Kangourou Sans Frontières

Mathematics Promotion Society *Math Kangaroo in USA*

Math Kangaroo 2013 in USA

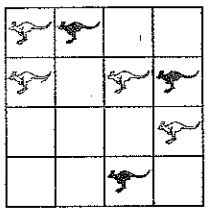
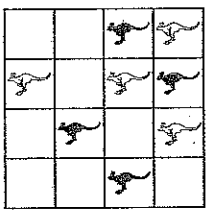
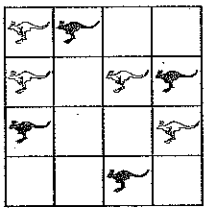
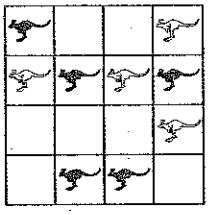
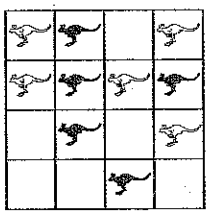
International Competition in Mathematics
Thursday, March 21, 2013

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.

Problems 3 points each

1. In which figure is the number of black kangaroos larger than the number of white kangaroos?

(A)  (B)  (C)  (D)  (E) 

2. Aline writes a correct calculation. Then she covers two digits which are the same with stickers (see the picutre). Which digit is under the stickers?

(A) 2 (B) 4 (C) 5 (D) 7 (E) 8

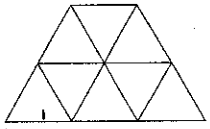
3. In what way should the last four circles be shaded so that the pattern is continued?

(A)  (B)  (C) 

(D)  (E) 

4. How many triangles can be seen in the picture to the right?

(A) 9 (B) 10 (C) 11 (D) 13 (E) 12



5. In the London 2012 Olympics, USA won the most medals: 46 gold, 29 silver and 29 bronze. China won the second most medals with 38 gold, 27 silver and 23 bronze medals. How many more medals did USA win than China?

(**A**) 6 (**B**) 14 (**C**) 16 (**D**) 24 (**E**) 26

6. Daniel had a package of 36 pieces of candy. Without breadking any pieces of candy, he divided all the candy equally among each his friends. Which of the following was definitely not the number of his friends?

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

7. Vero's mom prepares sandwiches with two slices of bread each. A package of bread has 24 slices. How many sandwiches can she prepare from two and a half packages of bread?

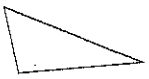
(**A**) 24 (**B**) 30 (**C**) 48 (**D**) 34 (**E**) 26

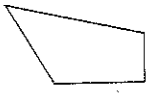
8. About the number 325, five boys said:
Andrei: "This is a 3-digit number."
Boris: "All the digits are different."
Vitya: "The sum of the digits is 10."
Grisha: "The units digit is 5."
Danya: "All the digits are odd."
Which of the boys was wrong?

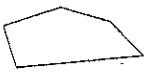
(**A**) Andrei (**B**) Boris (**C**) Vitya (**D**) Grisha (**E**) Danya

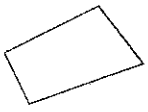
Problems 4 points each

9. A rectangular mirror was broken. Which of the following pieces is missing from the picture of the broken mirror?

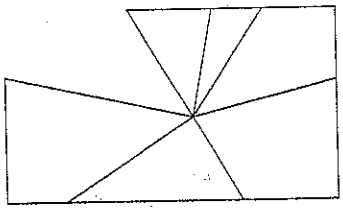
(**A**) 

(**B**) 

(**C**) 

(**D**) 

(**E**) 



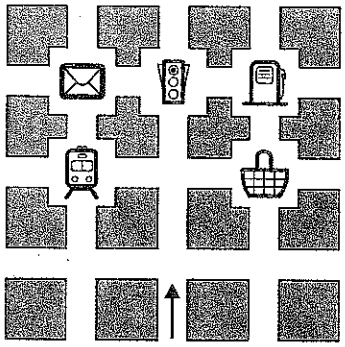
10. Each time Pinocchio lies, his nose gets 6 cm longer. Each time he tells the truth, his nose gets 2 cm shorter. After his nose was 9 cm long, he told three lies and made two true statements. How long was Pinocchio's nose afterwards?

(**A**) 14 cm (**B**) 15 cm (**C**) 19 cm (**D**) 23 cm (**E**) 31 cm

11. In a shop you can buy oranges in boxes of three different sizes: boxes of 5 oranges, boxes of 9 oranges or boxes of 10 oranges. Pedro wants to buy exactly 48 oranges. What is the smallest number of boxes he can buy?

