Kangaroo 2013 Cadet
(8th and 9th grade)

Maunulan yhteiskoulu
HELSINGIN MATEMATIIKKALUKIO

NAME _____ CLASS _____

Points: _____ Kangaroo leap: _____

Separate this answer sheet from the test.
Write your answer under each problem number.
For each wrong answer, 1/4 of the points of the problem will be deducted.
If you don't want to answer a question, leave the space empty and no deduction will be made.

PROBLEM	1	2	3	4	5	6	7
ANSWER							

PROBLEM	8	9	10	11	12	13	14
ANSWER							

PROBLEM	15	16	17	18	19	20	21
ANSWER							

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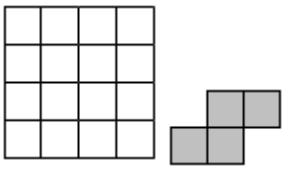
3 points

1.
Ann has the square sheet of paper shown on the left. By cutting along the lines of the square, she cuts out copies of the shape shown on the right. What is the smallest possible number of cells remaining?



(A) 0 (B) 2 (C) 4 (D) 6 (E) 8

2.
Nathalie wanted to build the same cube as Diana had (figure 1). However, Nathalie ran out of small cubes and built only a part of the cube, as you can see in the figure 2. How many small cubes does Nathalie need to complete her figure?

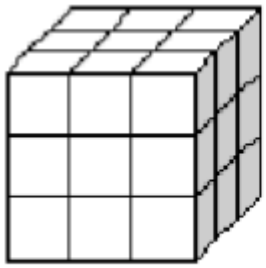


Figure 1

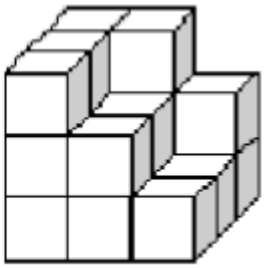
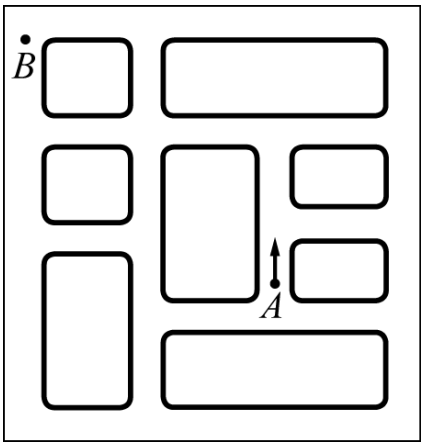


Figure 2

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

3.
Nick is learning to drive. He **knows** how to turn right but **cannot** turn left. What is the smallest number of turns he must make in order to get from A to B?



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

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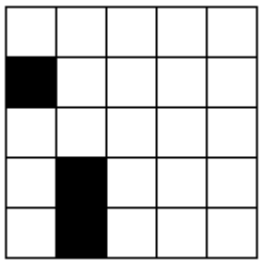
4.
A bag contains balls of five different colours. Two of them are red, three are blue, ten are white, four are green and three are black. Balls are taken from the bag without looking, and not returned. What is the smallest number of balls that should be taken from the bag to be sure that two balls of the same colour have been taken?

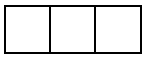
(A) 2 (B) 12 (C) 10 (D) 5 (E) 6

5.
Alex lights a candle every ten minutes. Each candle burns for 40 minutes and then goes out. How many candles are alight 55 minutes after Alex lighted the first candle?

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

6.
Carina and her friend are playing a game of "battleships" on a 5×5 board. Carina has already placed two ships as shown. She still has to place a 3×1 ship so that it covers exactly three cells. No two ships can have a point in common. How many positions are there for her 3×1 ship?





a 3×1 ship

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

7.
Mrs. Margareth bought 4 cobs of corn for everyone in her 4-member family. In the shop she got the discount the shop offered. How much did she pay?

