2006

wizBRAIN

EUROPEAN KANGAROO
ARITHMETIC AND MATHEMATICS CONTEST

Welcome to the Kangaroo, great that you join in!

* ***** You have 75 minutes. There are 30 questions. With every question one of the five options is the correct one.

* ***** Do what you can, don't be disappointed if you cannot answer everything.

* ***** You are not allowed to use a calculator; of course you may use scribbling paper.

* ***** Use a pencil to fill in the answer sheet carefully.

* ***** About scoring points:
  * * You start with 30 free points.
  * * Question   1 - 10: you will get 3 points for a correct answer;
    you will lose ¾ points for an incorrect one.
  * * Question 11 - 20: you will get 4 points for a correct answer;
    you will lose 1 point for an incorrect one.
  * * Question 21 - 30: you will get 5 points for a correct answer;
    you will lose 1¼ points for an incorrect one.
  * * If you don't answer a question, you neither gain nor lose points.

* ***** The answers will be on the website from March 22nd,
  www.math.ru.nl/kangoeroe

* ***** The scores and the prizes will arrive at schools in week 17.

Good luck and most of all: have fun!!

wizBRAIN
the Netherlands: 1 & 2 havo/vwo and 3 & 4 vmbo
Flanders: bso 2nd & 3rd degree and aso/tso 1st degree

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Puzzelsport
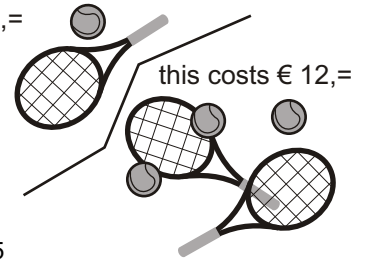www.puzzelsport.nl

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01. The European Kangaroo Contest has been held each year since 1991.
How many times has it been held including today (in 2006)?

A. 15e   **B.** 16e   **C.** 17e   **D.** 18e   **E.** 19e

02. How many euros does one ball cost?

this costs € 5,=

this costs € 12,=

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

03. $20 \times (0+6) - (20 \times 0) + 6 =$

A. 0   **B.** 12   **C.** 106   **D.** 114   **E.** 126

04. M is the centre of the regular pentagon.
What percentage of the pentagon is grey?
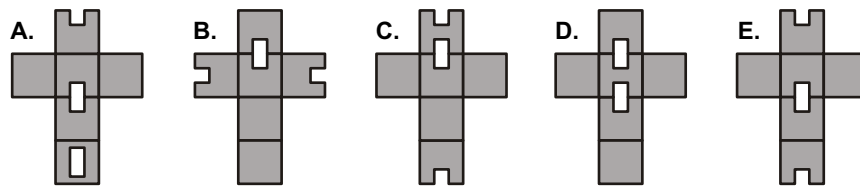
A. 10   **B.** 20   **C.** 25   **D.** 30   **E.** 40

05. Grandmother baked cookies for her grandchildren. When she gives each grandchild two cookies,
she has three cookies left. If she wants to give each grandchild three cookies, she would need two more
cookies.
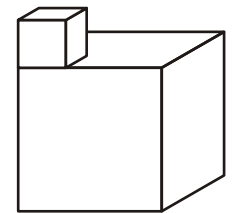How many grandchildren does grandmother have?

A. 2   **B.** 3   **C.** 4   **D.** 5   **E.** 6

06. A hollow cube has two holes as shown in the picture alongside.
Which of the following nets is a net of this cube?

A.   **B.**   **C.**   **D.**   **E.**

07. Of the 2006 pupils of a school, 1500 participate in the Kangaroo Contest.
1200 pupils participate in the Mathematics Olympiad, whereas 6 pupils don't participate in any contest.
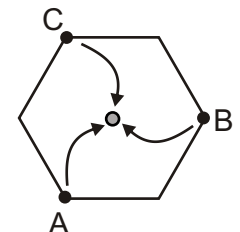How many pupils at this school participate in both contests?

