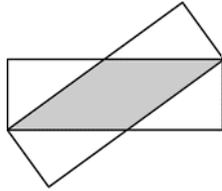**24.** Two identical rectangles with sides of length 3 cm and 9 cm are overlapping as in the diagram. What is the area of the overlap of the two rectangles?

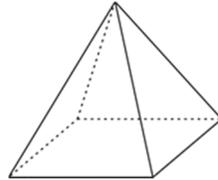(A) 12 cm²   (B) 13,5 cm²   (C) 14 cm²   (D) 15 cm²   (E) 16 cm²

25. A large cube is built using 64 smaller identical cubes. Three of the faces of the large cube are painted. What is the maximum possible number of small cubes that have exactly one face painted?

(A) 27   (B) 28   (C) 32   (D) 34   (E) 40

26. Kanga labelled the vertices of the square-based pyramid using 1, 2, 3, 4 and 5 once each. For each face Kanga calculated the sum of the numbers on its vertices. Four of these sums equalled 7, 8, 9 and 10. What is the sum of the fifth face?
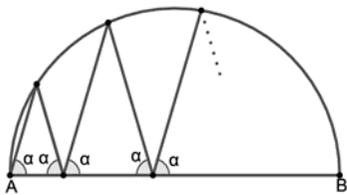
(A) 11   (B) 12   (C) 13   (D) 14   (E) 15

27. Alice, Belle and Cathy had an arm-wrestling contest. In each game two girls wrestled, while the third rested. After each game, the winner played the next game against the girl who had rested. In total, Alice played 10 times, Belle played 15 times and Cathy played 17 times.
Who lost the second game?

(A) Alice   (B) Belle   (C) Cathy
(D) either Alice or Belle could have lost the second game
(E) either Belle or Cathy could have lost the second game

28. In each of the squares, a number should be written so that the sums of the 4 numbers in each row and in each column are the same.
What number goes into the shaded square?

(A) 5   (B) 6   (C) 7   (D) 8   (E) 9

1		6	3
	2	2	8
	7		4
		7	

29. A zig-zag line starts at the point A, at one end of the diameter AB of a circle.
Each of the angles between the zig-zag line and the diameter AB is equal to α as shown.
After four peaks, the zig-zag line ends at the point B.
What is the size of angle α?

(A) 60°   (B) 72°   (C) 75°   (D) 80°   (E) Another answer

30. Eight consecutive three-digit positive integers have the following property: each of them is divisible by its last digit.
What is the sum of the digits of the smallest of the eight integers?

(A) 10   (B) 11   (C) 12   (D) 13   (E) 14

International mathematical contest «KANGAROO»

The time of the contest is 1 hour 15 minutes. There is exactly one correct answer among the answers (A)-(D). The test volume and content do not imply to be solved completely. There can be found some tasks in the test which are not from the school program.
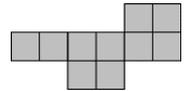
March 29, 2020   **Grade 9-11**

3 point problems

1. The diagram shows a shape made from ten squares of side length 1 cm joined edge to edge. What is the length of its perimeter, in centimetres?

(A) 14   (B) 18   (C) 30   (D) 32   (E) 40

2. When the answers to the following calculations are put in order from smallest to largest, which will be in the middle?

(A) 1+2345   (B) 12+345   (C) 123+45   (D) 1234 + 5   (E) 12345

3. Who is the mother of the daughter of Anne's mom's mom?

(A) Anne's sister   (B) Anne's niece   (C) Anne's mother   (D) Anne's aunt   (E) Anne's grandma

4. When Cosmo wears his new shirt properly as shown on the left, the horizontal stripes form seven closed rings around his waist. This morning he buttoned his shirt wrongly, as shown on the right. How many closed rings were there around Cosmo's waist this morning?

(A) 0   (B) 1   (C) 2   (D) 3   (E) 4

5. The sum of four consecutive integers is 2. What is the least of these integers?

(A) -3   (B) -2   (C) -1   (D) 0   (E) 1

6. In the calculations shown each letter stands for a digit. They are used to make some two-digit numbers. The two numbers on the left have a total of 79. What is the total of the four numbers on the right?

```
      A D
    + C D
A B + A B
+ C D + C B
 7 9    ?
```
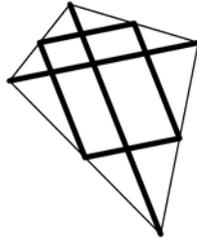
(A) 79   (B) 158   (C) 869   (D) 1418   (E) 7979

7. The years 2020 and 1717 both consist of a two-digit number repeated twice. How many years after 2020 will the next year be which has this property?

(A) 20   (B) 101   (C) 120   (D) 121   (E) 202

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8. Martin made a kite by cutting a straight wooden pole into 6 pieces. He used two of them, of lengths 120 cm and 80 cm, as the diagonals. The remaining four pieces connected the midpoints of the sides of the kite as shown. How long was the pole before it was cut?

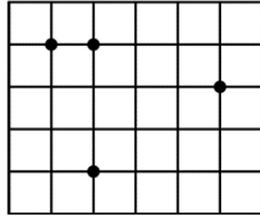(A) 300 cm   (B) 370 cm   (C) 400 cm   (D) 410 cm   (E) 450 cm

9. Mary had ten pieces of paper, some of which were squares, and the rest were triangles. She cuts three squares diagonally from corner to corner. She then counted the total number of vertices of the 13 obtained pieces of paper, which came to 42 vertices. How many triangles did she have before making the cuts?

