Kangourou Sans Frontières

Mathematics Promotion Society   **Math Kangaroo in USA**

Math Kangaroo 2012 in USA
International Competition in Mathematics
## Thursday, March 15, 2012

Levels 3 and 4

This test consists of 24 questions on 4 pages.
You have 75 minutes to complete it.
Calculators are not allowed!
Please enter your answers on the answer form provided.
Please put your name and ID number on the line below.

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3 Point Problems

1. Basil wants to write the word MATHEMATICS 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?
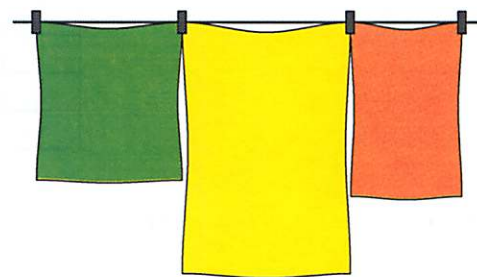
A) 7   B) 8   C) 9   D) 10   E) 13

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?
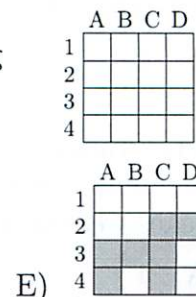
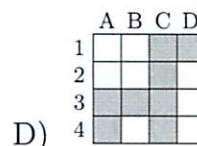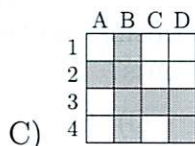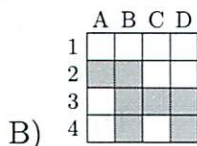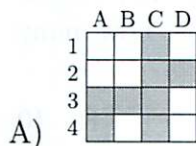A)   B)   C)   D)   E)
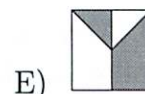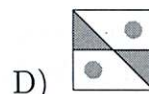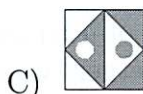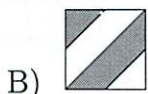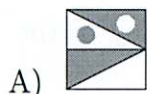
3. Father hangs the laundry outside on a clothesline. He wants to use as few pins as possible. For 3 towels he needs 4 pins, as shown. How many pins does he need for 9 towels?

A) 8   B) 10   C) 12   D) 14   E) 16

4. Iljo colors the squares A2, B1, B2, B3, B4, C3, D3 and D4 grey. Which coloring does he get?

A)   B)   C)   D)   E)

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5. 13 children are playing hide and seek. One of them is the "seeker" and the others hide. After a while 9 children have been found. How many children are still hiding?

A) 3   B) 4   C) 5   D) 9   E) 22

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.

Mike   Jake
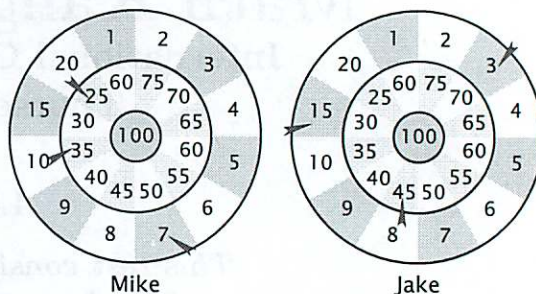
7. A regular rectangular pattern on a wall was created with 2 kinds of tiles: grey and striped. Some tiles have fallen off the wall (see the picture). How many grey tiles have fallen off?
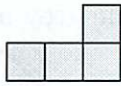
A) 9   B) 8   C) 7   D) 6   E) 5
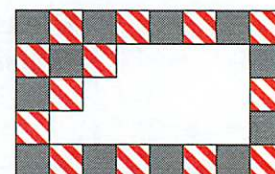
8. The year 2012 is a leap year, which means that there are 29 days in February. Today, on March 15, 2012, my grandfather's ducklings are 20 days old. When did they hatch from their eggs?

