** 56 **C)** 64 **D)** 72 **E)** 80

7. Choose one of the figures **A)**, **B)**, **C)**, **D)** or **E)** and using the figure to the right, construct a rectangular without overlapping the small squares. Which of the figures should be chosen?



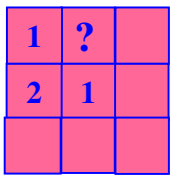
A)  **B)**  **C)**  **D)**  **E)** 

8. Put the right number in the dark cloud in order to obtain the correct result by doing the calculations in the direction of the arrows.

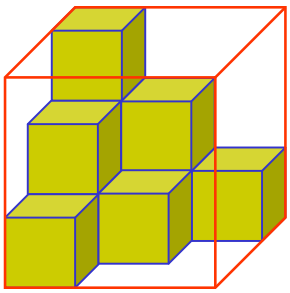


A) 1 **B)** 3 **C)** 5 **D)** 7 **E)** 9

9. The cells of the table should be filled in by the numbers 1, 2 and 3 in such a way that each number should appear exactly once in each row and each column. Three of the cells are filled already as shown in the figure. Which number should replace the question mark?



A) 1 **B)** 2 **C)** 3 **D)** 2 and 3 **E)** 1, 2 and 3



10. Diana ordered several small cubes in the bigger cube as shown in the figure. How many small cubes could be added?

A) 9 **B)** 13 **C)** 17 **D)** 21 **E)** 27

11. Borko is older than Vanko by 1 year and 1 day. He is born on the 1st of January 2002. When is born Vanko?

A) 2 January 2003 **B)** 2 January 2001 **C)** 31 December 2000

D) 31 December 2002 **E)** 31 December 2003 .

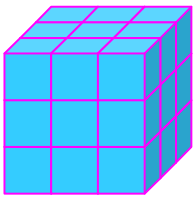
12. Koljo thought of a digit which was different from zero and wrote it down in his notebook. Later he wrote down another digit to the right of the first one. The sum of the obtained two-digit number and the number 19 is equal to 72. Find the digit that Koljo has thought of.

A) 2 **B)** 5 **C)** 6 **D)** 7 **E)** 9

13. An electronic watch shows 20:07. What time should pass at earliest after which the same digits appear again in a different order?

A) 4 h 20 min **B)** 6 h **C)** 10 h 55 min **D)** 11 h 13 min **E)** 24 h

14. The cube in the figure is colored blue and is divided into equal small cubes after. How many of the obtained small cubes have two blue sides exactly?

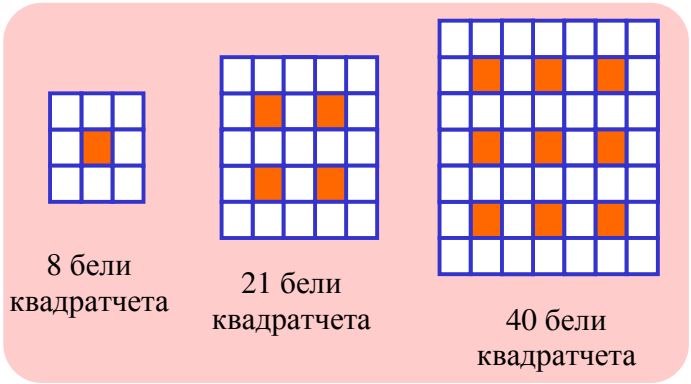


A) 4 **B)** 6 **C)** 8 **D)** 10 **E)** 12

15. One of the files in the computer's memory contains some information about Rumen, Fori, Lina, Jenny and Adie. Te information about Rumen is after the one about Lina, while the information about Fori is before the one about Rumen and is right after the one about Jenny. The information about Lina is after the one about Jenny but Jenny's information is first. Which is the place of Adie's information?

A) first **B)** second **C)** third **D)** fourth **E)** fifth

16. The first three squares fom a sequence are shown in the figure. In the sequence each square is bigger than the privious one. We are interested in the number of the small white sqaures of each square. Find the number of the small white squares of the fourth square (which is not shown in the picture).

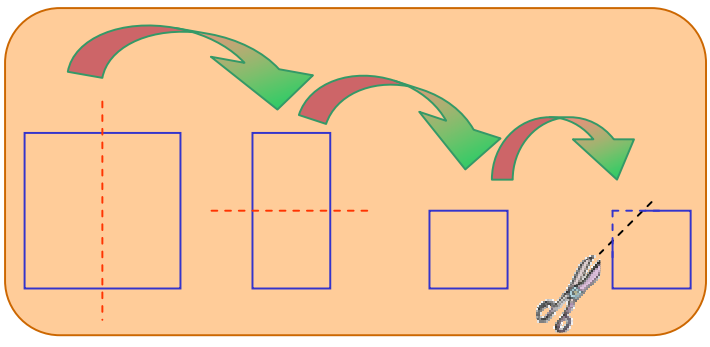


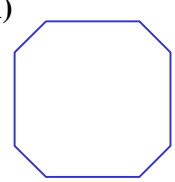
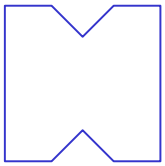
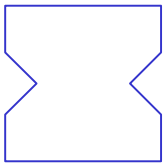
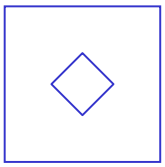
A) 50 **B)** 60 **C)** 65 **D)** 70 **E)** 75

17. Several children are arranged in a circle with equal distances between every two neighbors. They are numbered by the numbers 1, 2, 3 and so on. It is known that Bossi is numbered by 11 and is right opposite to Rossi who is numbered by 4. Find the number of all children.

A) 13 **B)** 14 **C)** 16 **D)** 17 **E)** 22

18. The given square is cut off from paper. It is folded once, after that once more as shown by the stippled lines. Thus, a smaller square is obtained. One of the corners of the smaller square is cut off by scissors and the smaller square is unfolded after. Which of the shown unfolded figures is impossible to be obtained in the described manner?



A)  **B)**  **C)**  **D)**  **E)** Each of the unfolded figures could be obtained

Results Scored: See the web-site of the Union of the Bulgarian Mathematicians.

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Additional Information:

1. The last two editions of the competition include special papers for disabled students.
2. Each summer mathematical camps are organized for the winners with the participation of students and teachers from other countries.