

# MATHEMATICS KANGAROO 2013

## Austria - 21.3.2013

Group: Benjamin, Grades: 5-6

Name:	
School:	
Class:	

Time allowed: 60 min.

Each correct answer, questions 1.-8.: 3 Points

Each correct answer, questions 9.-16.: 4 Points

Each correct answer, questions 17.-24.: 5 Points

Each question with no answer given: 0 Points

Each incorrect answer: Lose  $\frac{1}{4}$  of the points for that question.

You begin with 24 points.



**Please write the letter (A, B, C, D, E) of the correct answer under the questions number (1 to 24)**  
**Write neatly and carefully!**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>

<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>

<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>

Information on the Kangaroo contest: [www.kaenguru.at](http://www.kaenguru.at)  
If you want to do more in this area, check out the Austrian Mathematical Olympiad. Info at: [www.oemo.at](http://www.oemo.at)

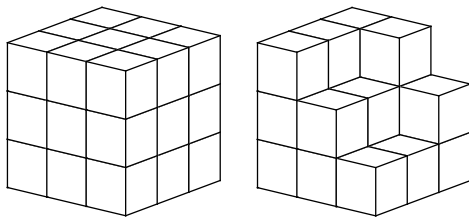
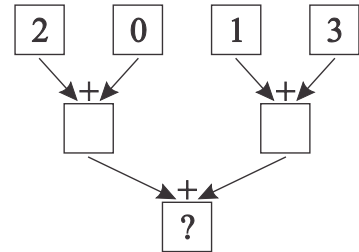
**Mathematical Kangaroo 2013**  
**Group Benjamin (Grade 5/6)**  
**Austria - 21.3.2013**



**- 3 Point Questions -**

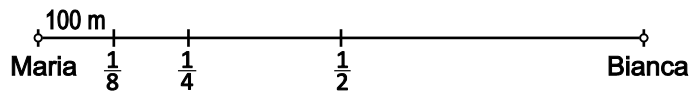
1. Which answer completes the addition tree?

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



2. Nathalie wanted to build a large cube out of lots of small cubes. How many cubes are missing from the picture on the right that would be needed to build the large cube on the left? (A) 5      (B) 6      (C) 7      (D) 8      (E) 9

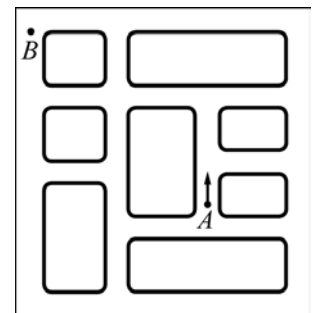
3. How far must Maria walk to reach her friend Bianca?



- (A) 300 m      (B) 400 m      (C) 800 m      (D) 1 km      (E) 700 m

4. Nick can turn right but not left on his bicycle. What is the least number of right turns he must make in order to get from A to B?

- (A) 3      (B) 4      (C) 6      (D) 8      (E) 10



5. Anna, Bob and Chris are altogether 31 years old. How old will all three be altogether in three years time?

- (A) 32      (B) 34      (C) 35      (D) 37      (E) 40

6. In the following sum the same digit is used in each square:  $\square\square \times \square = 176$   
 Which digit must be used so that the sum is correct?

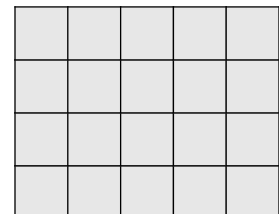
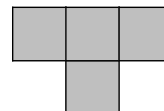
- (A) 6      (B) 4      (C) 7      (D) 9      (E) 8

7. Michael must take a tablet every 15 minutes. He takes the first at 11:05. When does he take the fourth?

- (A) 11:40      (B) 11:50      (C) 11:55      (D) 12:00      (E) 12:05

8. Anne has a few grey tiles like the one in the picture. What is the maximum number of these tiles that she can place on the  $5 \times 4$  rectangle without any overlaps?

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

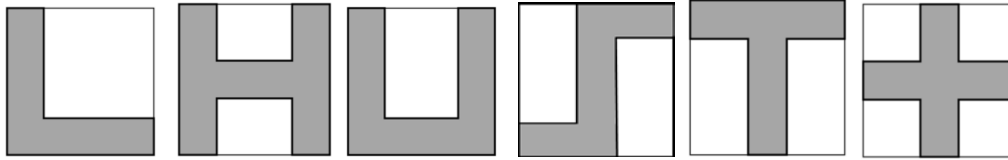


**- 4 Point Questions -**

9. The number 36 has the following property: 36 can be divided by its units digit without a remainder (36 is divisible by 6). With the number 38 this doesn't work. How many numbers between 20 and 30 have the same property as 36?

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

10. Maria drew the following figures on square sheets of paper.



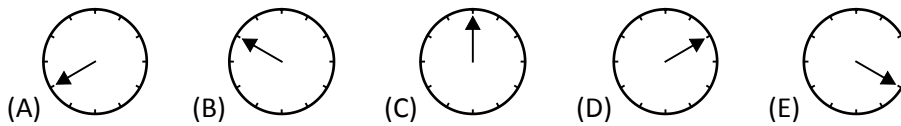
How many of these figures have the same perimeter as the square sheet of paper itself?

