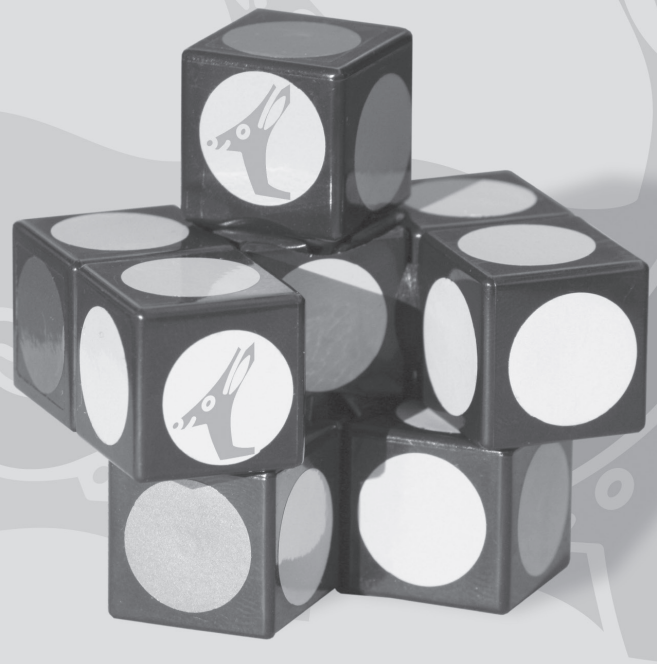
wizBRAIN 2013

wereldwijde wiskundewedstrijd

W4Kangoeroe

www.w4kangoeroe.nl

March 21st 2013



Good luck and most of all have fun.

calculators are not allowed

you may use 75 minutes

scribbling paper is allowed

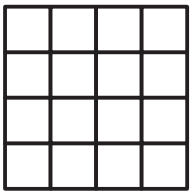
results and prizes will arrive at school in May

answers will be posted on the website March 28th

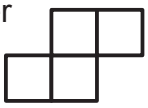
solutions will be posted on the website April 19th

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

1. *Mary* has a square piece of paper:



She uses scissors to cut out the largest number possible of pieces as shown:
How many squares are left over?



A. 0 **B.** 1 **C.** 2 **D.** 3 **E.** 4

---

2. When you multiply the digits of the number 23 you will get 2 x 3 = 6.
When you add the digits you will get 2 + 3 = 5.
Now take the smallest number of two digits that give 24 when multiplied.
What is the outcome when you add the digits of that number?

A. 6 **B.** 8 **C.** 9 **D.** 10 **E.** 11

---

3. *Eve* lights a candle every ten minutes.
Each candle burns for 40 minutes and then goes out.
How many candles are burning 55 minutes after *Eve* has lit her first candle?

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

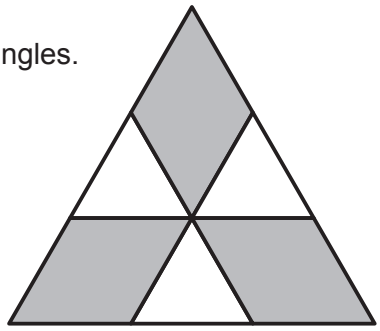
---

4. Three positive whole numbers are multiplied two by two.
The outcomes of the multiplications are 10, 14 and 35.
What is the outcome when you add the three numbers?

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

---

5. The large triangle is equilateral and its area is 9.
It is divided into three equal rhombuses and three equal triangles.
What is the total area of the three rhombuses?



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

---

6. A bag contains balls of five different colours. Two are red, three are blue, ten are white, four are green and three are black. You take a number of balls from the bag without looking. You want to be sure to have taken two balls of the same colour.
How many balls do you have to take at least, then?

A. 2 **B.** 5 **C.** 6 **D.** 10 **E.** 12

---

7. Sea water consists of water and salt.
The amounts of salt and water in the sea around Cyprus have the weight proportion 7 : 193.
How many kg salt is there in 1000 kg sea water?

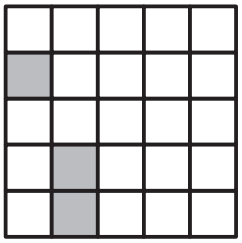
A. 35 **B.** 186 **C.** 193 **D.** 200 **E.** 350

---

8. The average number of children of five families cannot be equal to

A. 0,2 **B.** 1,2 **C.** 2,2 **D.** 2,4 **E.** 2,5

9. *Dana* and *Eve* are playing 'battleship' on a 5x5 rectangle.
Dana has already placed two ships (length one and length two); see picture.
She still has to place a three block ship.
Ships are not allowed to touch each other, not even at one point.
How many possibilities does *Dana* have for her third ship?