A. 300   **B.** 500   **C.** 600   **D.** 700   **E.** 1000

08. The object alongside consists of two cubes glued together.
The top one is a 1 cm cube. The bottom one is a 3 cm cube.
The object has to be painted completely.
How many cm^2 have to be painted?

A. 49   **B.** 56   **C.** 58   **D.** 60   **E.** 62

09. Ron folds the vertices A, B and C to the dot in the middle.
Which shape does Ron get then?

A. triangle   **B.** square   **C.** hexagon   **D.** hexagonal star
E. 12-sided polygon

10. Harry adds the numbers 2, 4, 6, and so on, to 2000 (inclusive).
Hermione adds the numbers 1, 3, 5, and so on, to 1999 (inclusive).
How much is the difference between their answers?

A. 1   **B.** 200   **C.** 500   **D.** 1000   **E.** 2000
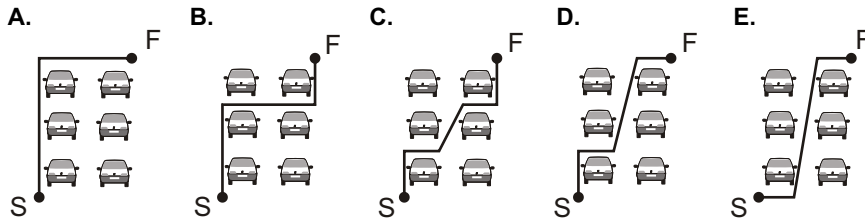
11. Six cars are parked in a parking lot. Harry wants to walk from S to F.
His route should be as short as possible.
Which of the following routes should he take?

A.   **B.**   **C.**   **D.**   **E.**

12. Two sides of a triangle are 7 cm each.
The length of the third side in cm is a whole number.
What is the largest perimeter, in cm, this traingle can have?

A. 14   **B.** 15   **C.** 21   **D.** 27   **E.** 28

13. The following is known of an object:
* if it is blue, it is round;
* if it is square, it is green;
* it is either blue or yellow;
* if it is yellow, it is square;
* it is either square or round.
What can you tell about this object?

A. it is blue and round   **B.** It is green and round
C. it is blue and square   **D.** it is yellow and square
E. it is yellow and round

14. A bag of toffees costs 1 euro. Every bag contains a voucher.
You will get a free bag of toffees for three vouchers.
How many bags of toffees will you get at most for 15 euros?

A. 15   **B.** 17   **C.** 20   **D.** 21   **E.** 22

15. There is a month with three Tuesdays on an even date.
On which day is the 21st of that month?

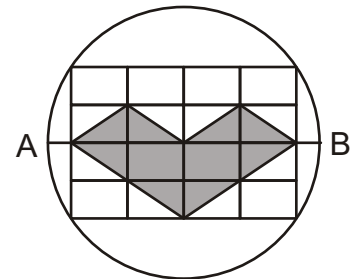**A.** Wednesday   **B.** Thursday   **C.** Friday   **D.** Saturday   **E.** Sunday

16. Which number is squared 500% more than the number itself?

A. 5   **B.** 6   **C.** 7   **D.** 8   **E.** 10

17. Three species of Martians fly to the moon by rocket. GreenMartians have two tentacles, orange Martians have three and blue Martians have five tentacles. There are as many green as orange Martians in the rocket and there are 10 more blue Martians than there are green ones.
The Martians have 250 tentacles all together.
How many blue Martians are flying along in the rocket?

A. 15   **B.** 20   **C.** 25   **D.** 30   **E.** 40

18. Diameter AB of the circle is 10 cm.
Exactly 4 rows of 4 equally big rectangles each, fit in the circle.
A grey V shaped figure is drawn on this.
How many cm is the perimeter of this figure?

A. 8   **B.** 16   **C.** 20   **D.** 25   **E.**30

19. If kangaroo Skippy jumps off with his left leg he jumps 2 meters.
If he jumps off with his right leg he jumps 4 meters. When he jumps off with two legs he jumps 7 meters.
How many jumps does Skippy have to do at least, to jump exactly 1000 meters?

