Kenguru 2017 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 right answer you get 3, 4, or 5 points. There is exactly one correct answer for each problem.

For each wrong answer, ¼ of the points of the problem will be deducted, for example for a 4-point problem -1 point. If you leave the answer empty, no deduction will be made.

There are two goals: to get as many points as possible, or to get as many consecutive right answers as possible.

3 points

PROBLEM	1	2	3	4	5	6	7
ANSWER							

4 points

PROBLEM	8	9	10	11	12	13	14
ANSWER							

5 points

PROBLEM	15	16	17	18	19	20	21
ANSWER							

Contest not to be held before 16th of March.

Logo design by Petra Siilanen.

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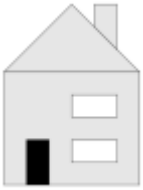
3 points

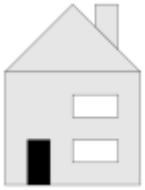
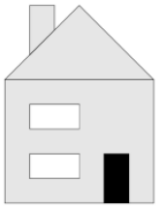
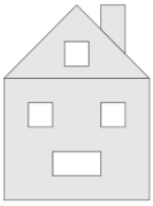
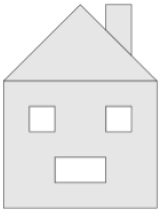
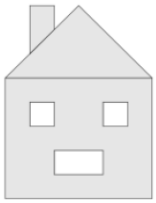
1.
What is the time 17 hours after 17:00?

(A) 8.00 (B) 10.00 (C) 11.00 (D) 12.00 (E) 13.00

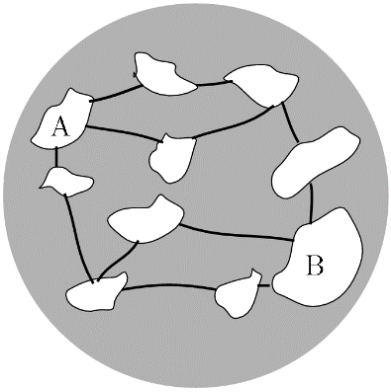
2.
From the front Ann sees her house as in the picture.



The backside the house has three windows and no door. What does Ann see when she looks at her house from the back?

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

3.
In a computer game, you destroy bridges leading to islands. At least how many bridges do you have to destroy to make it impossible to get from island A to island B using the bridges?



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

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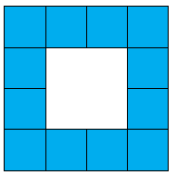
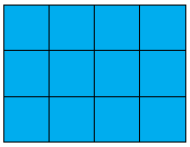
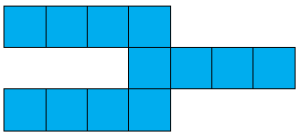
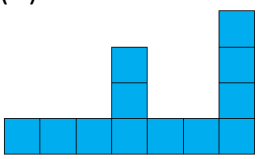
4.

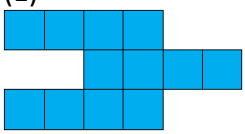
Alice has 4 pieces of this shape:  . Which figure can she not make from these 4 pieces?

(A) 

(B) 

(C) 

(D) 

(E) 

5.

The diagram shows a striped isosceles triangle and its height. Each stripe has the same height. What fraction of the area of the triangle is white?

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$ (E) $\frac{2}{5}$

6.

Anna has 20 euros. Each of her four friends, Nirmal, Tiina, Erlant and Samuli have 10 euros. How many euros does Anna have to give to each of her friends so that all five have the same amount of money?

(A) 2 (B) 4 (C) 5 (D) 8 (E) 10

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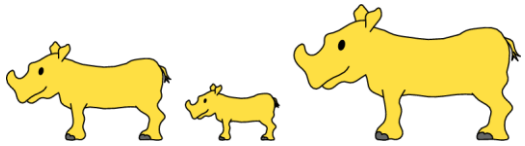
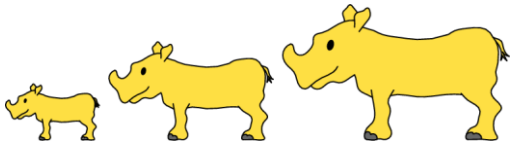
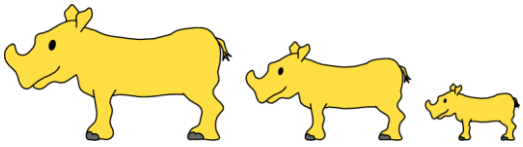
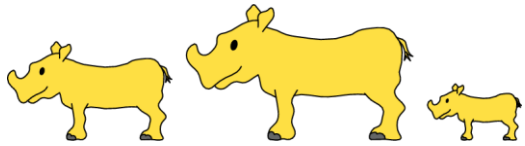
7.

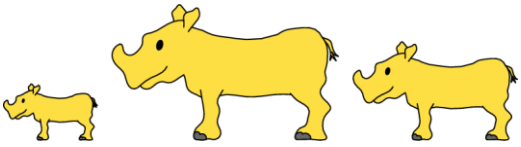
Jane, Kate and Lynn go for a walk. Jane walks up front, Kate walks in the middle and Lynn walks behind.
Jane weighs 500 kg more than Kate. Kate weighs 1000 kg less than Lynn.
Which of the following pictures shows Jane, Kate and Lynn in the right order?

(A) 

(B) 

(C) 

(D) 

(E) 

4 points

8.

A group of girls stands in a circle. Xena is the fourth to the left from Yana and the seventh to the right from Yana. How many girls are there in the group?