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

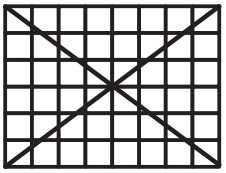
---

10. We know $\frac{1111}{101} = 11$.
What is the outcome of $\frac{3333}{101} + \frac{6666}{303}$?

A. 5 **B.** 9 **C.** 11 **D.** 55 **E.** 99

---

11. In a rectangle of 6 by 8 squares, 24 squares are not intersected by a diagonal, as you can see in the picture.
Now you draw a rectangle of 6 by 10 squares.
How many squares are not intersected by a diagonal now?



A. 24 **B.** 28 **C.** 29 **D.** 30 **E.** 32

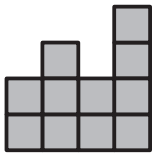
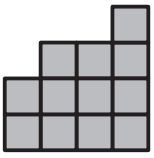
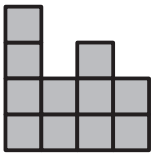
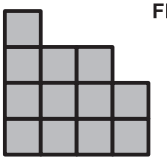
---

12. *Charles* has made a construction out of cubes.
Alongside you can see the construction from above.
Every square shows the number of cubes that are on top of each other.
What does *Charles* see when he looks at the construction from the back?

BACK

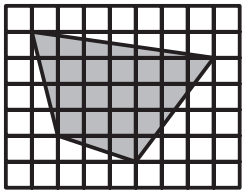
4	2	3	2
3	3	1	2
2	1	3	1
1	2	1	2

FRONT

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

---

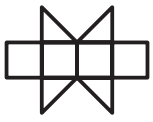
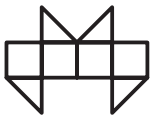
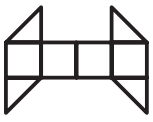
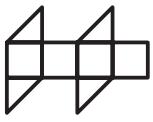
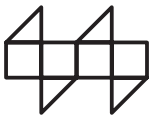
13. Here you see a quadrilateral on squared paper.
Each square is 2 by 2 cm.
What is the area of the quadrilateral?



A. 20 cm^2 **B.** 21 cm^2 **C.** 42 cm^2 **D.** 80 cm^2 **E.** 84 cm^2

---

14. Which of the following figures cannot be folded into a cube?

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

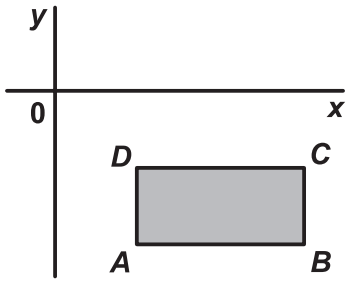
---

15. *Jo* has written down a number of consecutive integers.
Which of the following percentages cannot be the percentage of odd numbers?

A. 40% **B.** 45% **C.** 48% **D.** 50% **E.** 60%

---

16. Rectangle *ABCD* has been drawn in a plane with coordinate axes.
The sides are parallel to the axes.
The rectangle is below the *x*-axis and to the right of the *y*-axis, as shown in the picture. For each of the points *A*, *B*, *C*, *D* we divide the *y*-coordinate by the *x*-coordinate.
For which point does the outcome have the smallest value?



A. *A* **B.** *B* **C.** *C* **D.** *D*
E. depends on the rectangle

17. Using the same digits as those of the number 2013, we write down all possible four-digit integers, from small to large.
What is the largest difference between two consecutive numbers?

A. 198 **B.** 693 **C.** 702 **D.** 703 **E.** 793

---

18. *Dana* and *Pjotr* were born in the same month, *Eve* and *Fred* were also born in the same month. *Dana* and *Fred* were born on the same day of different months and also *Pjotr* and *Charles* differ by exactly one month.
Their dates of birth are 12-03-2000, 12-04-2000, 20-02-2001, 20-03-2001 and 23-04-2001.
Which of these children is youngest?

A. *Dana* **B.** *Eve* **C.** *Fred* **D.** *Charles* **E.** *Pjotr*

---

19. *Dana* is baking six pancakes, one by one, numbered from 1 through 6: the first pancake is number 1, the second is number 2, etcetera.
Sometimes a child runs into the kitchen and eats the warmest pancake.
In which order can the pancakes not be eaten?

A. 123456 **B.** 125436 **C.** 325461 **D.** 456231 **E.** 654321

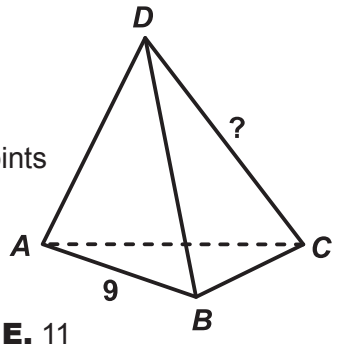
---

20. *Fred* and *Charles* will be running against each other.
Because *Charles* runs $\frac{9}{8}$ times as fast as *Fred*, *Charles* starts running half a lap behind.
They start at the same time.
How many laps will *Fred* have run when *Charles* overtakes him for the first time?

