wizBRAIN 2012

W4 KANGOEROE WereldWijde WiskundeWedstrijd

www.w4kangoeroe.nl

Good luck and most of all have fun.

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- calculator not allowed
- you may use 75 minutes
- scrap paper is allowed
- results and awards at school mid-May
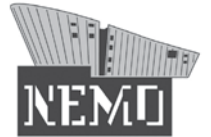- 20th March the answers will be on the website
- 15th April the explanations will be on the website

wizBRAIN
havo 1, 2 & 3
vwo 1 & 2
vmbo 3 & 4 (excl. basisberoepsgerichte leerweg)

1. Four chocolate bars cost six euros more than one bar.
How many euros does one bar cost?

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

2. 11,11 – 1,111 =

A. 9,009   **B.** 9,0909   **C.** 9,99   **D.** 9,999   **E.** 10

3. Julia has got five cardboard letters. She uses scissors to cut up one of the letters with a single cut along a straight line. She would like to get as many pieces as possible.
Which letter should Julia cut up?

A. F   **B.** H   **C.** M   **D.** O   **E.** S

4. A cuboid consists of four pieces of four cubes each.
Each piece has a colour of its own.
Which one is the white piece?
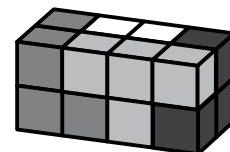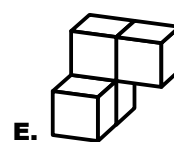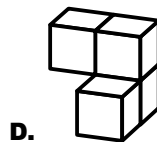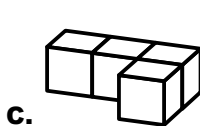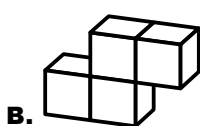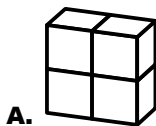
5. A dragon has five heads. Every time one of its heads is chopped off, immediately five new heads will grow on.
If we chop off six heads in succession, how many heads will the dragon have, then?

A. 25   **B.** 28   **C.** 29   **D.** 30   **E.** 35

6. Each of the nine paths in a park is 100 m long.
Sophie walks from A to B. She never walks the same path twice.
How many metres is the longest walk Sophie can take?
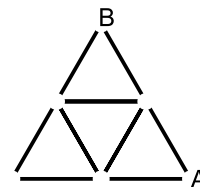
A. 400   **B.** 600   **C.** 700   **D.** 800   **E.** 900

7. In the following five exercises you replace every 8 by another positive whole number, the same number each time. In four of the exercises the outcome will change then.
For which exercise the outcome will *not* change?

A. $(8 + 8) : 8 + 8$ **B.** $8 \times (8 + 8) : 8$ **C.** $8 + 8 - 8 + 8$ **D.** $(8 + 8 - 8) \times 8$ **E.** $(8 + 8 - 8) : 8$

8. Two triangles are shown. You want to draw a straight line between a vertex of one triangle and a vertex of the other triangle.
The line is not allowed to intersect the triangles.
How many of these lines are there?
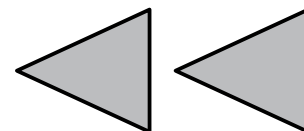
A. 3   **B.** 4   **C.** 5   **D.** 6   **E.** more than 6

9. Luke folds a sheet of paper as shown in the picture and makes two straight cuts after folding. Then he unfolds the paper.
Which of the possibilities for the paper can *not* appear?
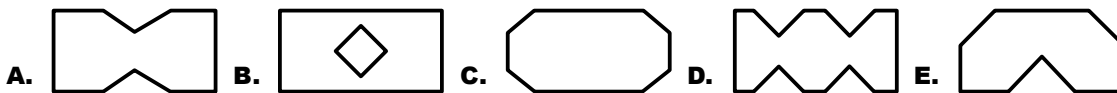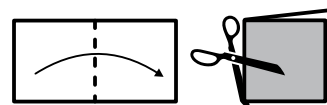
10. A watch lies on the table in such a way that the minute hand points north-east.
How many minutes will it take before the minute hand will point north-west?

A. 15   **B.** 20   **C.** 30   **D.** 40   **E.** 45

11. We make two four-digit numbers by using each of the digits 1, 2, 3, 4, 5, 6, 7 and 8 exactly once.
Then we add the two numbers.
What is the least possible outcome?

