



NAME \_\_\_\_\_

CLASS \_\_\_\_\_

Points: \_\_\_\_\_

Kangaroo leap: \_\_\_\_\_

ID code (teacher fills): \_\_\_\_\_

Separate this answer sheet from the test. Write your answer under each problem number.

A right answer gives 3, 4 or 5 points. Every problem has exactly one right answer.

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

There are two goals: to score as many points as possible or to have as many consecutive right answers as possible.

**3 points**

PROBLEM	1	2	3	4	5	6	7
ANSWER							

**4 points**

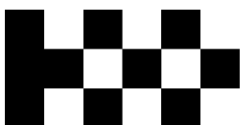
PROBLEM	8	9	10	11	12	13	14
ANSWER							

**5 points**

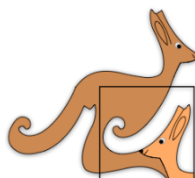
PROBLEM	15	16	17	18	19	20	21
ANSWER							

Contest not to be held before 25<sup>th</sup> of March.

Logo design by Samin Ahmed.



Teknologiateollisuuden  
100-vuotissäätiö



3 points



1.

In the Mayan number system a dot was written for 1, and a bar was written for 5. Which symbol was written for the number 17?

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

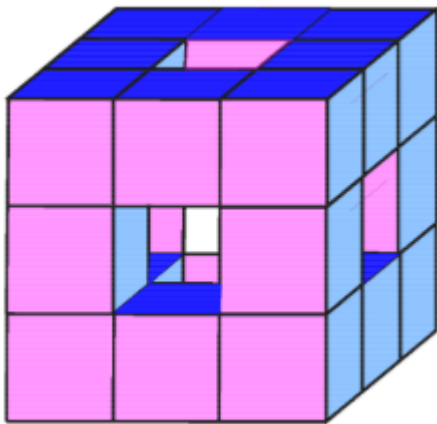
2.

In a family, each daughter has four brothers and each son has three sisters. How many children are there in the family?

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 12

3.

A big cube was built of small identical cubes. Then, in each of the three directions, a hole was drilled from front to back, removing always the central small cubes (see picture). How many small cubes were there left?



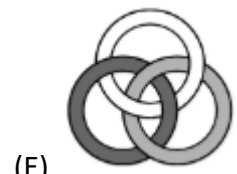
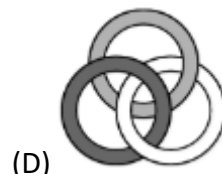
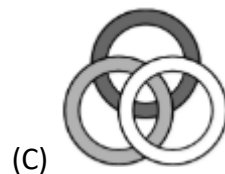
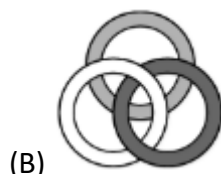
- (A) 15 (B) 17 (C) 18 (D) 19 (E) 20

4.

Three rings are linked as shown in the picture.



Which of the following diagrams also shows the same three rings?



5.

Samuli divides his apples into six equal piles. Josefina divides the same number of apples into five equal piles. She notices that each of her piles contains two apples more than each of Samuli's piles. How many apples does Samuli have in his piles altogether?

(A) 40

(B) 45

(C) 50

(D) 55

(E) 60

6.

In a race, Emil finished before Manfred, Victor finished after Jan, Manfred finished before Jan and Miki finished before Victor. Who finished last of these five runners?

(A) Emil

(B) Manfred

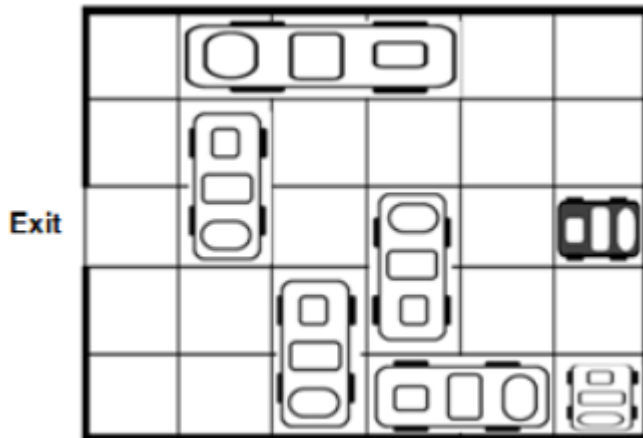
(C) Victor

(D) Jan

(E) Miki

7.