A. 4 **B.** 6 **C.** 8 **D.** 9 **E.** 72

---

21. At each of the four vertices and along each of the six edges of a pyramid one of the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 11 is written (10 was skipped).
Each number is used only once.
The number at each edge is the sum of the two numbers at the endpoints of that edge. (You will get the sum by adding those two numbers.)
Along edge *AB* the number 9 is written; see the picture.
Which number is written along edge *CD*?



A. 4 **B.** 5 **C.** 6 **D.** 8 **E.** 11

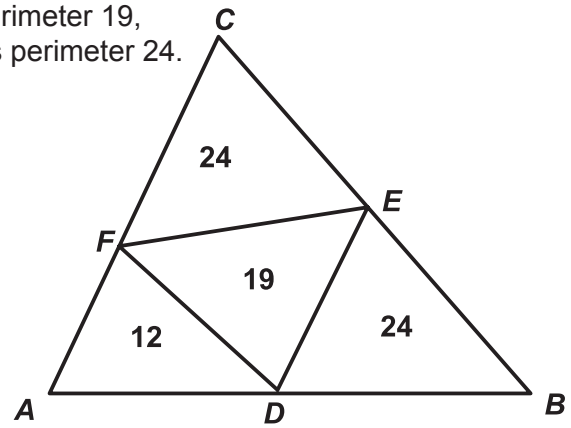
---

22. "Each of my children has as many children as they have siblings," *Nazeli* tells, "my age is the number of children and grandchildren together."
We know that *Nazeli* is between 60 and 75 years old.
How old is *Nazeli*?

A. 62 **B.** 64 **C.** 67 **D.** 70 **E.** 72

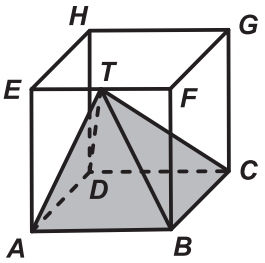
---

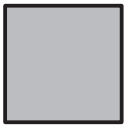
23. Triangle *ADF* has perimeter 12, triangle *DEF* has perimeter 19, triangle *DBE* has perimeter 24 and triangle *FEC* has perimeter 24.
What is the perimeter of triangle *ABC*?



A. 38 **B.** 41 **C.** 43 **D.** 47 **E.** 49

24. Here you see drawn a vitreous cube *ABCD.EFGH*.
In this cube a wooden pyramid *T.ABCD* is placed.
Top *T* is midpoint of edge *EF*.
Which of the following pictures is not a view of the cube with pyramid?



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

---

25. A gardener has to plant 20 trees along a path: oak trees and lime trees.
Between two oak trees there cannot be exactly three trees.
What is the largest number of oak trees that the gardener could possibly plant?

A. 8 **B.** 10 **C.** 12 **D.** 14 **E.** 16

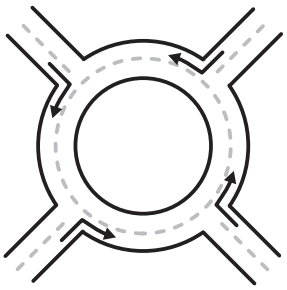
---

26. *Fred* and *Charles* ran a marathon yesterday.
Fred finished in front of twice as many runners as finished before *Charles*.
Charles finished in front of one and a half as many runners as finished before *Fred*.
Fred came in 21st.
How many people ran the marathon?

A. 31 **B.** 41 **C.** 51 **D.** 61 **E.** 71

---

27. Four cars get onto a roundabout at the same time from different directions, see picture. None of the cars complete the circle and at each exit one car leaves the roundabout.



How many different ways of leaving the roundabout are there for the four cars?

A. 9 **B.** 12 **C.** 15 **D.** 24 **E.** 81

---

28. *Eve* writes down a sequence of numbers. She starts with 1, -1.
She then multiplies the last two numbers written down and writes down the outcome.
The third number is 1 x -1 = -1 and the fourth number is -1 x -1 = 1.
When *Eve* has written down 2013 numbers she adds all numbers.
What answer does *Eve* get?

A. -1006 **B.** -671 **C.** 0 **D.** 671 **E.** 1007

---

29. *Dana* has chosen a five-digit number.
Then she crossed out one of the digits.
She adds the number she gets this way to the number first chosen. The answer is 52713.
What is the outcome when you add the digits of the first chosen number?

A. 17 **B.** 19 **C.** 20 **D.** 23 **E.** 26

---

30. The three largest divisors of a positive whole number *N* that are not equal to *N* itself, are added. The sum is more than *N*.
What is certainly true?

A. *N* can be divided by 4 **B.** *N* can be divided by 5 **C.** *N* can be divided by 6
D. *N* can be divided by 7 **E.** Such a number N does not exist