

# Mathematical Kangaroo 2015

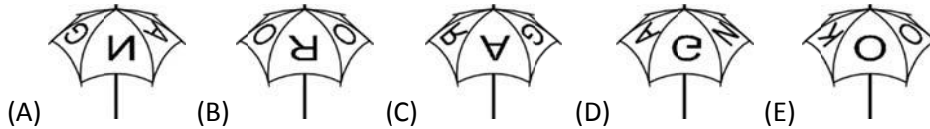
## Group Kadett (Grades 7 and 8)

### Austria - 23. 3. 2015



#### - 3 point questions -

1. The word KANGAROO is written on the top of my umbrella.  
Which of the following pictures shows my umbrella?



2. A rectangle is made of 4 equally sized, small rectangles. The smaller side has side length 10 cm. How long is the longer side?

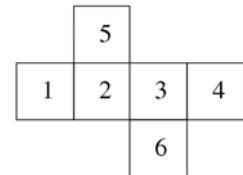


- (A) 10 cm      (B) 20 cm      (C) 30 cm      (D) 40 cm      (E) 50 cm

3. Which of the following numbers is closest to the product of  $2 \cdot 015 \times 510 \cdot 2$ ?

- (A) 0,1      (B) 1      (C) 10      (D) 100      (E) 1000

4. The diagram shows the net of a cube whose faces are numbered. Sascha adds the numbers that are on opposite faces of the cube. Which three results does he get?



- (A) 4, 6, 11      (B) 4, 5, 12      (C) 5, 6, 10      (D) 5, 7, 9      (E) 5, 8, 8

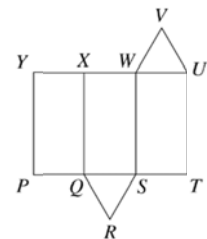
5. Which of the following fractions is not a whole number?

- (A)  $\frac{2011}{1}$       (B)  $\frac{2012}{2}$       (C)  $\frac{2013}{3}$       (D)  $\frac{2014}{4}$       (E)  $\frac{2015}{5}$

6. The drive from A-village to B-town via C-house takes 130 minutes. The drive from A-village to C-house takes 35 minutes. How many minutes does a drive from C-house to B-town take?

- (A) 95      (B) 105      (C) 115      (D) 165      (E) 175

7. The diagram shows the net of a three-sided prism. Which line of the diagram forms an edge of the prism together with line UV when the net is folded up?

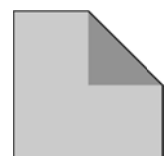


- (A) WV      (B) XW      (C) XY      (D) QR      (E) RS

8. When Simon the squirrel comes down from his tree onto the floor, he never moves further than 5 m away from the trunk of his tree. Furthermore, he stays at least 5 m away from the dog kennel. Which picture shows most accurately the area in which Simon can be found?



9. One corner of a square piece of paper is folded into the middle of the square. That way an irregular pentagon is created. The numerical values of the areas of the Pentagon and the square are consecutive whole numbers. What is the area of the square?



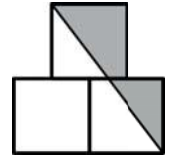
- (A) 2      (B) 4      (C) 8      (D) 16      (E) 32

10. The side lengths of a triangle are 6, 10 and 11. An equilateral triangle has the same perimeter as this triangle. How long is one side of the equilateral triangle?

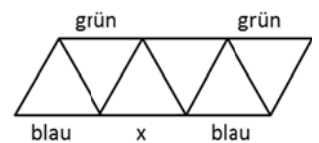
- (A) 18      (B) 11      (C) 10      (D) 9      (E) 6

**- 4 point questions -**

11. A cyclist covers a distance of 5 m in one second. The wheels of his bike each have a circumference of 125 cm. How many complete turns does each wheel do in 5 seconds?  
 (A) 4            (B) 5            (C) 10            (D) 20            (E) 25
12. All the boys in a class are born on different days of the week and all the girls are born in different months. If one new girl or boy joins this class, this is definitely no longer true. How many teenagers are in this class?  
 (A) 18            (B) 19            (C) 20            (D) 24            (E) 25
13. The diagram consists of three squares each one of side length 1. The midpoint of the topmost square is exactly above the common side of the two other squares. What is the area of the section coloured grey?  
 (A)  $\frac{3}{4}$             (B)  $\frac{7}{8}$             (C) 1            (D)  $1\frac{1}{4}$             (E)  $1\frac{1}{2}$
14. Each star in the equation  $2 * 0 * 1 * 5 * 2 * 0 * 1 * 5 * 2 * 0 * 1 * 5 = 0$  should be replaced by either "+" or "-" so that the equation is correct. What is the smallest number of stars that can be replaced by "+"?  
 (A) 1            (B) 2            (C) 3            (D) 4            (E) 5
15. During a thunder storm it rained 15 liters per square meter. By how much did the water level of an outdoor swimming pool increase?  
 (A) 150 cm    (B) 0,15 cm    (C) 15 cm        (D) 1,5 cm  
 (E) It depends on the size of the swimming pool.



