



EUROPEAN KANGAROO MATHEMATICS CONTEST

Friday March 21st 2003

vmbo year 3 & 4 , havo/vwo year 1 & 2

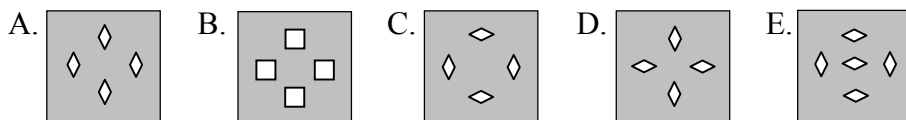
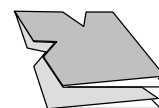
Welcome to the Kangaroo, great that you decided to participate!!

- * 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 and lose $\frac{3}{4}$ points for an incorrect one
 - * Question 11-20: You will get 4 points for a correct answer and lose 1 point for an incorrect one
 - * Question 21-30: You will get 5 points for a correct answer and lose $1\frac{1}{4}$ points for an incorrect one
 - * If you don't answer a question, you neither gain nor lose points.
- * The answers will be from March 25th on the website, www.sci.kun.nl/math/kangoeroe
- * The scores and the prizes will arrive at the schools in week 18.

Good luck and most of all: Have fun!!

1. When Harry walked to school this morning he marked some of the 17 trees he passed with a red cross. He did this with the first tree, the third, the fifth, etc. After school, on his way home, Harry once again marked some of the trees with a red cross. This time he did it with the first tree, the fourth, the seventh etc. How many trees did not get a red cross?
- A. 4 B. 5 C. 6 D. 7 E. 8

2. When you unfold the paper you see here, you will get one of the following shapes. Which one?



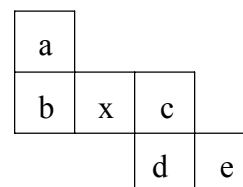
3. There were five kangaroos in a cage in a pet shop yesterday. Their average price was 6000 euros. This morning, during the cleaning of the cage, the cutest kangaroo escaped. The average price of the other four kangaroos is 5000 euros. How many euros was the price of the escaped kangaroo?
- A. 5000 B. 6000 C. 6500 D. 8000 E. 10000



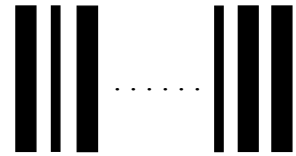
4. Harry is taking a walk around. He changes direction six times during this walk. How many right angles can Harry make at most?
- A. 2 B. 3 C. 4 D. 5 E. 6

5. Here you see a net of a cube. If you can see the 'x' on top of the cube, which letter will be at the bottom?

- A. a B. b C. c D. d E. e



6. A barcode consists of 17 black lines, with white lines in between. There are two kinds of black lines: broad lines and narrow lines. There are 3 more white lines than broad black lines. How many narrow black lines are there?



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

7. Minoes has written the letter \forall on tracing paper. She then rotated the paper 90° clockwise, turned it over to the left and then rotated it 180° anticlockwise. Which of the following pictures will Minoes see now?

- A. \blacktriangleleft B. \blacktriangleright C. \blacktriangleleft D. \blacktriangleright E. \blacktriangleright

8. Harry builds a cuboid out of 42 little cubes. The cubes have edges of 1 cm. The perimeter of the bottom of the cuboid is 18 cm. How many cm is the height of the cuboid?

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

9. Minoes has a two-digit integer. She divides the number by its first digit. What is the largest outcome Minoes can get?

- A. 9 B. 10 C. 10 $\frac{1}{2}$ D. 19 E. 20

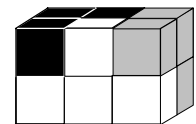
10. Harry draws four straight lines. He does it so that he will get the largest number of intersections. How many intersections will he have?

