wizPROF 2025

WERELDWIJDE WISKUNDEWEDSTRIJD

W4 KANGOEROE 2025

WWW.W4KANGOEROE.NL

COMPETITION PERIOD
MARCH 20 TO 31

GOOD LUCK AND MOST OF ALL HAVE FUN !

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- calculators are not allowed
- you may use 75 minutes
- only a pencil, an eraser and scribbling paper are allowed
- results and prizes will arrive at school at the end of May
- answers will be posted on the website about April 4th
- solutions will be posted on the website about April 20th

wizPROF
havo 4 & 5
vwo 3, 4, 5 & 6

1. *Lisa* has four wooden digits.
She can use them to form the number 2025.

How many different numbers greater than 2025 can she form with these digits?

A. 3   **B.** 6   **C.** 8   **D.** 9   **E.** 11

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2. A recipe requires 1 cup of rice and $1\frac{1}{2}$ cups of water.
Ad wants to use $1\frac{1}{2}$ cups of rice.

How many cups of water does he need?

A. 1   **B.** $1\frac{1}{4}$ **C.** $1\frac{3}{4}$ **D.** $2\frac{1}{4}$ **E.** $2\frac{1}{2}$

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3. In which of the following hexagons is exactly one-third of the area black and exactly half of the area white?

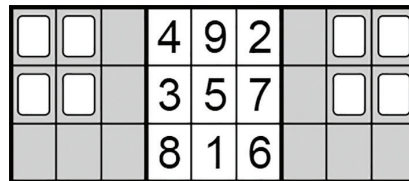**A.**   **B.**   **C.**   **D.**   **E.**

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4. The base of a triangle increases by 50% and its height decreases by one-third.

What is the ratio *area new triangle* **:** *area original triangle*?

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

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5. The leaflet shown has transparent windows, allowing you to see some numbers even when the flaps are folded over.

If you fold both flaps over, what is the sum of the numbers that can be seen through the windows?

A. 7   **B.** 9   **C.** 12   **D.** 14   **E.** 15

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6. The Kangaroo contest took place every year on the third Thursday of March.

Which date was the earliest possible day for the Kangaroo contest?

A. 14 March   **B.** 15 March   **C.** 20 March   **D.** 21 March   **E.** 22 March

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7. *Alex* starts with a square piece of paper and folds it along a diagonal to create a triangle.
Then, he folds the paper again so that one of the short sides of the triangle lies on top of the long side of the triangle, forming the smaller triangle *AXC*, as shown.
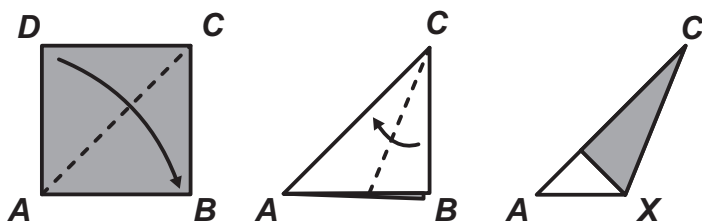
What is the size of angle *AXC*?

A. 108°   **B.** 112.5°   **C.** 120°   **D.** 145°   **E.** 157.5°

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8. *Luka* has some dogs, rabbits and cats.
Eight of his pets are not dogs, five are not rabbits and seven are not cats.

How many pets does *Luka* have?

**A.** 10   **B.** 11   **C.** 15   **D.** 16   **E.** 20

9. A circle with center *O* and a radius of 10 cm is given.
Inside this circle, a square with vertices *O*, *P*, *Q* and *R* is drawn,
where point *Q* lies on the circumference of the circle.
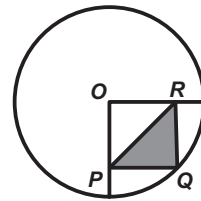
What is the area of triangle *PQR* in cm² ?

A. 2.5   **B.** 25   **C.** 50   **D.** 75   **E.** 100

10. An athlete has two gold medals and five silver medals.
The medals are numbered from 1 to 7, in a certain order.
In each of the six black-and-white photos of the medals, exactly
one gold medal is shown.
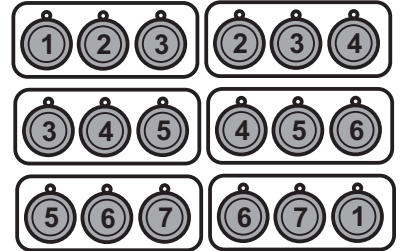
What is the sum of the numbers on the two gold medals?

