

**THURSDAY
MARCH 21ST 2024**



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WERELDWIJDE WISKUNDE WEDSTRIJD

WWW.W4KANGOEROE.NL

**GOOD LUCK AND MOST OF
ALL HAVE FUN !**



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 March 29th



solutions will be posted on the website about April 20th

wizBRAIN
havo 1, 2 & 3
vwo 1 & 2
vmbo 3 & 4 m.u.v. basisberoepsgerichte leerweg.

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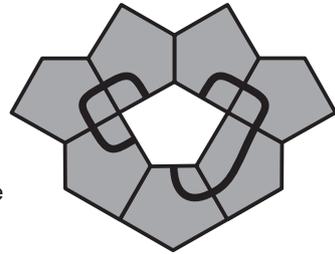
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1. A shape is made of pentagonal tiles of equal size.



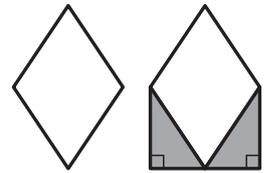
Which of the following tiles can be placed in the space of the shape so that you get two closed curves?



2. Which of the following strings **cannot** be transformed into the cord shown on the right without cutting?



3. The left diagram on the right is a rhombus. Two right-angled triangles are added to this rhombus (see right diagram).



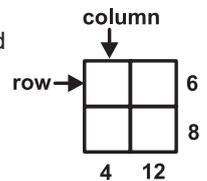
By what percentage has the area increased?

- A. 20% B. 25% C. 30% D. 40% E. 50%

4. What is the value of $\frac{20 \times 24}{2 \times 0 + 2 \times 4}$?

- A. 12 B. 30 C. 48 D. 60 E. 120

5. Four different positive integers are placed on a grid and then covered up. The multiplications of the numbers in each row and in each column are shown next to and below the grid.



What is the addition of the four integers in the grid?

- A. 10 B. 12 C. 13 D. 14 E. 15

6. *Ria* has three coins with the numbers 1, 5 and 11 on them (see picture). She wants to place the three coins side by side to make a four-digit number.



How many different four-digit numbers can *Ria* make?

- A. 3 B. 4 C. 6 D. 8 E. 9

7. In a fruit bowl there are five kinds of fruit: apples, grapes, cherries, strawberries and bananas.

Alwin likes apples.

Cam likes grapes, cherries, strawberries and bananas.

Eva likes apples and cherries.

Ben likes apples, cherries, strawberries and bananas.

Don likes apples, grapes and cherries.

The fruit is shared. Everyone gets a different kind of fruit and everyone gets a kind of fruit that they like.

Who gets the cherries?

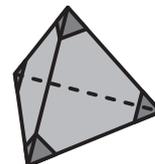
- A. *Alwin* B. *Ben* C. *Cam* D. *Don* E. *Eva*

8. In an elevator, due to weight restrictions, 12 adults or 20 children can be carried.

What is the largest number of children that can be carried in the elevator together with nine adults?

- A. 3 B. 4 C. 5 D. 6 E. 8

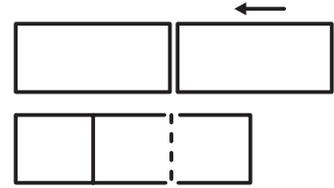
9. *Julio* cuts off the four corners of the regular shape below.



How many vertices does the shape that remains have?

- A. 8 B. 9 C. 11 D. 12 E. 15

10. Two identical rectangles with an area of 18, are slid over each other. The new rectangle has an area of three identical squares.



What is the perimeter of this new rectangle?

- A. 18 B. 20 C. 24 D. 27 E. 36

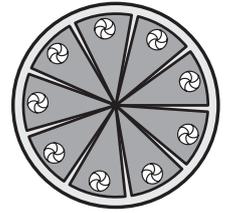
11. The length of a set of four well-parked supermarket trolleys is 108 cm. The length of a set of ten well-parked supermarket trolleys is 168 cm.



What is the length of a single supermarket trolley?

- A. 60 cm B. 68 cm C. 78 cm D. 88 cm E. 90 cm

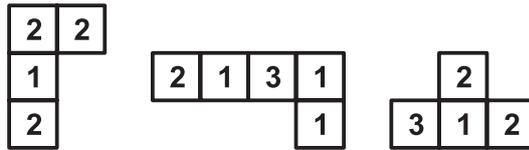
12. *Carina* baked a pie and cut it into ten equal pieces. She ate one piece and then arranged the remaining pieces evenly (see figure).