The parking lot in the picture has only one exit, and the cars can only move forwards and backwards. What is the minimum number of white cars that have to move so that the black car can exit the parking lot?



(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

4 points

8.

Nea has five identical squares. She shades a part of each square as shown. In which square does the shaded part have the largest area?

(A)



(B)



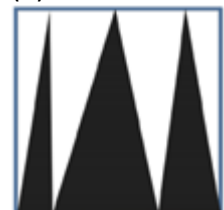
(C)



(D)

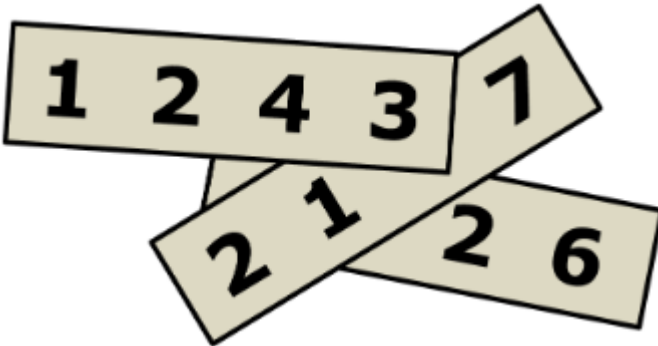


(E)



9.

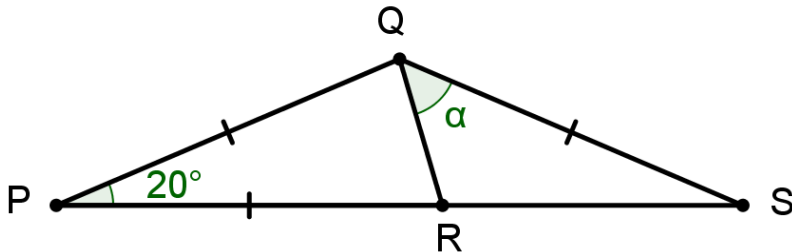
A four-digit integer is written on each of these three pieces of paper. The sum of the three integers is 10 126. The pieces of paper are placed so that some of the digits are covered as shown in the diagram. What is the sum of the covered digits?



- (A) 18                      (B) 19                      (C) 20                      (D) 21                      (E) 22

10.

In the diagram,  $PQ = PR = QS$  and angle  $P = 20^\circ$ . What is the size of angle  $\alpha$ ?



- (A)  $20^\circ$                       (B)  $30^\circ$                       (C)  $40^\circ$                       (D)  $50^\circ$                       (E)  $60^\circ$

11.

Alan, Bill, Claire, Dora, and Erik meet each other and shake hands exactly once with each person they already know. Alan shakes hands once, Bill twice, Claire three times and Dora four times. How many times does Erik shake hands?

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

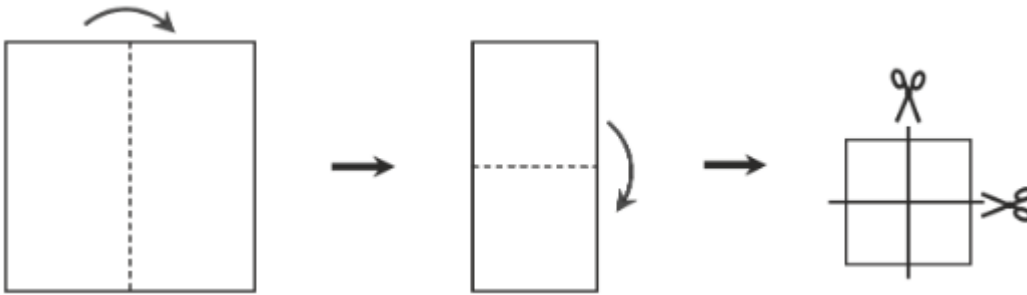
12.

After a series of 20 shots at the basket, Oskari had scored 55% of the time. Five shots later, his success rate had increased to 56%. On how many of the last five shots did he score?

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

13.