16. A bush has 10 twigs. Each twig has exactly 5 leaves or exactly 2 leaves and a flower. Which of the following numbers could be the total number of leaves on the bush?  
 (A) 45            (B) 39            (C) 37            (D) 31            (E) None of the numbers from (A) to (D)
17. The 10 participants of a test achieve on average 6 points. Exactly 6 of the participants passed the test. The average of the participants that passed the test was 8 points. What is the average of the participants that did not pass the test?  
 (A) 1            (B) 2            (C) 3            (D) 4            (E) 5



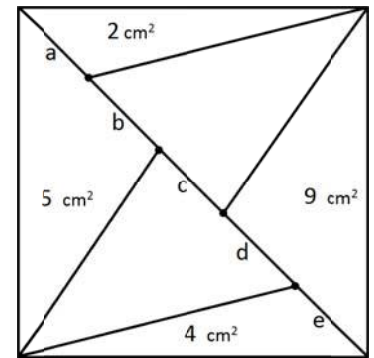
18. Each side of each triangle in the diagram is painted either blue, green or red. Four of the sides are already painted. Which colour can the line marked „x" have, if each triangle must have all sides in different colours?  
 (A) only green    (B) only red    (C) only blue    (D) either red or blue    (E) The question cannot be solved.
19. Eva added the lengths of three sides of a rectangle and obtained 44 cm. Ulli also added the lengths of three sides of the same rectangle and obtained 40 cm. What is the perimeter of the rectangle?  
 (A) 42 cm        (B) 56 cm        (C) 64 cm        (D) 84 cm        (E) 112 cm
20. The teacher asks five of her students, how many of them had studied the previous day. Azra says: "Nobody." Berti says: "Only one." Christa says: "Exactly two." Doris says: "Exactly three." Emina says: "Exactly four." The teacher knows that students always lie if they haven't studied and are always truthful when they have studied. How many of those students had studied the previous day?  
 (A) 0            (B) 1            (C) 2            (D) 3            (E) 4

**- 5 point questions -**

21. In a group of kangaroos the two lightest ones weigh 25 % of the total weight of the whole group. The three heaviest ones weigh 60 % of the total weight. How many kangaroos are in this group?  
 (A) 6            (B) 7            (C) 8            (D) 15            (E) 20

22. Five positive whole numbers, which are not necessarily all different, are written on five cards. Peter calculates the sum of each pair of cards. He obtains only three different results, namely 57, 70 and 83. What is the biggest number that is written on one of the cards?

(A) 35            (B) 42            (C) 48            (D) 53            (E) 82

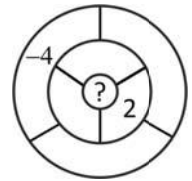


23. A square with area 30 is split into two by its diagonal and then split into triangles as shown in the diagram. Some of the areas of the triangles are given in the diagram. Which of the line segments a, b, c, d, e of the diagonal is the longest?

(A) a            (B) b            (C) c            (D) d            (E) e

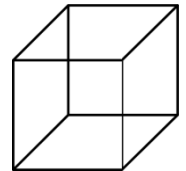
24. Riki wants to write one number in each of the seven sections of the diagram pictured. Two zones are adjacent if they share a part of their outline. The number in each zone should be the sum of all numbers of its adjacent zones. Riki has already placed numbers in two zones. Which number does she need to write in the zone marked „?“.

(A) 1            (B) -2            (C) 6            (D) -4            (E) 0



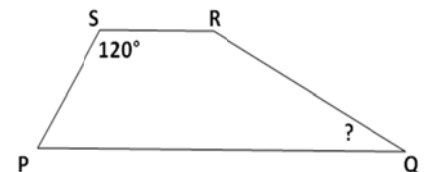
25. Florian has seven pieces of wire of lengths 1 cm, 2 cm, 3 cm, 4 cm, 5 cm, 6 cm and 7 cm. He uses some of those pieces to form a wire model of a cube with side length 1. He does not want any overlapping wire parts. What is the smallest number of wire pieces that he can use?

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



26. In the trapezium PQRS the sides PQ and SR are parallel. Also  $\angle RSP = 120^\circ$  and  $\overline{RS} = \overline{SP} = \frac{1}{3}\overline{PQ}$ . What is the size of angle  $\angle PQR$ ?

(A)  $15^\circ$             (B)  $22.5^\circ$             (C)  $25^\circ$             (D)  $30^\circ$             (E)  $45^\circ$



27. On a straight line there are five points. Alex measures all the distances between every possible pair of points. He obtains in ascending order 2, 5, 6, 8, 9, k, 15, 17, 20 and 22. What is the value of k?

(A) 10            (B) 11            (C) 12            (D) 13            (E) 14

28. I have noted down six digits of Erich's seven-digit phone number in the correct order. I don't know which digit I have missed out and where I have missed it out. What is the maximum number of tries that I have to make to be sure that I have used the correct phone number? (Note: The first digit could also be 0!)

(A) 55            (B) 60            (C) 64            (D) 70            (E) 80

29. Maria divides 2015 by 1. Then she divides 2015 by 2 and then in order by 3, 4 etc. up to and including 1000. For each division she writes down the remainder. What is the biggest remainder she has noted down?

(A) 15            (B) 215            (C) 671            (D) 1007            (E) another value

30. Each positive whole number is coloured in according to the following three rules:

- (i) Each number is either red or green.
- (ii) The sum of two different red numbers results in a red number.
- (iii) The sum of two different green numbers is a green number.

How many ways are there to do this?

(A) 0            (B) 2            (C) 4            (D) 6            (E) there are more than six ways