(A) 0,80 € (B) 1,20 € (C) 2,80 € (D) 3,20 € (E) 3,40 €

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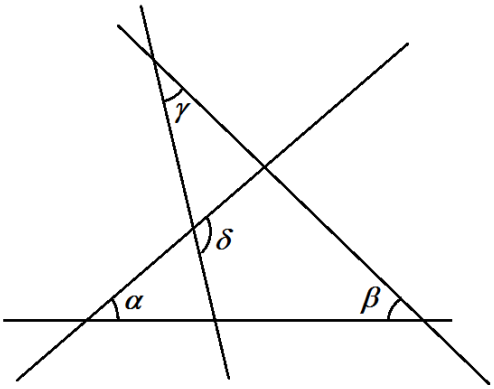
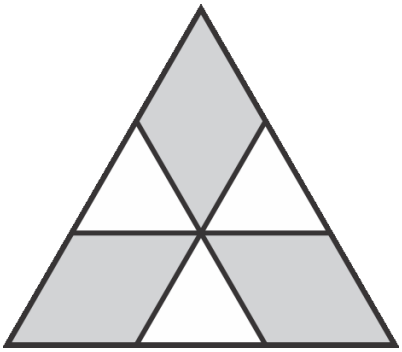
4 points

8.
In the diagram, $\alpha = 55°$, $\beta = 40°$ and $\gamma = 35°$.
What is the value of δ?



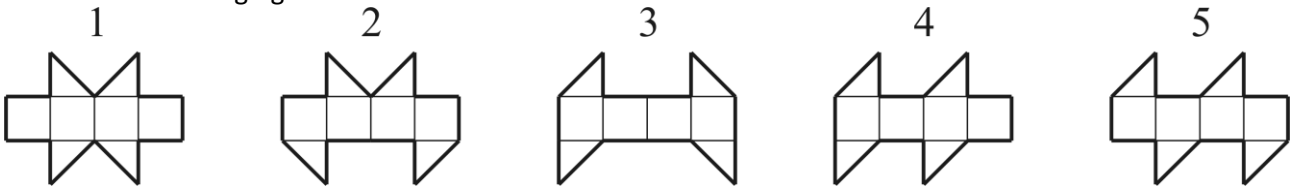
(A) 100° (B) 105° (C) 120° (D) 125° (E) 130°

9.
In the picture, the big triangle is equilateral and has area 9. The lines are parallel to the sides and divide the sides into three equal parts. What is the area of the shaded part?



(A) 1 (B) 4 (C) 5 (D) 6 (E) 7

10.
One of the following figures cannot be folded to form a cube. Which one?



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

11.
Roo wants to tell Kanga a number with the product of its digits equal to 24. What is the sum of the digits of the smallest such number?

(A) 6 (B) 8 (C) 9 (D) 10 (E) 11

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12.

Andy, Betty, Cathie, Dannie and Eddy were born on 20/02/2001, 12/03/2000, 20/03/2001, 12/04/2000 and 23/04/2001 (day/month/year), but not necessarily in this order. Andy and Eddy were born in the same month. Also, Betty and Cathie were born in the same month. Andy and Cathie were born on the same day of different months. Also, Dannie and Eddy were born on the same day of different months. Which of these children is the youngest?

(A) Andy (B) Betty (C) Cathie (D) Dannie (E) Eddy

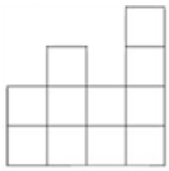
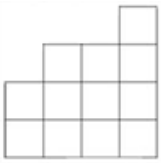
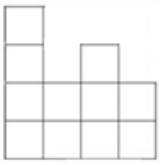
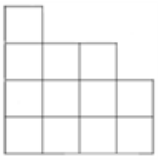
13.

BEHIND

4	**2**	**3**	**2**
3	**3**	**1**	**2**
2	**1**	**3**	**1**
1	**2**	**1**	**2**

FRONT

John has made a building of cubes standing on 4×4 grid. The diagram shows the number of cubes standing in each cell on top of each other. When John looks from behind, what does he see?

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

14.

Mark and Liza stand on opposite sides of a circular fountain. They then start to run clockwise round the fountain. Mark's speed is 9/8 of Liza's speed. How many circuits has Liza completed when Mark catches up with her for the first time?