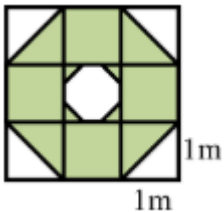
Sara folds a square sheet of paper exactly in half twice and then cuts it exactly in half twice, as shown in the diagram. How many of the pieces she obtains are squares?



- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) 8

14.

On a floor which is tiled with squares of side 1 m two similar octagons are drawn, as shown.



What is the exact area of the shaded part?

- (A)  $7 \text{ m}^2$                       (B)  $\frac{56}{9} \text{ m}^2$                       (C)  $\frac{55}{9} \text{ m}^2$                       (D)  $6 \text{ m}^2$                       (E)  $\frac{53}{9} \text{ m}^2$

5 points

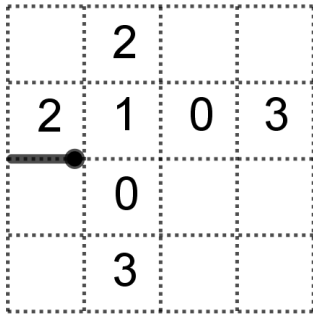
15.

Kasper has two cylindrical candles with different heights and diameters. The first candle burns for 6 hours, while the second candle burns for 8 hours. He lights both candles at the same time, and three hours later both candles are the same height. What is the ratio of their original heights?

- (A) 4 : 3                      (B) 8 : 5                      (C) 5 : 4                      (D) 3 : 5                      (E) 5 : 3

16.

Konsta arranges matches, like the one in the picture, along the dotted lines. He forms one closed path without crossings, such that the number shown in each cell is equal to the number of matches around this cell. How many matches are in this path?



(A) 12

(B) 14

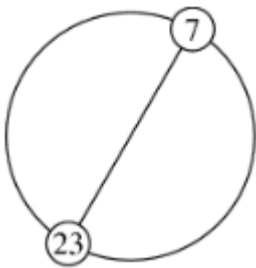
(C) 16

(D) 18

(E) 20

17.

The integers from 1 to  $n$  (including 1 and  $n$ ) are equally spaced in numerical order on a circle. The diameter through the position of the integer 7 also goes through the position of 23, as shown. What is the value of  $n$ ?



(A) 30

(B) 32

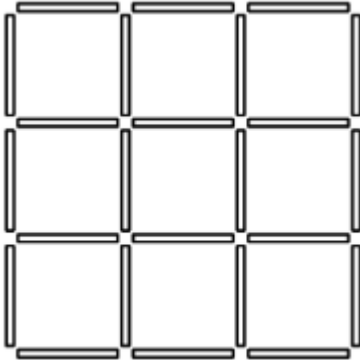
(C) 34

(D) 36

(E) 38

18.

Helmi has sticks of length 1 of four different colors: red, blue, yellow, and green. From those sticks, she composes a  $3 \times 3$ -square so that for each small  $1 \times 1$ -square all its four sides are of different colours. What is the smallest number of green sticks that she needs?



- (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) 7

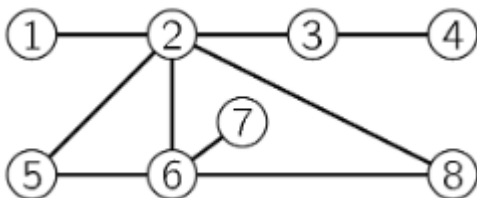
19.

Some 3-player teams are enrolled in a chess tournament. Each player must play exactly once against all other players, but not against the players in their own team. For organizing reasons, no more than 250 games can be played in total. How many teams can be enrolled in the tournament at most?

- (A) 7                      (B) 8                      (C) 9                      (D) 10                      (E) 11

20.

Roope paints each of the eight circles in the diagram either red, yellow or blue so that no two circles that are connected with a line get painted with the same colour. Which two circles must be painted with the same colour?



- (A) 5 and 8                      (B) 1 and 6                      (C) 2 and 7                      (D) 4 and 5                      (E) 3 and 6





**21.**

There are 18 wagons and exactly 700 passengers in the train. In any five consecutive wagons there are exactly 199 passengers in total. How many passengers are in the two middle wagons together?

(A) 70

(B) 77

(C) 78

(D) 96

(E) 103