What is the size of the angle between two pieces of pie?

- A. 1° B. 2° C. 3° D. 4° E. 5°

13. *Werner* wants to make a 4×4 square of four pieces. Three of the four pieces you see alongside.



The addition of the numbers in each row and in each column in this square should always give the same result. You may not turn the pieces.

Which of the following pieces does *Werner* need to complete the square?

- A.

1	1	3
---	---	---

 B.

2	1	0
---	---	---

 C.

1	2	1
---	---	---

 D.

2	2	2
---	---	---

 E.

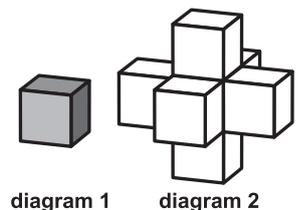
2	2	3
---	---	---

14. *Paula* the penguin goes fishing every day. She always brings twelve fish for her two chicks to eat. Every day she gives seven fish to the chick she sees first. The other chick gets five fish. In the past few days, one of the chicks has eaten 44 fish.

How many fish has the other chick eaten?

- A. 34 B. 40 C. 46 D. 52 E. 58

15. *Johan* has a large number of identical cubes. He made the structure (diagram 2) by sticking another cube on each face of the cube (in diagram 1). Now, he wants to make an even more extended structure by sticking another cube on each face of his structure (diagram 2).



How many extra cubes will he need to complete his extended structure?

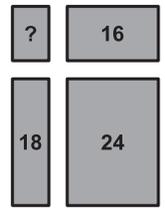
- A. 10 B. 12 C. 14 D. 16 E. 18

16. A kangaroo jumps up a mountain and then jumps back down again along the same route. On the way up, it covers 1 meter per jump. On the way down, it covers 3 meters per jump. In total, the kangaroo makes 2024 jumps.

What is the total distance the kangaroo jumps?

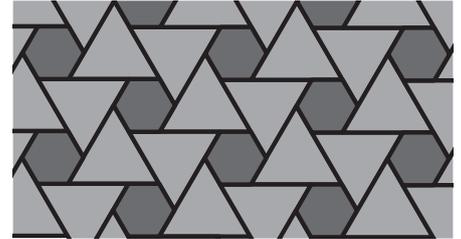
- A. 506 m B. 1012 m C. 2024 m D. 3036 m E. 4048 m

17. *Gerard* cuts a large rectangle into four smaller rectangles. The perimeters of three of these smaller rectangles are 16, 18 and 24, as shown in the diagram.



What is the perimeter of the fourth small rectangle?

- A. 8 B. 10 C. 12 D. 14 E. 16
-
18. Fresh mushrooms consist of 80% water.
Dried mushrooms consist of 20% water.
- By what percentage does the weight of the mushroom decrease during drying?
- A. 60% B. 70% C. 75% D. 80% E. 85%
-
19. *Jerry* the tiler is planning to make a large, square mosaic floor with a repeating pattern. For this he uses hexagonal and triangular tiles, arranged as shown in the diagram. He thinks he will need 3000 hexagonal tiles to make the whole floor.



Approximately, how many triangular tiles will *Jerry* need?

- A. 1000 B. 1500 C. 3000 D. 6000 E. 9000
-
20. Nine cards numbered from 1 to 9 are placed face up on the table. *Aleksa*, *Bart*, *Clara* and *Deindra* take two cards each. *Aleksa* said, "My numbers add up to 6". *Bart* said, "The difference between my numbers is 5". *Clara* said, "The multiplication of my numbers is 18". *Deindra* said, "One of my numbers is twice the other one". All four statements are true.

What number was left on the table?

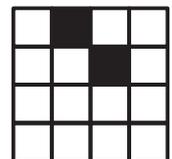
- A. 1 B. 3 C. 6 D. 8 E. 9
-
21. The digits 0 to 9 can be represented by horizontal and vertical black segments (see diagram). For example, the 0 consists of four vertical black segments and two horizontal black segments.



Greg chooses three different digits. In total, his digits have five horizontal and ten vertical black segments.