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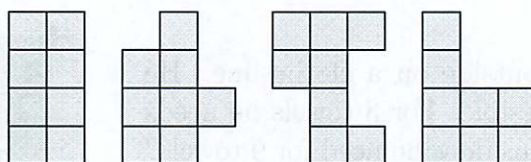
A) 0   B) 1   C) 2   D) 3   E) 4

10. Three balloons cost 12 cents more than one balloon. How many cents does one balloon cost?

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

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

18. 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?
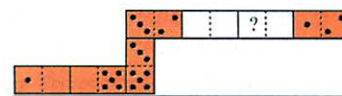

A) 2   B) 3   C) 4   D) 5   E) 6

19. Gregor 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 Gregor can get?

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

20. 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

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?

A)   B)   C)   D)   E)
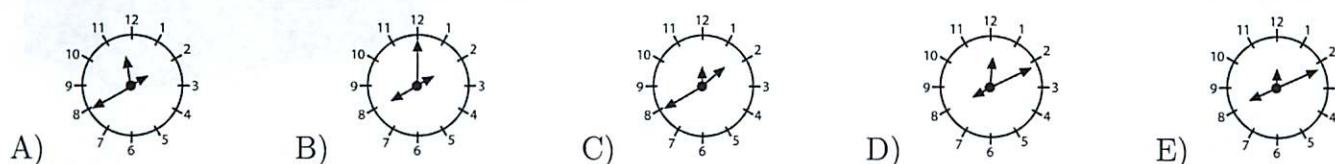
22. Michael chose a positive number, multiplied it by itself, added 1, multiplied the result by 10, added 3, and multiplied the result by 4. His final answer was 2012. What number did Michael choose?

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

23. A rectangular paper sheet measures 192 × 84 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

24. In a soccer game the winner gains 3 points, while the loser gains 0 points. If the game is a tie, 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

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 below Patrick first writes in the results of the calculations. Then he completes the sudoku. Which number will Patrick put in the grey cell?

1×1		1×3	
2×2	$6 - 3$		$6 - 5$
$4 - 1$	$1 + 3$	$8 - 7$	
$9 - 7$	$2 - 1$		

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

13. 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

14. 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

15. A recangular prism is made of four pieces, as shown. Each piece consists of four cubes and is a single color. What is the shape of the white piece?

A)   B)   C)   D)   E)
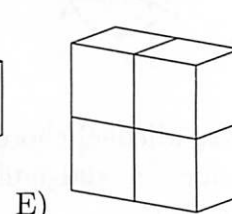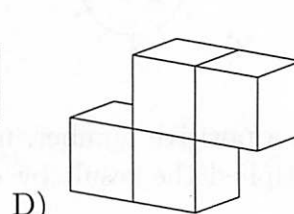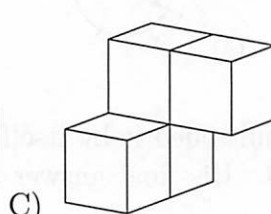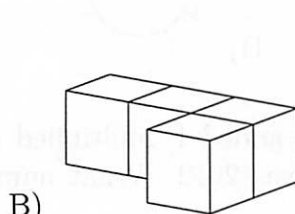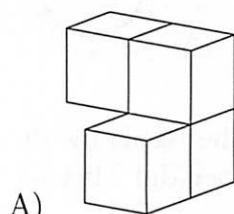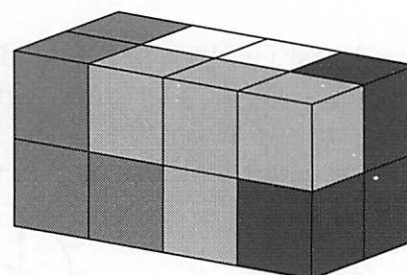
16. At a Christmas party there was exactly one candlestick on each of the 15 tables. There were 6 five-branched candlesticks; the rest of them were three-branched candlesticks. How many candles had to be bought for all the candlesticks?

A) 45   B) 50   C) 57   D) 60   E) 75

5 Point Problems

17. 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