A. 7   **B.** 8   **C.** 9   **D.** 10   **E.** 11

11. The four-digit number 80□□ is missing its last two digits.
We know that this number is divisible by both 8 and 9.

What is the product of the last two digits?

A. 6   **B.** 16   **C.** 20   **D.** 24   **E.** 48

12. *Anna* is looking at a photo on her smartphone.
The photo has a format of 16:9 and fills the entire screen.
When she rotates the smartphone, the photo gets smaller.

What fraction of the screen is taken up by the smaller photo?

A. $\frac{3}{4}$ **B.** $\frac{9}{16}$ **C.** $\frac{27}{64}$ **D.** $\frac{32}{81}$ **E.** $\frac{81}{256}$

13. $\frac{1}{19}$ of *Kate's* age is equal to $\frac{1}{17}$ of *Tom's* age.
The sum of their ages is between 40 and 100.

What is *Kate's* age?

**A.** 19   **B.** 34   **C.** 38   **D.** 57   **E.** 76

14. *Paul* shoots 27 times at two circular targets within a rectangular goal area.
He hits 50% of the shots aimed at the top-left target and 80% of the shots aimed
at the bottom-right target.
In total, he misses 9 shots.
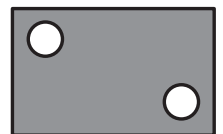
How many times did he hit the top-left target?

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

15. Five bricks are stacked on the ground, as shown.
Peter can only remove a brick if there are no other bricks on top of it.
He randomly selects one of the available bricks to remove and continues doing so until all the bricks are
gone.
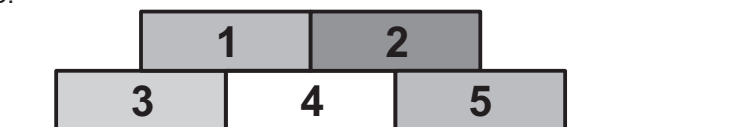
What is the probability that the brick numbered 4 will be the third one he removes?

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

16. *David* wants to place the numbers 1 to 8 in the eight cells of the diagram, with one number in each cell. The cells containing consecutive numbers (for example 1 and 2, or 4 and 5) may not share a side or a vertex.
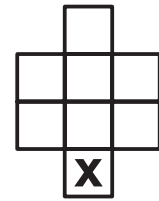
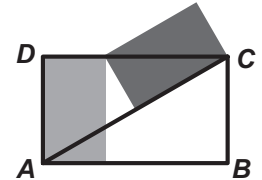Which numbers can be placed in the cell marked X?

A. 1 or 8   **B.** 2 or 7   **C.** 3 or 6   **D.** 4 or 5   **E.** 7 or 8

17. The number *N* is the largest six-digit number with the product of all its digits equals 180.

What is the sum of the digits of *N*?

A. 16   **B.** 20   **C.** 21   **D.** 22   **E.** 24

18. The two shaded rectangles are congruent and both have an area of 4.

What is the area of rectangle *ABCD*?

A. $4\sqrt{3}$ **B.** 8   **C.** 10   **D.** 12   **E.** $8\sqrt{3}$

19. The product of three prime numbers is 11 times as big as their sum S.

What is the maximum possible value of S?

A. 14   **B.** 17   **C.** 21   **D.** 25   **E.** 26

20. *Sara* has a bag of 18 balls, numbered from 1 to 18.

What is the smallest number of balls *Sara* must remove to ensure she has removed at least three balls with prime numbers on them?

A. 11   **B.** 12   **C.** 13   **D.** 14   **E.** 15

21. In square *ABCD*, two rectangles are drawn.
The dimensions are shown in the figure.
The overlapping area of the rectangles is 18 cm².
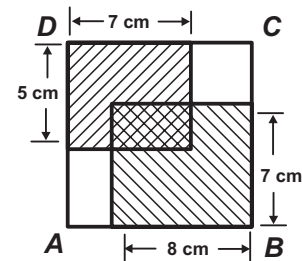
What is the perimeter of square *ABCD* in cm?

**A.** 28   **B.** 34   **C.** 36   **D.** 38   **E.** 40

22. A four-digit number *A* $\square\square$ *B*, where *B* is not equal to *A*, is multiplied by *B*.
This gives a new four-digit number *B* $\square\square$ *A*,
where the first and last digits of the original number are swapped.

