# Känguru der Mathematik 2010
Group Kadett (Grades 7. und 8.)
Austria - 18.3.2010

- 3 Point Questions -

1) How much is 12 + 23 + 34 + 45 + 56 + 67 + 78 + 89?

A) 389 **B)** 396 **C)** 404 **D)** 405 **E)** another number

2) How many lines of symmetry does this figure have?

A) 0 **B)** 1 **C)** 2 **D)** 4 **E)** infinitely many

3) A fly has 6 legs and a spider has 8. Together 2 flies and 3 spiders have as many legs as 10 birds and.......

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

4) For transport, games are packed in several equally sized, cube shaped boxes. Every eight of which are packed in a bigger cubic box. How many of the small boxes are on the bottom level of the bigger box?

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

5) The perimeter of the figure pictured on the right is..............

**A)** 3a+4b **B)** 3a+8b **C)** 6a+4b **D)** 6a+6b **E)** 6a+8b
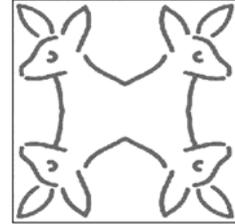
6) Martina draws the six cornerpoints of a regular hexagon and then connects some of them to obtain a geometric figure. Which of the following figures cannot be generated?

A) trapezium **B)** right angled triangle **C)** square

D) kite **E)** obtuse triangle

7) I write down seven consecutive whole numbers. The sum of the smallest three is 33. What is the sum of the biggest three numbers?

A) 39 **B)** 37 **C)** 42 **D)** 48 **E)** 45
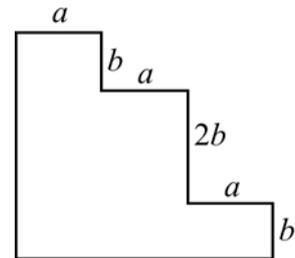
8) Herbert has cut firewood. After he has made 53 cuts, he realises that he has 72 pieces of wood. How many pieces of wood did he have to start with?

A) 17 **B)** 18 **C)** 19 **D)** 20 **E)** 21

9) In the box are seven blocks. It is possible to slide the blocks around so that another block can be added to the box. What is the minimum number of blocks that must be moved?

A) 2 **B)** 3 **C)** 4 **D)** 5 **E)** It is not possible.

10) The sum of the first hundred positive odd numbers is deducted from the sum of the first hundred positive even numbers. What is the result?

**A)** 0 **B)** 50 **C)** 100 **D)** 10100 **E)** 15150
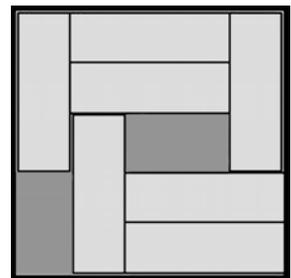
- 4 Point Questions -

11) Grandma has baked a cake for her grandchildren. She does not know if today 3, 5 or all 6 grandchildren will come. Into how many pieces does she have to cut the cake in order to be sure that all grandchildren present will get the same amount of cake?

A) 12 **B)** 15 **C)** 18 **D)** 24 **E)** 30

12) Which of the following two-digit numbers is the smallest which cannot be made by adding three different single-digit natural numbers?

A) 10 **B)** 15 **C)** 23 **D)** 25 **E)** 28

13) In the quadrilateral ABCD AD = BC, ∠ DAC = 50°, ∠ DCA = 65° and ∠ ACB = 70°. How big is ∠ ABC ?

A) 50° **B)** 55° **C)** 60° **D)** 65° **E)** It is not clear.