**A.** 2468   **B.** 3333   **C.** 3825   **D.** 4734   **E.** 6912

12. Ismael would like to fill in numbers in the empty boxes of the table shown alongside.
The sum of the first three numbers should be 100.
The middle three numbers should sum to 200, and the final three should add up to 300.
Which number should Ismael put in the middle box?

10			130

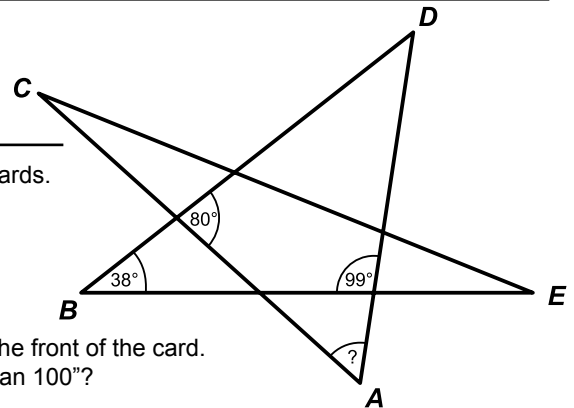**A.** 50   **B.** 60   **C.** 70   **D.** 75   **E.** 100

13. A cube is in position 1 on the table.
It is rolled over along an edge to move to position 2.
After that it is rolled over along an edge again to move it to position 3, etcetera.
In which two positions was the same face of the cube on the table?

		6	7
		4	5
1	2	3	
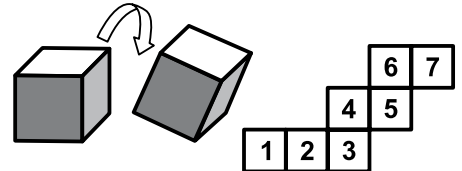
A. 1 en 5   **B.** 1 en 6   **C.** 1 en 7   **D.** 2 en 6   **E.** 2 en 7

14. How many degrees is angle A in the picture alongside?

**A.** 35   **B.** 42   **C.** 57
D. 65   **E.** 109

15. The numbers 2, 5, 7 and 12 have been written on four index cards.
The back of these cards contain remarks:
• "divisible by 7",
• "less than 10",
• "odd",
• "greater than 100".
None of the four remarks is correct for the number shown on the front of the card.
Which number is shown on the front for the remark "greater than 100"?

A. 2   **B.** 5   **C.** 7   **D.** 12   **E.** impossible to tell

16. We have a large equilateral triangle with sides of 6 cm.
We cut off small equilateral triangles from the corners. These triangles are the same size.
The three small triangles combined have the same perimeter as the remaining grey hexagon.
How many cm is the length of the side of a small triangle?
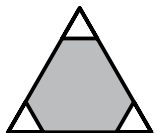
A. 1   **B.** 1,2   **C.** 1,25   **D.** 1,5   **E.** 2

17. Tim has five cubes.
When he orders them from small to large, two neighbouring cubes will always differ in height by 2 cm.
When Tim puts the two smallest cubes on top of each other, their height is the same as that of the largest cube.
When Tim puts all five cubes on top of each other, what will be the height in cm?

A. 6   **B.** 14   **C.** 22   **D.** 44   **E.** 50

18. In the equality alongside, like figures denote like digits.
Different figures represent different digits. Every digit is greater than 1.
How many digits could be represented by a triangle, if the equality is correct?
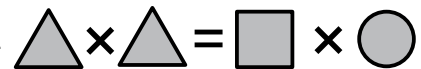
A. 1   **B.** 2   **C.** 3   **D.** 4   **E.** 5

19. Some mice have been stealing pieces of cheese all day.
Lazy cat Tom noticed that all mice have stolen different numbers of pieces of cheese.
Every mouse has stolen fewer than 10. And no mouse has stolen twice as many pieces as another mouse.
What is the largest number of cheese stealing mice that Tom could have seen?