How many four-digit numbers *A* $\square\square$ *B* exist that have this property?

A. 1   **B.** 2   **C.** 9   **D.** 10   **E.** 11

23. *Daniël* numbers squares on grid paper.
Each square has a side length of 0.5 cm.
He starts with number 1 and then numbers the squares 2, 3, 4, 5, and so on, in a counter-clockwise spiral, as shown in the figure.
He stops once he has numbered 2025 squares and looks at the shape formed by all the numbered squares.
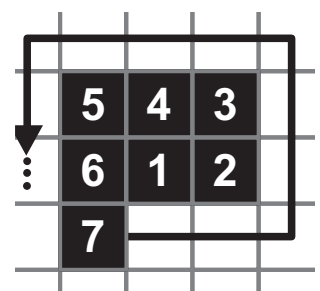
What is the perimeter of this shape in cm?

A. 25   **B.** 45   **C.** 80   **D.** 90   **E.** 180

24. *ABCDEF* is a six-digit number made up of the digits 1, 2, 3, 4, 5 and 6, with each digit used exactly once.
The following conditions are true:
- The first two digits *AB* form a number divisible by 2.
- The first three digits *ABC* form a number divisible by 3.
- The first four digits *ABCD* form a number divisible by 4.
- The first five digits *ABCDE* form a number divisible by 5.
- The entire number *ABCDEF* is divisible by 6.

What is the sixth digit *F*?

A. 1   **B.** 2   **C.** 4   **D.** 6   **E.** both 4 and 6 are possible

25. In the diagram, the diameter of the small circle lies on the diameter of the large circle.
The large circle has a chord of length 16 that is parallel to its diameter and is tangent to the small circle.
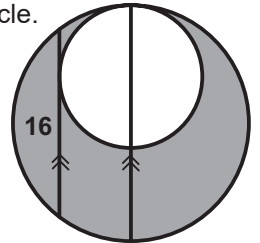
What is the area of the shaded region between the two circles?

A. 36π **B.** 49π **C.** 64π **D.** 81π
E. the information provided is not sufficient

26. We have a sequence of numbers a_1, a_2, a_3, a_4, ..., a_{10}.
In this sequence, from the third term onwards, each term is the average of all the previous terms. That is:
- a_3 is the average of a_1 and a_2,
- a_4 is the average of a_1, a_2 and a_3,
- and so on.

We know that $a_1 = 8$ en $a_{10} = 26$. What is the value of a_2?

A. 28   **B.** 32   **C.** 38   **D.** 44   **E.** 50

27. Six circles are arranged in the shape of a triangle, as shown. *John* writes the digits from 1 to 6 inside the circles so that the sums of the numbers on all three sides of the triangle are equal.
He then calculates the sum of the numbers in the three circles at the vertices of the triangle.
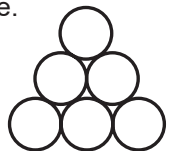
How many different possible values could he obtain for this sum?

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

28. At a party, there are twelve children, including three pairs of twins.
Six blue hats and six red hats are distributed among the children.
Both children in each pair of twins always wear hats of the same colour.

How many ways are there to distribute the hats?

**A.** 72   **B.** 86   **C.** 90   **D.** 92   **E.** 102

29. *Anastasia* wants to place the numbers from 1 to 8 into the cells of a grid with two rows and four columns.
The number in each cell must be smaller than the number in the cell below it.
The numbers in the second, third and fourth column must be bigger than the numbers in the cells to their left.
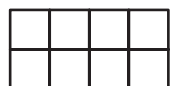
In how many different ways can *Anastasia* fill the grid?

A. 6   **B.** 8   **C.** 10   **D.** 12   **E.** 14

30. Triangle *ABC* has an area of 60.
Point *D* is the midpoint of side *AB*.
Points *E* and *F* divide side *BC* into three equal segments.
Point *G* is the intersection of lines *CD* and *AF*.
Point *H* is the intersection of lines *CD* and *AE*.
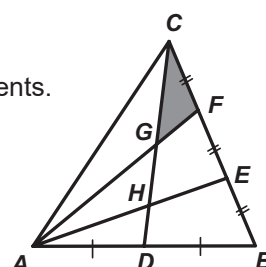
What is the area of triangle *CGF*?

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