(A) 8   (B) 7   (C) 6   (D) 5   (E) 4

10. In the given grid, of squares with side length 1, four points are marked. By forming a triangle using three of the given points, what is the smallest area that can be obtained?

(A) 1\2   (B) 1   (C) 3\2   (D) 2   (E) 5\2

4 point problems

11. Helen wants to spend 18 consecutive days visiting her Grandma. Her Grandma reads her story books on story days Tuesday, Saturday and Sunday. If Helen wants to spend the greatest amount of story days with her Grandma, on which day of the week should she start her visit?
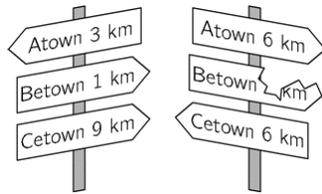
(A) Monday   (B) Tuesday   (C) Friday (D) Saturday   (E) Sunday

12. If a, b, c and d are integers satisfying $ab=2cd$, which of the following numbers could not be the value of the product $abcd$?

(A) 50   (B) 100   (C) 200   (D) 450   (E) 800

13. The shortest path from Atown to Cetown runs through Betown. Walking on this path from Atown to Cetown we would first find the signpost shown on the left. Later we would find the signpost shown on the right. What distance was written on the broken sign?
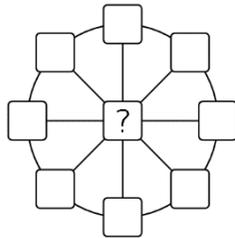
(A) 1 km   (B) 2 km   (C) 3 km   (D) 4 km   (E) 5 km

14. An isosceles triangle has a side of length 20 cm. Of the other two side lengths, one is equal to 2/5 of the other. Which of the following values is the perimeter of this triangle?

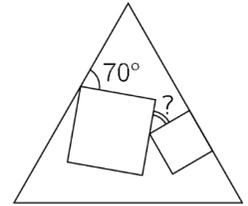(A) 36 cm   (B) 48 cm   (C) 60 cm   (D) 90 cm   (E) 120 cm

15. In each of the nine cells of the figure shown a number shall be written so that the sum of the three numbers on each diameter is 13 and the sum of the eight numbers on the circumference is 40. What number must be written in the central cell?

(A) 3   (B) 5   (C) 8   (D) 10   (E) 12

16. Two squares of different size are drawn inside an equilateral triangle. One side of one of these squares lies on one of the sides of the triangle as shown. What is the size of the angle marked by the question mark?

(A) 25°   (B) 30°   (C) 35°   (D) 45°   (E) 50°

17. Masha put a multiplication sign between the 2nd and 3rd digits of the number 2020 and noted that the resulting product 20 · 20 is a square number. How many numbers between 2010 and 2099 (including 2020) have the same property?

(A) 1   (B) 2   (C) 3   (D) 4   (E) 5

18. Luca began a 520 km trip by car with 14 litres of fuel in the car tank. His car consumes 1 litre of fuel per 10 km. After driving 55 km, he reads a road sign showing the distances from that point to five petrol stations ahead on the road. These distances are 35 km, 45 km, 55 km, 75 km and 95 km. The capacity of the car's fuel tank is 40 litres and Luca wants to stop just once to fill the tank. How far is the petrol station that he should stop at?
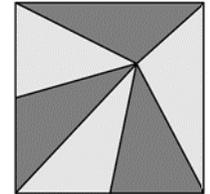
(A) 35 km   (B) 45 km   (C) 55 km   (D) 75 km   (E) 95 km

19. Let $17x+51y=102$. What is the value of $9x+27y$?

(A) 54   (B) 36   (C) 34   (D) 18   (E) The value is undetermined.

20. A square shaped stained glass window of 81 dm² is made out of six triangles of equal area (see figure). A fly is sitting exactly on the spot where the six trangles meet. How far from the bottom of the window is the fly sitting?

(A) 3 dm   (B) 5 dm   (C) 5.5 dm   (D) 6 dm   (E) 7.5 dm

5 point problems

21. The digits from 1 to 9 are randomly arranged to make a 9-digit number. What is the probability that the resulting number is divisible by 18?

(A) 1/2   (B) 4/9   (C) 5/9   (D) 1/3   (E) 3/4

22. A hare and a tortoise competed in a 5 km race along a straight line. The hare is five times faster than the tortoise. The hare mistakenly started perpendicular to the route. After a while he realized his mistake, then turned and ran straight to the finish point. He arrived at the same time as the tortoise. What is the distance between the hare's turning point and the finish point?

(A) 11 km   (B) 12 km   (C) 13 km   (D) 14 km   (E) 15 km

23. There are some squares and triangles on the table. Some of them are blue and the rest are red. Some of these figures are large and the rest are small. We know that
1. If the figure is large, it's a square;
2. If the figure is blue, it's a triangle.
Which of the statements A--E must be true?

(A) All red figures are squares.   (B) All squares are large.   (C) All small figures are blue.
(D) All triangles are blue.   (E) All blue figures are small.