MATHEMATICS KANGAROO 2011
Austria - 17.3.2011

Group: Kadett, Grades: 7-8

Name:	
School:	
Class:	

Time allowed: 75 min.
Each correct answer, questions 1.-10.: 3 Points
Each correct answer, questions 11.-20.: 4 Points
Each correct answer, questions 21.-30.: 5 Points
Each question with no answer given: 0 Points
Each incorrect answer: Lose ¼ of the points for that question.
You begin with 30 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!

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

| 21	22	23	24	25	26	27	28	29	30

Mathematics Kangaroo 2011
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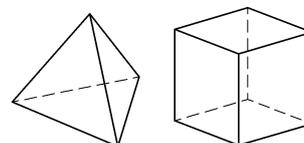
1) Which of the following calculations give the biggest result?

   A) 201×1 **B)** $20 \times 1 \times 1$ **C)** 1×2011 **D)** $1 + 2011$ **E)** $1 \div 2011$

2) Elsa has 3 tetrahedra and 5 dice. How many faces do these eight objects have altogether?

   A) 42   **B)** 48   **C)** 50   **D)** 52   **E)** 56

3) A zebra crossing has alternating white and black stripes each 50 cm wide. The first stripe is white and the last one is white. The zebra crossing in front of our school has 8 white stripes. How wide is the road?

   A) 7 m   **B)** 7 5 m   **C)** 8 m   **D)** 8 5 m   **E)** 9 m

4) My calculator has gone mad. If I want to multiply, it divides and if I want to add, it subtracts. I type in (12×3)+(4×2)=. Which result will it give me?

   A) 2   **B)** 6   **C)** 12   **D)** 28   **E)** 38

5) My digital clock just showed 20:11. In how many minutes will it again show the digits 0, 1, 1, 2 in any order?

   A) 40   **B)** 45   **C)** 50   **D)** 55   **E)** 60

6) In the picture on the right we can see three squares. The corners of the middle square are on the midpoints of the sides of the larger square, and the corners of the smaller square are on the midpoints of the sides of the middle square. The area of the small square is 6 cm². What is the area of the big square?

   A) 24 cm²   **B)** 18 cm²   **C)** 15 cm²   **D)** 12 cm²   **E)** 9 cm²

7) The 17 houses in my street are numbered consecutively on one side with the odd numbers 1, 3, 5… and on the other side with the numbers 2, 4, 6, …. My house is the last one on the even side and has the number 12. Yours is the last one on the odd side. Which number does your house have?

   A) 5   **B)** 7   **C)** 13   **D)** 17   **E)** 21

8) Felix the Tomcat catches 12 fish in 3 days. On the second day he catches more than on the first. On the third day he catches more than on the second but less than on the first two days together. How many fish does he catch on day three?

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

9) From all whole numbers between 100 and 1000 whose digits sum to 8, the smallest and the largest number are chosen. How big is the sum of those two numbers?

   A) 707   **B)** 907   **C)** 916   **D)** 1000   **E)** 1001

10) In the picture on the right we see an L-shaped object which is made up of four squares. We would like to add another equally big square so that the new object has a line of symmetry. How many ways are there to achieve this?

   A) 1   **B)** 2   **C)** 3   **D)** 5   **E)** 6
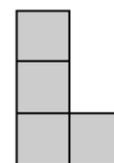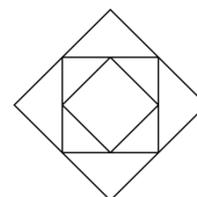
- **4 Point Questions** -

11) $\dfrac{2011 \times 2 \cdot 011}{201 \cdot 1 \times 20 \cdot 11} =$ **A)** 0.01   **B)** 0.1   **C)** 1   **D)** 10   **E)** 100

12) Marie has 9 pearls which weigh in order 1 g, 2 g, 3 g, 4 g, 5 g, 6 g, 7 g, 8 g and 9 g. She makes four rings each with two pearls. The pearls on those rings weigh in order 17 g, 13 g, 7 g and 5 g. How much does the pearl which has not been used weigh?

   A) 1 g   **B)** 2 g   **C)** 3 g   **D)** 4 g   **E)** 5 g

13) Fridolin the hamster runs through the maze shown on the right. On the path there are 16 pumpkin seeds. He is only allowed to cross each junction once. What is the maximum number of pumpkin seeds that he can collect?

A) 12   **B)** 13   **C)** 14   **D)** 15   **E)** 16

14) The list 17, 13, 5, 10, 14, 9, 12, 16 are the points scored in a test. Which two scores can be removed without changing the average value of the list?

A) 12 and 17   **B)** 5 and 17   **C)** 9 and 16   **D)** 10 and 12   **E)** 14 and 10

15) Each area in the picture on the right should be coloured using one of the colours, red (R), green (G), blue (B) or orange (O). Areas which touch must be different colours. Which colour is the area marked X?

A) red   **B)** blue   **C)** green   **D)** orange   **E)** The colour cannot definitely be determined.

16) A square piece of paper is cut into six rectangular pieces as shown on the right. The sum of the perimeters of the six pieces is 120 cm. How big is the area of the square?