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

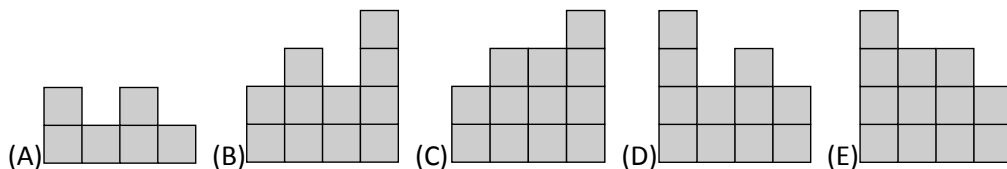
11. Patricia drives one afternoon at a constant speed to her friend. She looks at her watch as she leaves and when she arrives.



In which position will the minute hand be when she has completed one third of her journey?



12. Johann stacks  $1 \times 1$  cubes on the squares of a  $4 \times 4$  grid. The diagram on the right shows how many cubes were piled on top of each other on each square of the grid. What will Johann see if he looks from behind (*hinten*) at the tower?



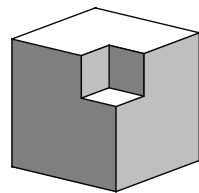
HINTEN			
4	2	3	2
3	3	1	2
2	1	3	1
1	2	1	2
VORNE			

13. 36 children voted for five students from their class. Each child was only allowed to vote once. The winner received 12 votes, and the student placed last just 4 votes. If each student received a different number of votes, how many votes did the second placed student receive?

- (A) 8 (B) 8 or 9 (C) 9 (D) 9 or 10 (E) 10

14. A  $1 \times 1 \times 1$  cube is cut out of each corner of a  $3 \times 3 \times 3$  cube. The picture shows the result after the first cube is cut out. How many faces will the final shape have?

- (A) 16 (B) 20 (C) 24 (D) 30 (E) 36



15. How many different subtraction sums between two digit numbers are there, which have the answer 50?

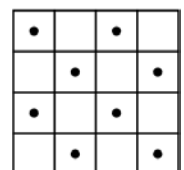
- (A) 40 (B) 30 (C) 50 (D) 60 (E) 10

16. In the last game of the hockey match there were lots of goals. In the first half 6 goals were scored and the visiting team were leading. After the home team scored another three goals in the second half, they won the match. How many goals did the hometeam score in total?

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

**- 5 Point Questions -**

17. Which of the figures below will cover the most dots when laid on the square shown on the right.

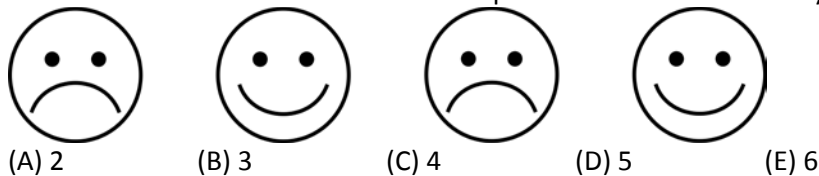


18. Matthias is catching fish. If he had caught three times as many fish as he has actually caught, he would have 12 more fish. How many fish has he caught?  
 (A) 7 (B) 6 (C) 5 (D) 4 (E) 3

19. Numbers are written in the 4x4 grid: any two numbers in neighbouring squares should have a difference of 1, that is squares that share an edge. The number 3 is already given. The number 9 will be used somewhere in the grid. How many different numbers will have been used once the grid is filled in completely?  
 (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

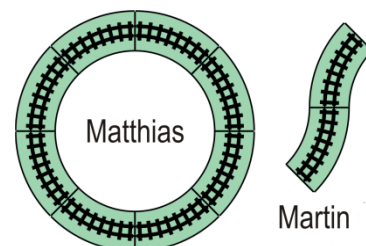
3			

20. Two buttons with smiling faces and two buttons with sad faces are in a row as shown in the picture. When you press a button the face changes, and so do the faces of the neighbouring buttons. What is the minimum number of button presses needed so that only smiling faces can be seen?



21. If you start with three numbers, the 'addition machine' produces three new ones by adding together each pair of two. For instance from the numbers {3, 4, 6} the addition machine makes {10, 9, 7}. If you use the addition machine again these numbers become {16, 17, 19}. We feed the three numbers {20, 1, 3} into the addition machine and let the machine calculate 2013 times. What is the biggest possible difference between two of the three resulting numbers?  
 (A) 1 (B) 2 (C) 17 (D) 19 (E) 2013

22. From an old model train set there are only identical pieces of track to use. Matthias puts 8 such pieces in a circle (picture on the left). Martin begins his track with 2 pieces as shown in the picture on the right. He also wants to build a closed track and use the smallest number of pieces possible. How many pieces will his track use?  
 (A) 11 (B) 12 (C) 14 (D) 15 (E) 16



23. 2013 people live on an island. Some of these people are truth-tellers and the others are liars. The truth-tellers always tell the truth whereas the liars always lie. Each day one of the people says 'when I have left the island the number of truth-tellers will be the same as the number of liars.' Then he leaves the island. After 2013 days there is no longer anybody living on the island. How many liars were living there to begin with?  
 (A) 0 (B) 1006 (C) 1007 (D) 2013 (E) It is not possible to answer.

24. 40 boys and 28 girls hold hands in a big circle. Exactly 18 boys give their right hand to a girl. How many boys give their left hand to a girl?  
 (A) 18 (B) 9 (C) 28 (D) 14 (E) 20