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

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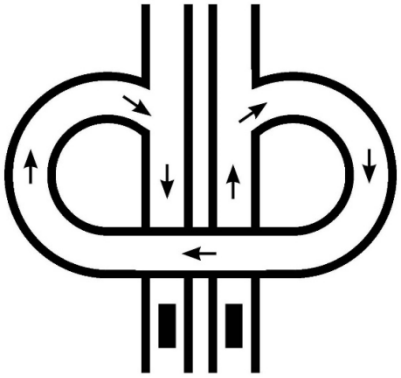
9.

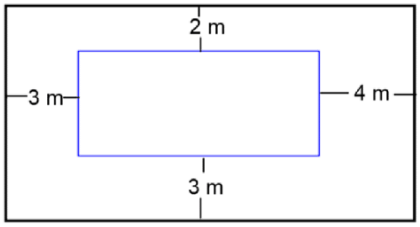
A car passes the following path. How many degrees does it turn?



(A) 180° (B) 270° (C) 360° (D) 450° (E) 540°

10.

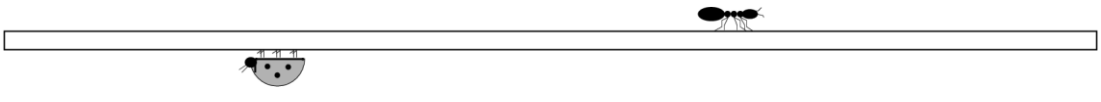
The diagram shows two rectangles whose sides are parallel.
What is the difference in the lengths of the perimeters of the two rectangles?



(A) 12 m (B) 16 m (C) 20 m (D) 21 m (E) 24 m

11.

Annie the Ant started at the left end of a pole and crawled $\frac{2}{3}$ of its length.
Bob the Beetle started at the right end of the same pole and crawled $\frac{3}{4}$ of its length.
What fraction of the length of the pole are Annie and Bob now apart?



(A) $\frac{3}{8}$ (B) $\frac{1}{12}$ (C) $\frac{5}{7}$ (D) $\frac{1}{2}$ (E) $\frac{5}{12}$

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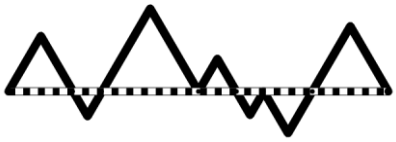
12.

Tycho wants to prepare a schedule for his jogging.
He wants to jog exactly twice a week, and on the same days every week.
He never wants to jog on two consecutive days.
How many such schedules are there?

(A) 16 (B) 14 (C) 12 (D) 10 (E) 8

13.

In the diagram, the dashed line and the black path form seven equilateral triangles.
The length of the dashed line is 20 cm. What is the length of the black path?



(A) 25 cm (B) 30 cm (C) 35 cm (D) 40 cm (E) 45 cm

14.

The diagram shows four overlapping hearts.
The areas of the hearts are 1 cm^2, 4 cm^2, 9 cm^2 and 16 cm^2.
How large is the shaded area?

(A) 9 cm^2 (B) 10 cm^2 (C) 11 cm^2 (D) 12 cm^2 (E) 13 cm^2

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5 points

15.

Emily will write a number into each cell of a 3×3 table so that the sum of the numbers in any two cells that share an edge are the same. She has already written two numbers.
When Emily is ready with her task, what is the sum of the numbers in the table?

2		
		3

(A) 18 (B) 20 (C) 21 (D) 22 (E) 23

16.

Ten kangaroos stood in a line as shown in the picture.

Suddenly two facing kangaroos standing next to each other exchanged places by jumping past each other.
This was repeated until no further jumps were possible.
How many exchanges were made?

(A) 15 (B) 16 (C) 18 (D) 20 (E) 21

17.

A bus leaves the airport every 3 minutes to drive to the city centre.
A car leaves the airport at the same time with the bus and drives to the city centre by the same route.
It takes each bus 60 minutes and the car 35 minutes to drive from the airport to the city centre.
How many buses does the car pass on its way to the centre, excluding the bus it left with?

(A) 8 (B) 9 (C) 10 (D) 11 (E) 13

18.

In the sequence 2, 3, 6, 8, 8, … each number is the last digit of the product of the two preceding numbers. What is the 2017th number in the sequence?

(A) 2 (B) 3 (C) 4 (D) 6 (E) 8

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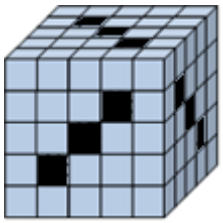
19.

Mike had 125 small cubes.
He glued some of them together to form a big cube with 9 straight tunnels leading through the whole cube as shown in the diagram.
How many of the small cubes did he not use?



(A) 52 (B) 45 (C) 42 (D) 39 (E) 36

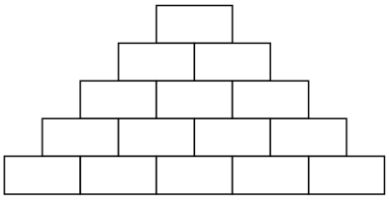
20.

Every other sentence Kanga says is a truth and every other is a lie. Sometimes she starts with a lie and sometimes with a truth.
Kanga is thinking of an integer and tells her friend about it:
”It’s not smaller than 1. It’s not larger than 3. It’s not larger than 7. It’s not smaller than 5.”
What is the integer Kanga is thinking of?

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

21.

Sarah wants to write a positive integer in each box of the diagram so that each number is the sum of the two numbers in the boxes immediately underneath.
What is the largest amount of odd numbers that Sarah can write?



(A) 5 (B) 7 (C) 8 (D) 10 (E) 11