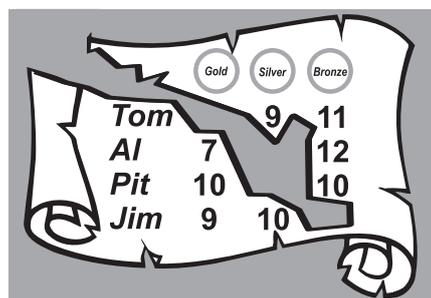
What is the addition of his three digits?

- A. 9 B. 10 C. 14 D. 18 E. 19
-
22. *Amina* wants to shade two more squares in the diagram shown on the right. The resulting pattern has a single axis of symmetry. This axis of symmetry can be horizontal, vertical or diagonal.



In how many different ways can she complete her pattern?

- A. 2 B. 3 C. 4 D. 5 E. 6
-
23. Captain *R.R. Flint* asked four of his pirates to write on a piece of paper how many gold, silver and bronze coins were in the treasure chest. Their responses are shown in the picture.

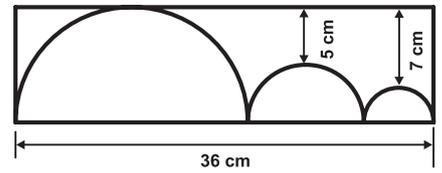


Unfortunately, part of the paper was damaged. Only one of the four pirates told the truth. The other three pirates lied in all their answers. The total number of coins is 30.

Who told the truth?

- A. *Tom* B. *Al* C. *Pit* D. *Jim* E. You can't know that.

24. The diagram on the right shows three semi-circles inside a rectangle.



The middle semi-circle is touching the other two semi-circles. (touches means: lies against it)
 The two outer semi-circles each touch a short side of the rectangle.
 The largest half circle also touches a long side of the rectangle.
 The shortest distances from the long side of the rectangle to the other two semi-circles are 5 cm and 7 cm, as shown.

What is the perimeter, in cm, of the rectangle?

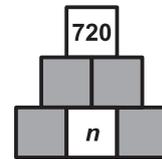
- A. 82 B. 92 C. 96 D. 108 E. 120

25. A group of 50 students sit in a circle. They throw a ball around. Each student who gets the ball, throws it to the sixth student sitting counterclockwise from where they are sitting, who catches it. Freda catches the ball 100 times

In that time, how many students **never** get to catch the ball?

- A. 0 B. 8 C. 10 D. 25 E. 40

26. Mason wants to complete the diagram alongside so that each box will contain the multiplication of the numbers in the two boxes below it. In each box there will be a positive integer. In the top box is the number 720.



How many different values can the integer n take?

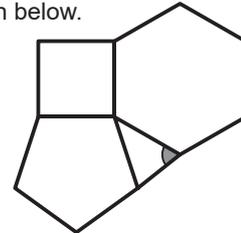
- A. 1 B. 4 C. 5 D. 6 E. 8

27. Farmer Fien sells duck and chicken eggs. She has baskets holding 4, 6, 12, 13, 22 and 29 eggs. Her first customer buys all the eggs in one basket. Fien notices that the number of chicken eggs she now has left is twice the number of duck eggs.

How many eggs did the customer buy?

- A. 4 B. 12 C. 13 D. 22 E. 29

28. A regular pentagon and a regular hexagon are attached to a square as shown below.



What is the size of the marked angle?

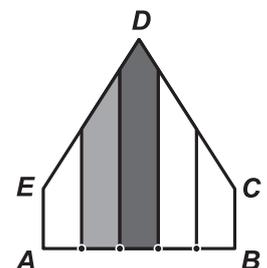
- A. 24° B. 42° C. 60° D. 69° E. 74°

29. Alex drives from point A to point B and then immediately returns to A . Bob drives from point B to point A and then immediately returns to B . They travel on the same road, start at the same time and each travels at a constant speed. Alex's speed is three times Bob's speed. They pass each other for the first time 15 minutes after the start.

How long after the start will they pass each other for the second time?

- A. 20 min B. 25 min C. 30 min D. 35 min E. 45 min

30. In the pentagon $ABCDE$ is $\angle A = \angle B = 90^\circ$, $AE = BC$ en $ED = DC$. Segment AB is divided by four points into five equally wide sections. From these four points, four perpendiculars are drawn upwards (see diagram).



The dark shaded region has an area of 13 cm^2 and the light shaded region has an area of 10 cm^2 .

What is the area, in cm^2 , of the entire pentagon?

- A. 45 B. 47 C. 49 D. 58 E. 60