A. 141   **D.** 142   **C.** 143   **D.** 144   **E.** 145

20. Harry, Ron and Hermione bought a tent. Harry paid 60% of the price.
Ron paid 40% of the rest. Hermione had to pay another 30 euros after that.
How many euros did the tent cost?
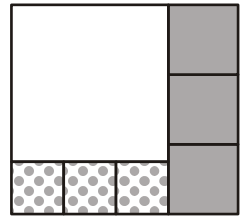
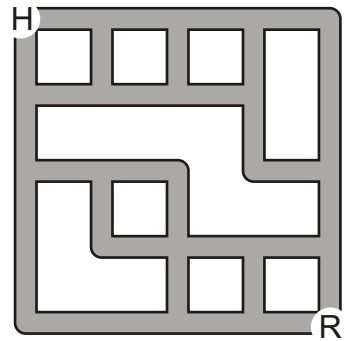**A.** 50   **B.** 60   **C.** 125   **D.** 150   **E.** 200

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21. A rectangle is divided into seven squares.
The sides of the grey squares on the right hand side are 8 each.
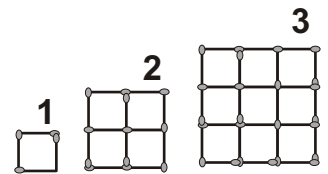How long are the sides of the big white square?

A. 15   **B.** 16   **C.** 18   **D.** 20
E. You can't tell

22. Harry is standing at corner H and Ron at corner R.
Harry is looking for a shortest possible route (using grey roads) to Ron.
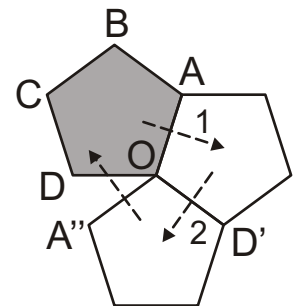How many shortest routes can Harry choose from?

A. 6   **B.** 8   **C.** 9   **D.** 11   **E.** 12

23. Hermione uses matches to make a square.
Then she makes a bigger square by adding on smaller squares.
She continues this way up to and including square 31.
Alongside you see squares 1, 2 and 3.
How many more matches has square 31 compared to square 30?

A. 61   **B.** 120   **C.** 124   **D.** 148   **E.** 254

24. Regular pentagon OABCD is reflected in line OA, mapping D onto D'.
The image pentagon is then reflected in OD', mapping A onto A''.
We continue this way.
After how many reflections do we get back pentagon OABCD for the first time?

A. 6   **B.** 10   **C.** 12   **D.** 15   **E.** 20

25. A three-digit number ends in a 2.
When we put this 2 in front, we get a three-digit number that is 36 less.
What is the digit sum of this number?

A. 4   **B.** 5   **C.** 7   **D.** 9   **E.** 10

26. We look at all positive whole numbers that have a digit sum of 2006.
What is the first digit of the smallest of these numbers?

A. 1   **B.** 3   **C.** 5   **D.** 6   **E.** 8

27. A train has to be put together by placing five wagons (P, Q, R, S and T) behind the locomotive.
The wagons can be ordered in 120 different ways.
For how many of these orders is wagon P closer to the locomotive than wagon Q?

A. 10   **B.** 30   **C.** 48   **D.** 60   **E.** 120

28. Ron drives at a constant speed from Harry to Hermione.
If his speed was 30 km/hour more, his travelling time would be three times smaller.
How many times smaller would his travelling time be, if his speed was 60 km/hour more?

A. 4   **B.** 4,5   **C.** 5   **D.** 6   **E.** 8

29. The product of two whole numbers is equal to $2^5 \times 3^2 \times 5 \times 7^3$.
The sum of these two numbers can be divisible by

A. 3   **B.** 5   **C.** 8   **D.** 10   **E.** 49

30. $1^2 + 2^2 + 3^2 + ... + 2005^2 - 1 \times 3 - 2 \times 4 - 3 \times 5 ... - 2004 \times 2006 =$

A. 0   **B.** 2000   **C.** 2004   **D.** 2005   **E.** 2006