(A) 4 (B) 8 (C) 9 (D) 2 (E) 72

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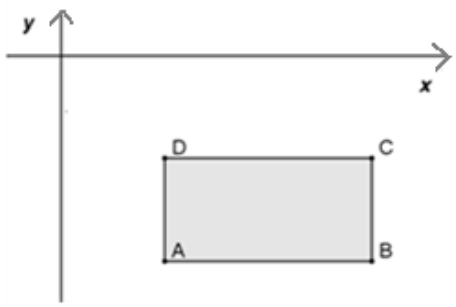
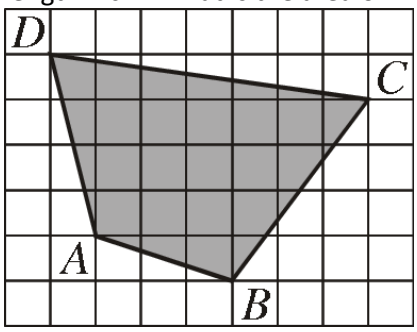
5 points

15.
The edges of rectangle *ABCD* are parallel to the coordinate-axes. *ABCD* lies below the *x*-axis and to the right of the *y*-axis, as shown in the figure. For each of these points we calculate the value *y*-coordinate ÷ *x*-coordinate. Which of the four points gives the smallest value?



(A) A (B) B (C) C
(D) D (E) It depends on the rectangle.

16.
The diagram shows a shaded quadrilateral *ABCD* drawn on a grid. Each cell of the grid has sides of the length 2 cm. What is the area of *ABCD*?



(A) 96 cm^2 (B) 84 cm^2 (C) 76 cm^2 (D) 88 cm^2 (E) 104 cm^2

17.
Ria bakes six raspberry pies one after the other, numbering them 1 to 6 in order, with the first being number 1. Her children sometimes run into the kitchen and eat the hottest pie. Which of the following could not be the order in which the pies are eaten?

(A) 123456 (B) 125436 (C) 325461 (D) 456231 (E) 654321

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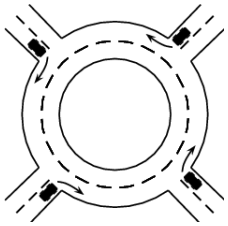
18.
Four cars enter a roundabout at the same time, each one from a different direction, as shown in the diagram. Each car leaves the roundabout to a different direction than where it came from. No two cars leave the roundabout to the same direction. How many different ways are there for the cars to leave the roundabout?



(A) 9 (B) 12 (C) 15 (D) 24 (E) 81

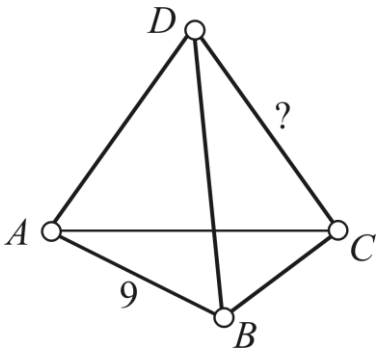
19.
A sequence starts 1, -1, -1, 1, -1. After the fifth term, every term is equal to the product of the two preceding terms. For example, the sixth term is equal to the product of the fourth term and the fifth term. What is the sum of the first 2013 terms?

(A) -1006 (B) -671 (C) 0 (D) 671 (E) 1007

20.
John chooses a 5-digit positive integer and deletes one of its digits to make a 4-digit number. The sum of this 4-digit number and the original 5-digit number is 52713. What is the sum of the digits of the original 5-digit number?

(A) 26 (B) 20 (C) 23 (D) 19 (E) 17

21.
Each of the four vertices and six edges of the tetrahedron is marked with one of the ten numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 11 (number 10 is omitted). Each number is used exactly once. For any two vertices of the tetrahedron, the sum of two numbers at these vertices is equal to the number on the edge connecting these two vertices. The edge *AB* is marked with the number 9. Which number is used to mark edge *CD*?



(A) 4 (B) 5 (C) 6 (D) 8 (E) 11