A) 48 cm²   **B)** 64 cm²   **C)** 110.25 cm²   **D)** 144 cm²   **E)** 256 cm²

17) In a tournament FC Barcelona scored three goals and conceded one goal. The team won once, lost once and drew once in the tournament. What was the score in the game that FC Barcelona won?

A) 2:0   **B)** 3:0   **C)** 1:0   **D)** 4:1   **E)** 0:1

18) Louise draws a line DE of length 2cm. How many ways are there for her to add a point F so that a right-angled triangle DEF with area 1 cm² can be formed?

A) 2   **B)** 4   **C)** 6   **D)** 8   **E)** 10

19) The positive number a is smaller than 1 and the number b is greater than 1. Which of the following numbers is biggest?

A) $a \times b$ **B)** $a + b$ **C)** $a \div b$ **D)** b **E)** It depends on a and b.

20) The dark line halves the surface area of the dice shown on the right. Which drawing could represent the net of the die?

A)   **B)**   **C)**   **D)**   **E)**

21) The five-digit number 24X8Y is divisible by 4, 5 and 9. What is the sum of X and Y?

A) 13   **B)** 10   **C)** 9   **D)** 5   **E)** 4

22) Lina has placed two tiles on a square game board. Which one of the 5 counters shown, can she add, so that none of the remaining four counters can be placed anymore?

A)   **B)**   **C)**   **D)**   **E)**

23) Each one of the three birds Isaak, Max and Oskar has its own nest. Isaak says: "I am more than twice as far away from Max as I am from Oskar". Max says: "I am more than twice as far away from Oskar as I am from Isaak". Oskar says: "I am more than twice as far away from Max as I am from Isaak". At least two of them speak the truth. Who is lying?

A) Isaak   **B)** Max   **C)** Oskar   **D)** nobody
E) It can not be decided from the information given.

24) On the inside of a square with side length 7 cm another square is drawn with side length 3 cm. Then a third square with side length 5 cm is drawn so that it cuts the first two as shown in the picture on the right. How big is the difference between the black area and the grey area?
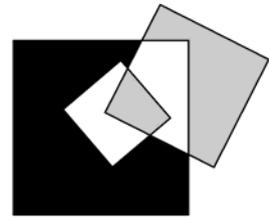
A) 0 cm²   **B)** 10 cm²   **C)** 11 cm²   **D)** 15 cm²
E) It can not be decided from the information given.

25) Myshko shoots at a target board. He only hits the numbers 5, 8 and 10. In doing so he hits the numbers 8 and 10 equally often and scores a total of 99 points. For 25% of his shots he missed the target board completely. How often did he shoot at the target board?

A) 10   **B)** 12   **C)** 16   **D)** 20   **E)** 24

26) In a convex quadrilateral *ABCD* with AB = AC, the following holds true: $\angle BAD = 80°$, $\angle ABC = 75°$, $\angle ADC = 65°$. How big is $\angle BDC$? (Note: In a convex quadrilateral all internal angles are less than 180°.)

A) 10°   **B)** 15°   **C)** 20°   **D)** 30°   **E)** 45°

27) Seven years ago Eva's age was a multiple of 8. In eight years it will be a multiple of 7. Eight years ago Raffi's age was a multiple of 7. In seven years it will be a multiple of 8. Which of the following statements can be true?

A) Raffi is two years older than Eva.   **B)** Raffi is ten years older than Eva.
C) Raffi and Eva are the same age.   **D)** Raffi is one year younger than Eva.
E) Raffi is two years younger than Eva.

28) Which is the smallest possible positive, whole number value of the expression, if different letters stand for different digits not equal to 0 and the same letters stand for the same digits?

$$\frac{K \times A \times N \times G \times A \times R \times O \times O}{G \times A \times M \times E}$$

A) 1   **B)** 2   **C)** 3   **D)** 5   **E)** 7

29) The figure on the left consists of two rectangles. Two side lengths are marked: 11 and 13. The figure is cut into three parts along the two lines drawn inside. These can be put together to make the triangle shown on the right. How long is the side marked x?
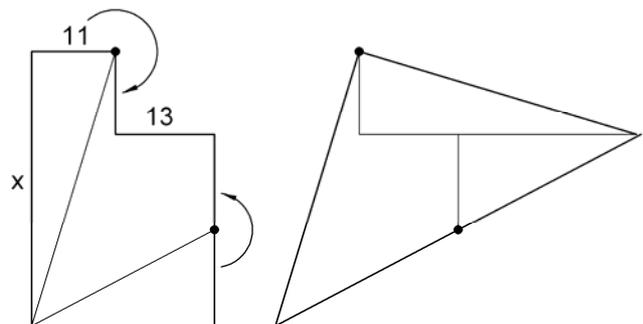
A) 36   **B)** 37   **C)** 38   **D)** 39   **E)** 40

30) Mark plays a computer game in a 4×4 table. The cells each have a colour which is initially hidden. If he clicks into a cell it changes to red or blue. He knows that there are exactly two blue fields and that they share one side line. Which is the smallest number of clicks with which he can definitely find the blue cells?

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