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

20. Mrs Gardener is growing strawberries and green beans in her garden.
Last year the part for beans was a rectangle.
This year she has extended the small sides by 3 meter.
This way the part for beans became a square.
The part for strawberries got 15 m2 smaller.
How many m^2 was the part for beans last year?
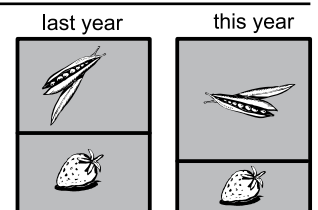
**A.** 5   **B.** 9   **C.** 10   **D.** 15   **E.** 18

21. Each time the talking fairy tale square tells the truth, its sides shrink 2 cm.
Each time it lies, its perimeter doubles, but it remains a square. The square has just spoken four sentences.
Two sentences were true, two were lies. We do not know which ones were true.
Before these four sentences were spoken, the square had sides of 8 cm.
How many cm is the largest possible perimeter of the fairy tale square now?

A. 64   **B.** 80   **C.** 88   **D.** 112   **E.** 124

22. An airport has a horizontal escalator that is 500 m long.
The escalator moves at a speed of 4 km/hour. Emma and Danny step onto the escalator simultaneously.
Emma walks at a speed of 6 km/hour, Danny stays put on the escalator.
How many metres will Emma be ahead of Danny when she reaches the end of the escalator?

A. 100   **B.** 160   **C.** 200   **D.** 250   **E.** 300

23. Three line segments divide a large triangle in four small triangles and three small quadrilaterals.
The perimeters of all quadrilaterals add up to 25 cm.
The perimeters of all triangles add up to 20 cm.
The perimeter of the large uncut triangle is 19 cm.
What will be the result if you add up the lengths of the three line segments?
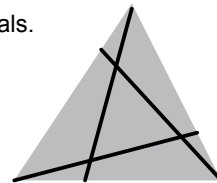
A. 11 cm   **B.** 12 cm   **C.** 13 cm   **D.** 15 cm   **E.** 16 cm

24. The tango is danced in pairs, one man and one woman. At a dance night no more than 50 persons were present.
At a certain moment, a fraction of 3/4 of the men were dancing with a fraction of 4/5 of the women.
How many people were dancing then?

A. 20   **B.** 24   **C.** 30   **D.** 32   **E.** 46

25. The numbers from 1 through 12 have been written down in a circle.
The difference between two numbers that are next to each other is always 2 or 3.
Which numbers will have to be next to each other?
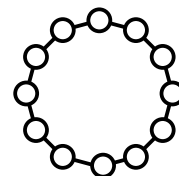
A. 3 en 5   **B.** 4 en 6   **C.** 5 en 8   **D.** 6 en 8   **E.** 7 en 9

26. Some three digit numbers have a curious property.
If you remove the first digit, you will get a square.
Do you remove the last digit, then you will also get a square.
What is the result when you add up all numbers with this property?

A. 1177   **B.** 1344   **C.** 1629   **D.** 1829   **E.** 1993

27. Somebody draws an equilateral triangle, with centre M.
He also draws the triangle that he gets when he rotates this triangle 3° clockwise around M.
He also draws the triangle that he gets when he rotates the second triangle 9° clockwise around M.
He also draws the triangle that he gets when he rotates the third triangle 27° clockwise around M.
Etcetera. Each time the angle of rotation becomes 3 times as big.
How many different triangles, including the initial one, will he draw?
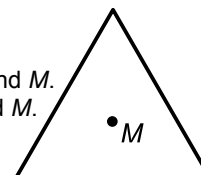
A. 5   **B.** 6   **C.** 7   **D.** 8   **E.** more than 8

28. The number 2012 is written down 2012 times in a row.
We will get a huge number this way.
This huge number is divided by 9.
What is the remainder?

A. 0   **B.** 3   **C.** 5   **D.** 7   **E.** 8

29. M is the midpoint of side AB of square $ABCD$.
MN is perpendicular to the diagonal AC.
What is the ratio area of triangle MNC : area square $ABCD$?
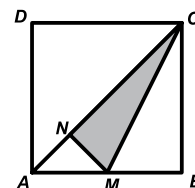
A. 1:5   **B.** 1:6   **C.** 3:16   **D.** 7:36   **E.** 7:40

30. Every box of a 3x3 table contains a positive number. When you multiply the numbers in a row you will always get 1.
When you multiply the numbers in a column, you will also get 1 always.
When you multiply the numbers in a 2x2 part of the table, you will always get 2.
What is the number in the central box of the table?

A. $\frac{1}{8}$ **B.** $\frac{1}{4}$ **C.** 4   **D.** 8   **E.** 16