(**A**) 8 (**B**) 7 (**C**) 6 (**D**) 5 (**E**) 4

12. Ann starts walking in the direction of the arrow. At every intersection of streets she turns either to the right or to the left. First she goes to the right, then to the left, then again to the left, then to the right, then to the left, and finally again to the left. Then Ann is finally walking towards



(A)  (B)  (C)  (D)  (E) 

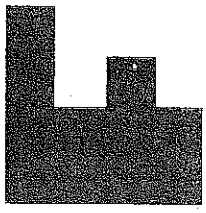
13. Schoolmates Andy, Betty, Cathie and Dannie were born in the same year. Their birthdays were on February 20th, April 12th, May 12th and May 25th, not necessarily in this order. Betty and Andy were born in the same month. Andy and Cathie were born on the same day of different months. Who of these schoolmates is the oldest?

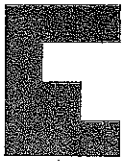
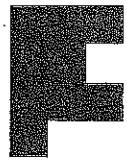
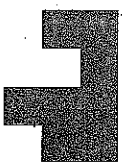
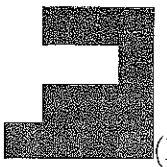
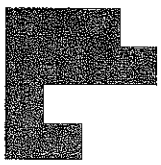
(**A**) Andy (**B**) Betty (**C**) Cathie (**D**) Dannie
(**E**) impossible to determine

14. 30 children going to Adventure Park took part in at least one of two events. 15 of them took part in the "moving bridge" contest, and 20 of them went down the zip-wire. How many children from Adventure Park took part in both events?

(**A**) 25 (**B**) 15 (**C**) 30 (**D**) 10 (**E**) 5

15. Which of the following pieces fits with the piece in the picture to the right so that together they form a rectangle?



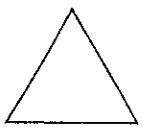
(A)  (B)  (C)  (D)  (E) 

16. The number 35 has the property that it is divisible by the digit in the ones position, because 35 divided by 5 is 7. The number 38 does not have this property. How many numbers greather than 21 and smaller than 30 have this property?

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

Problems 5 points each

17. Joining the midpoints of the sides of the triangle in the drawing we obtain a smaller triangle. We repeat this one more time with the smaller triangle. How many triangles of the same size as the smallest resulting triangle fit in the original drawing?



(**A**) 5 (**B**) 8 (**C**) 10 (**D**) 16 (**E**) 32

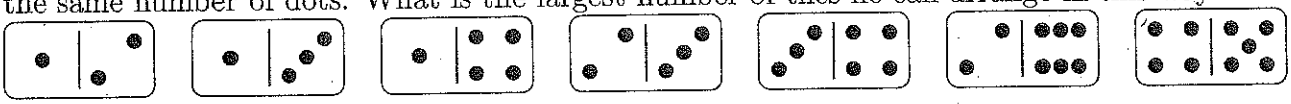
18. After the First of January 2013, how many years will pass before the following event happens for the first time: the product of the digits in the notation of the year is greater than the sum of these digits?

(A) 87 (B) 98 (C) 101 (D) 102 (E) 103

19. In December Tosha-the-cat slept for exactly 3 weeks. How many minutes did he stay awake during this month?

(A) $(31-7)\times 3\times 24\times 60$ (B) $(31-7\times 3)\times 24\times 60$ (C) $(30-7\times 3)\times 24\times 60$
(D) $(31-7)\times 24\times 60$ (E) $(31-7\times 3)\times 24\times 60\times 60$

20. Basil has several domino tiles, as shown below. He wants to arrange them in a line according to the following "domino rule": in any two neighboring tiles, the neighboring squares must have the same number of dots. What is the largest number of tiles he can arrange in this way?



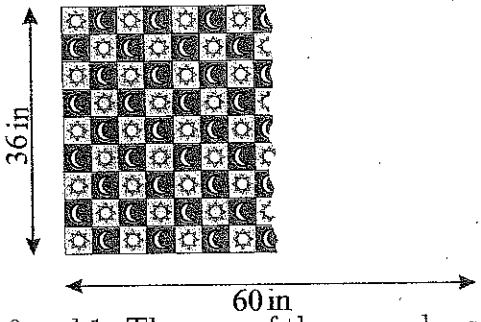
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

21. Cristi has to sell 10 glass bells which vary in price: 1 dollar, 2 dollars, 3 dollars, 4 dollars, 5 dollars, 6 dollars, 7 dollars, 8 dollars, 9 dollars, and 10 dollars. In how many ways can Cristi divide all the glass bells into three packages so that each the packages has the same price?

(A) 1 (B) 2 (C) 3 (D) 4
(E) Such a division is not possible.

22. Peter bought a rug 36 in wide and 60 in long. The rug has a pattern of small squares containing either a sun or a moon, as can be seen in the figure. You can see that along the width there are 9 squares. When the rug is fully unrolled, how many moons can be seen?

(A) 68 (B) 67 (C) 65 (D) 63 (E) 60



23. Baby Roo wrote down several numbers using only the digits 0 and 1. The sum of these numbers is 2013. It turned out that it is impossible to get the same sum by adding up fewer numbers of this kind. How many numbers did Baby Roo write?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 204

24. Beatrice has many pieces like the grey one in the picture. At least how many of these grey pieces are needed to make a solid grey square?

(A) 3 (B) 4 (C) 6 (D) 8 (E) 16