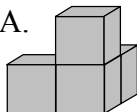
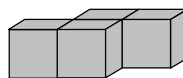
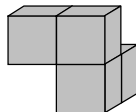
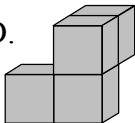
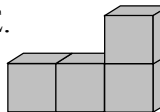
- A. 2 B. 3 C. 5 D. 6 E. 7

11. Which of the following numbers multiplied by 32 results in a number with the most zeros at the end?

- A. 7200 B. 3125 C. 5000 D. 7500 E. 10000

12. The puzzle you see here consists of three pieces consisting of 4 cubes each. What does the grey piece look like?



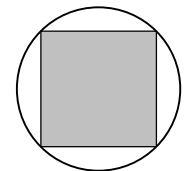
- A.  B.  C.  D.  E. 

13. An unloaded truck weighs 2000 kg. When that truck left this morning the cargo was 80% of the total weight of the loaded truck. A quarter of the cargo has just been unloaded. How many percent of the total weight of the truck is the cargo now?

- A. 20% B. 25% C. 55% D. 60% E. 75%

14. In a circle of radius 3 cm the largest possible square has been drawn. How many cm^2 is the area of this square?

- A. 9 B. 12 C. 15 D. 18 E. 21



15. Harry has six sticks. These are 1 cm, 2 cm, 3 cm, 2001 cm, 2002 cm and 2003 cm long. He creates as many triangles as possible with these sticks by putting the ends together. How many different triangles can Harry create?

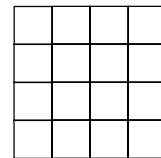
- A. 2 B. 3 C. 5 D. 6 E. 8

16. There are two sorts of dragons in a reservation, red ones and green ones. Every red dragon has 3 heads and 2 tails. Every green dragon has 3 heads and 4 tails. All dragons together have 60 heads and 62 tails. How many red dragons live in the reservation?

- A. 6 B. 7 C. 8 D. 9 E. 10

17. Minoes draws one straight line on a small chessboard with 16 squares. What is the biggest number of squares she can divide into two with this line?

- A. 4 B. 5 C. 6 D. 7 E. 8



18. Six points, P, Q, R, S, T and U (in that order) are on a line, so that $PS = RU$ and $QS = SU$. Which of the following statements is certainly true?

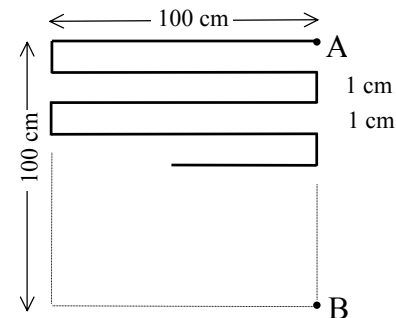
- A. $PQ = QR$ B. $QR = ST$ C. $QS = TU$ D. $PQ = RS$ E. $RS = TU$

19. Minoes has six cards with on each card a 4 or a 6. She takes three cards and adds the numbers. After that she puts the cards back, shuffles them and starts again. After doing this a lot of times, she discovers she only got the outcomes 16 and 18. How many cards with a six does she have?

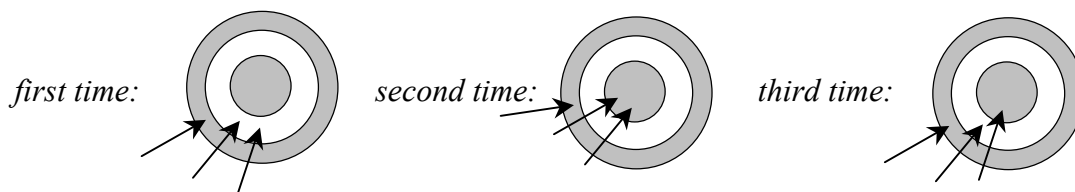
- A. 1 B. 2 C. 3 D. 4 E. 5

20. The points A and B are 100 cm apart. The “winding line” between A and B consists of pieces of 100 cm and 1 cm. Every next piece forms a right angle with the previous piece. How many cm long is the winding road?