14) In order to sew together three short strips of cloth to get one long strip
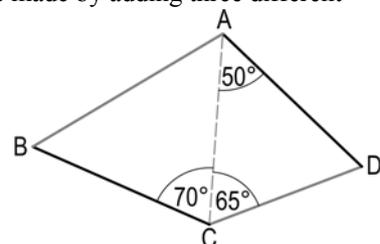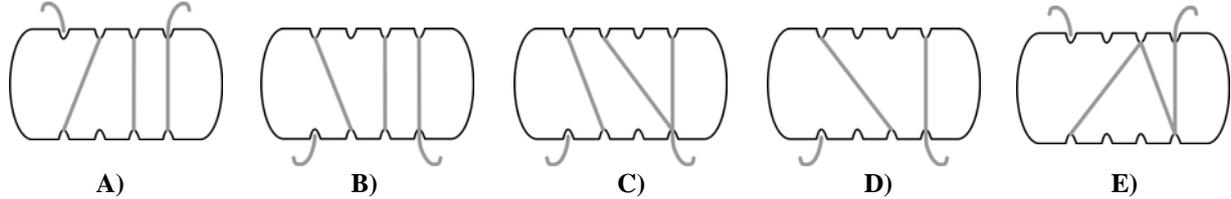
Cathy needs 18 minutes. How much time does she need to sew together a really long piece consisting of six short strips?

A) 27 minutes   **B)** 30 minutes   **C)** 36 minutes

D) 45 minutes   **E)** 60 minutes
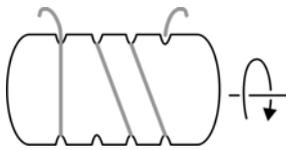

15) Andrea wraps a band around a piece of wood. She then turns the wood around as pictured. What does the wood now look like?

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

16) A square is split into 4 smaller squares. All small squares should either be coloured in white or black. How many ways are there to colour the big square? (patterns are the same if they can be – as shown in the picture – transformed into one another by rotation.)

**A)** 5   **B)** 6   **C)** 7   **D)** 8   **E)** 9
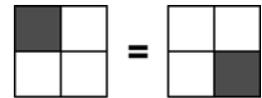
17) In a box are 50 counters: white ones, blue ones and red ones. There are eleven times as many white ones as blue ones. There are less red ones than white ones, but more red ones than blue ones. By how much is the number of red counters less than the number of white counters in the box?

A) 2   **B)** 11   **C)** 19   **D)** 22   **E)** 30

18) In the figure ABCD is a rectangle and PQRS a square. The area of the grey part is half as big as the area of ABCD. How long is the side PX?

A) 1   **B)** 1.5   **C)** 2   **D)** 2.5   **E)** 4
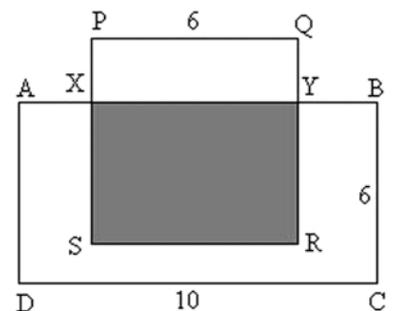
19) What is the smallest number of straight lines with which a plane can be divided into exactly 5 sections?

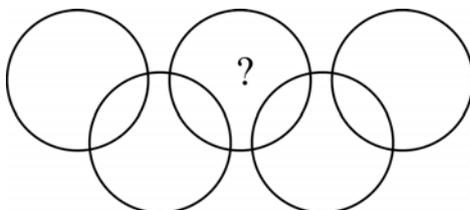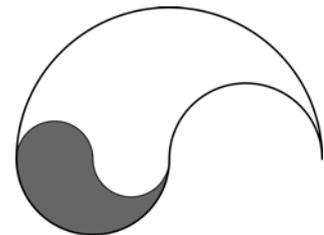**A)** 3   **B)** 4   **C)** 5   **D)** 6   **E)** another number

20) Which of the numbers a, b, c, d and e is biggest if $a - 1 = b + 2 = c - 3 = d + 4 = e - 4$?

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

- 5 Point Questions -

21) In the figure we see semicircles with radii 2 cm, 4 cm or 8 cm. What fraction of the area is grey?

A) $\dfrac{1}{3}$ **B)** $\dfrac{1}{4}$ **C)** $\dfrac{1}{5}$ **D)** $\dfrac{3}{4}$ **E)** $\dfrac{2}{3}$

22) In the figure there are nine regions inside the circles. The numbers 1 to 9 should be written in the regions so that the sum of the numbers in each circle is exactly 11. Which number has to go in the region with the question mark?

