



Kangourou Sans Frontières



Wydział Matematyki i Informatyki
Uniwersytetu Mikołaja Kopernika
w Toruniu

Towarzystwo Upowszechniania Wiedzy
i Nauk Matematycznych

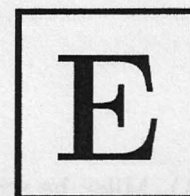
Math Kangaroo in USA

International Mathematical Contest KANGAROO 2012

Ecolier

Levels: 3 and 4

Time allowed: 75 minutes
Calculators are not allowed!

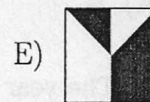
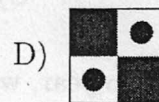
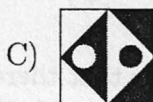
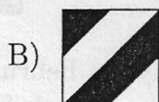
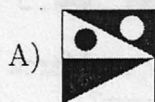


3 Point Problems

1. Basil wants to write the word MATEMATYKA on a sheet of paper. He wants to color different letters different colors, and the same letters the same color. How many colors will he need?

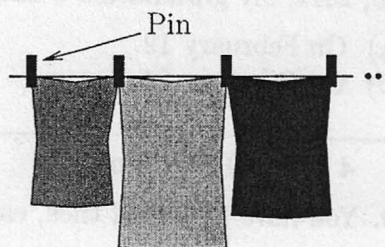
- A) 6 B) 7 C) 8 D) 9 E) 5

2. In four of the five pictures below the white area is equal to the grey area. In which picture are the white area and the grey area different?



3. Father hangs the laundry outside on a clothesline. He wants to use as few pins as possible. For 3 towels he needs 4 pins, as shown. How many pins does he need for 12 towels?

- A) 11 B) 13 C) 12 D) 14 E) 15



4. Iljo colors the squares a_2 , b_1 , b_2 , b_3 , b_4 , c_3 , d_3 and d_4 grey. Which coloring does he get?

	a	b	c	d
1				
2				
3				
4				

A)

	a	b	c	d
1				
2				
3				
4				

B)

	a	b	c	d
1				
2				
3				
4				

C)

	a	b	c	d
1				
2				
3				
4				

D)

	a	b	c	d
1				
2				
3				
4				

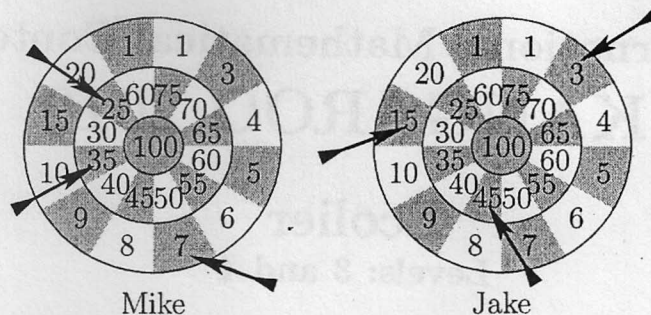
E)

	a	b	c	d
1				
2				
3				
4				

5. 15 children are playing hide and seek. One of them is the "seeker" and the others hide. After a while 10 children have been found. How many children are still hiding?

- A) 3 B) 4 C) 5 D) 9 E) 25

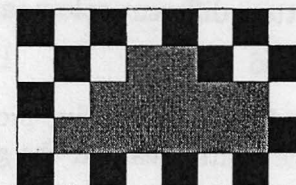
6. Mike and Jake were playing darts. Each one threw three darts (see the picture). Who won and how many points more than his opponent did he score?



- A) Mike; he scored 3 points more.
 B) Jake; he scored 4 points more.
 C) Mike; he scored 2 points more.
 D) Jake; he scored 2 points more.
 E) Mike; he scored 4 points more.

7. A regular rectangular pattern on a wall was created with 2 kinds of tiles: white and black. Some tiles have fallen off the wall (see the picture). How many black tiles have fallen off?

- A) 9 B) 8 C) 7 D) 6 E) 5



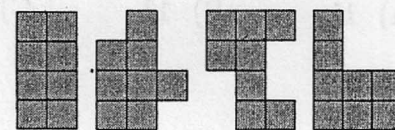
8. The year 2012 is a leap year, which means that there are 29 days in February. Today, on March 15, 2012, my grandfather's ducklings are 20 days old. When did they hatch from their eggs?

- A) On February 19. B) On February 21. C) On February 23.
 D) On February 24. E) On February 26.

4 Point Problems

9. You have L-shaped tiles, each consisting of 4 squares as

shown: How many of the following shapes can you make by gluing together two of these tiles?



- A) 0 B) 1 C) 2 D) 3 E) 4

10. Five pens cost 1 dollar and 20 cents more than two pens. How much does one pen cost?

- A) 24 cents B) 30 cents C) 40 cents D) 60 cents E) 1 dollar

11. Grandmother made 20 gingerbread cakes for her grandchildren. She decorated them with raisins and nuts. First she decorated 15 cakes with raisins and then 15 cakes with nuts. At least how many cakes were decorated with both raisins and nuts?

- A) 4 B) 5 C) 6 D) 8 E) 10

12. In a sudoku puzzle the numbers 1, 2, 3, 4 can occur only once in each column and in each row. In the mathematical sudoku on the right Patrick first writes in the results of the calculations. Then he completes the sudoku. Which number will Patrick put in the grey cell?