- A. 909 B. 2500 C. 9900 D. 10100 E. 10200



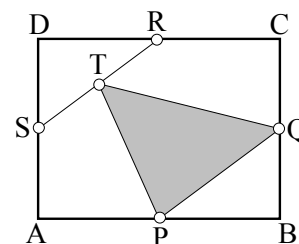
21. Minoes has thrown 3 darts on a board three times. The first time she scored 29 points and the second time 43 points. How many points did she score the third time?


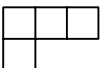


- A. 32 B. 34 C. 36 D. 38 E. 40

22. In rectangle ABCD P, Q, R and S are the midpoints of the sides. T is the midpoint of line segment RS. The surface of ABCD is 1. What is the area of ΔPQT ?

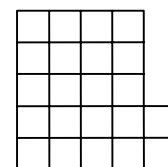
- A. $\frac{1}{6}$ B. $\frac{1}{5}$ C. $\frac{1}{4}$ D. $\frac{5}{16}$ E. $\frac{3}{8}$



23. Harry has puzzle pieces X:  and Y: 

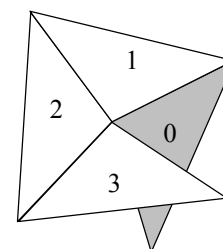
Using these pieces he wants to make the picture shown on the right. How many pieces X does Harry need at least?

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



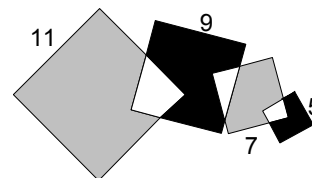
24. We make a spiral of isosceles triangles with a top angle of 100° . We start with the grey triangle, which is given number 0. Every next triangle, number 1, 2, 3, etc. is placed so that it has one side in common with the previous triangle as shown in the diagram. You can see that number 3 partly covers number 0. Which number does the first triangle have that covers number 0 entirely?

- A. 10 B. 12 C. 14 D. 16 E. 18



25. The four overlapping squares have sides 11, 9, 7 and 5 cm respectively. How many cm^2 is the total area of the grey parts bigger than that of the black parts?

- A. 0 B. 25 C. 36 D. 49 E. 64

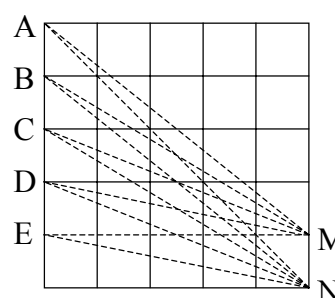


26. On a bookshelf are Maths books and Physics books, fifty in total. No two Physics books are next to each other and next to every Maths book there is another Maths book. Which of the following statements is not true?

- A. There are no less than 32 Maths books.
 B. There are no more than 17 Physics books.
 C. It is sure that there are 3 Maths books next to each other.
 D. If there are 17 Physics book, then one of them is either the first or the last one.
 E. Out of every 9 books in a row at least 6 are Maths books.

27. The big square is divided into 25 small squares. Dotted lines are drawn from the points M and N to each of the points A, B, C, D and E. How many degrees are the angles together formed by the dotted lines at A, B, C, D and E?

- A. 30 B. 45 C. 60 D. 75 E. 90



28. A jug holds as much wine as a bottle and a glass together. A bottle holds as much wine as a pitcher and a glass together. Three pitchers hold as much as two jugs. How many glasses go in a pitcher?

- A. 3 B. 4 C. 5 D. 6 E. 7

29. Paul, Quintus, Richard, Simon and Tim are standing in a circle. Each of the boys has one other boy who is nearest to him. Their teacher has asked every one of them who that person is. Paul and Quintus were both named twice, Richard once. Which of the following statements is true?

- A. Paul and Quintus aren't neighbours. B. Simon and Tim are not neighbours.
 C. Simon and Tim are neighbours. D. Simon and Tim both are Richard's neighbours.
 E. The situation described above is impossible.

30. The proper divisors of the number 12 are 2, 3, 4 and 6, but not 1 and 12. Minoes is looking for numbers having the property that the biggest proper divisor is 15 times as big as the smallest proper divisor. How many of these numbers are there?

- A. 0 B. 1 C. 2 D. 3 E. infinitely many