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

23) At the Lumpimarket only exchanges can be made. A cock is worth 4 hens, 3 cocks are worth 1 goose and 2 hens and 5 cocks are worth 5 turkeys. Mister Gagač goes to the market with a load of hens in order to buy a goose, a turkey and a cock. What is the least amount of hens he has to take with him?

A) 15   **B)** 27   **C)** 34   **D)** 41   **E)** 42

24 A paperstrip is folded three times in the middle. It is then opened again and looked at from the side so that one can see all 7 folds from the side at the same time. Which of the following views is not a possible result?

A)
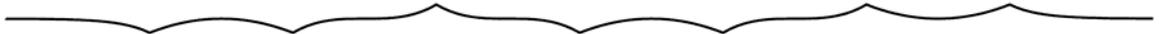
B)

C)

D)

E)

25) On every one of 18 cards either a 4 or 5 is written. The sum of the numbers on all cards is divisible by 17. On how many cards is the number 4 written?

A) 4 **B)** 5 **C)** 6 **D)** 7 **E)** 9

26) The numbers from 1 to 10 are written 10 times each on a board. Now the children play the following game: One child deletes two numbers off the board and writes instead the sum of the two numbers minus 1. Then a second child does the same, and so on until there is only one number left on the board. The last number is

A) less than 11 **B)** 11 **C)** 46 **D)** greater than 46 **E)** depends on the course of the game.

27) In Tautostadt there are only nobles and liars. Each sentence that is spoken by a noble is true. Each one that is spoken by a liar is false. One day some of them meet in a room and three speak as follows:

The first one says: „ There are no more than three in this room. We are all liars."

The second one says: „ There are no more than four in this room. We are not all liars."

The third one says: „In this room we are five. Three of us are liars."

How many people are in the room and how many of them are liars?

A) three people, one of which is a liar   **B)** four people, one of which is a liar

C) four people, two of which are liars   **D)** five people, two of which are liars

E) four people, three of which are liars

28) A kangaroo who is interested in geometry has a collection of 1×1×1 dice. Each die has a certain colour. It wants to make a 3×3×3 cube out of the dice so that small dice that meet at the very least on one corner are always of a different colour. What is the smallest amount of colours it needs to use?

A) 6 **B)** 8 **C)** 9 **D)** 12 **E)** 27

29) The big equilateral triangle consists of 36 small equilateral triangles which each have an area of 1 cm². Determine the area of ABC.
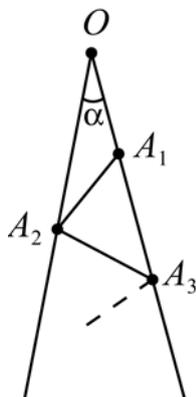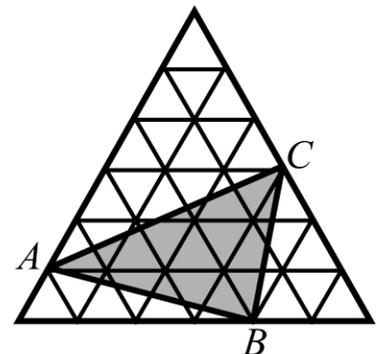
A) 11 cm² **B)** 12 cm² **C)** 15 cm² **D)** 9 cm² **E)** 10 cm²

30) In the figure $\alpha = 7°$. All lines OA_1, A_1A_2, A_2A_3, … are equally long. What is the maximum number of lines that can be drawn in this way if no two lines are allowed to intersect each other?

A) 10 **B)** 11 **C)** 12 **D)** 13 **E)** As many as we want.

KÄNGURU DER MATHEMATIK 2010
18.3.2010

Categorie: Kadett, Grades: 7-8

Name:	
School:	
Class:	

Time alllowed: 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 than question.
You begin with 30 points

**Please write the letter (A, B, C, D, E) of the correct answer
under the question 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

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