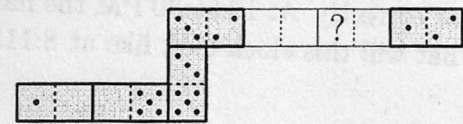
- A) 1 B) 2 C) 3 D) 4 E) 1 or 2

1 · 1		1 · 3	
	6 - 3		6 - 5
4 - 1	1 + 3		
9 - 7			

13. In the animal school, 3 kittens, 4 ducklings, 2 baby geese and several lambs are taking lessons. The teacher owl found out that all of her pupils have 44 legs altogether. How many lambs are there among them?

- A) 6 B) 5 C) 4 D) 3 E) 2

14. Frank made a domino snake out of seven tiles. He put the tiles next to each other so that the sides with the same number of dots were touching. Originally the snake had 33 dots on its back. However, his brother George took away two tiles from the snake (see the picture). How many dots were in the place with the question mark?



- A) 2 B) 3 C) 4 D) 5 E) 6

15. Laura, Iggy, Val and Kate want to be in one photo together. Kate and Laura are best friends and they want to stand next to each other. Iggy wants to stand next to Laura because he likes her. In how many different ways can they pose for the photo if they all stand in one row?

- A) 3 B) 4 C) 5 D) 6 E) 7

16. Among Nikolay's classmates there are twice as many girls as boys. Which of the following numbers can be equal to the number of all children in this class?

- A) 30 B) 20 C) 24 D) 25 E) 29

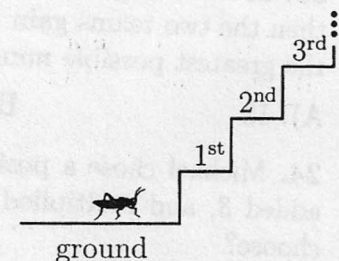
5 Point Problems

17. Gregory forms two numbers with the digits 1, 2, 3, 4, 5 and 6. Both numbers have three digits, and each digit is used only once. He adds these two numbers. What is the greatest sum Gregory can get?

- A) 975 B) 999 C) 1083 D) 1173 E) 1221

18. A grasshopper wants to climb a staircase with many steps. She makes only two kinds of jumps: 3 steps up or 4 steps down. Beginning at the ground level, at least how many jumps will she have to make in order to take a rest on the 22th step?

- A) 7 B) 9 C) 10 D) 12 E) 15



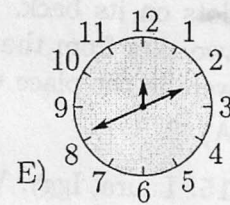
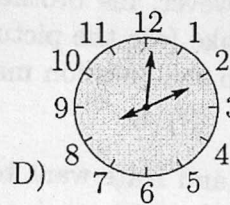
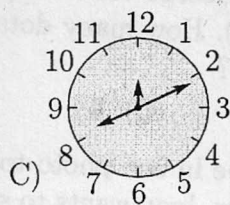
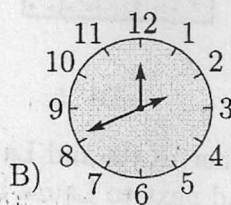
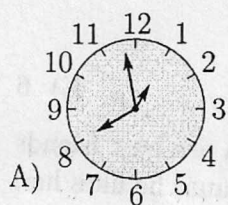
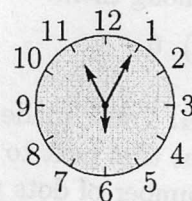
19. A rectangular paper sheet measures $192 \text{ mm} \times 84 \text{ mm}$. You cut the sheet along just one straight line to get two parts, one of which is a square. Then you do the same with the non-square part of the sheet, and so on. What is the length of the side of the smallest square you can get with this procedure?

- A) 1 mm B) 4 mm C) 6 mm D) 10 mm E) 12 mm

20. Among 496 pieces of fruit (pears, apples, oranges and bananas) there were three times less pears than apples, five times less apples than oranges and seven times less oranges than bananas. How many bananas were there?

- A) 350 B) 315 C) 455 D) 385 E) 420

21. A special clock has 3 hands of different length (for hours, for minutes, and for seconds). We do not know which hand is which, but we know that the clock runs correctly. At 12:55:30 PM the hands were in position depicted on the right. What will this clock look like at 8:11:00 PM?



22. There are five children in the Smith family: Amy, Bart, Celine, Darius and Emma. Their grandma has bought the following five presents for them: a doll, a soccer ball, a book, a puzzle and a teddy bear. Each child got one of these presents. We know that:

- The oldest child received a book; the youngest one received a teddy bear.
- Celine is older than Bart and younger than Emma. Celine did not get a puzzle.
- Amy has four older siblings.
- Bart received a soccer ball.
- Darius is not the oldest.

What did Darius receive?

- A) A doll. B) A soccer ball. C) A book. D) A puzzle. E) A teddy bear.

23. In a soccer game the winner gains 3 points, while the loser gains 0 points. If the game is a draw, then the two teams gain 1 point each. A certain team played 38 games and gained 80 points. Find the greatest possible number of games that the team lost.

- A) 12 B) 11 C) 10 D) 9 E) 8

24. Michael chose a positive number, multiplied it by itself, added 1, multiplied the result by 10, added 3, and multiplied the result by 4. His final answer was 2012. What number did Michael choose?

- A) 11 B) 9 C) 8 D) 7 E) 5