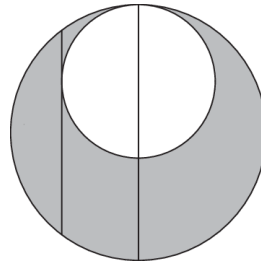


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9.-10. klase

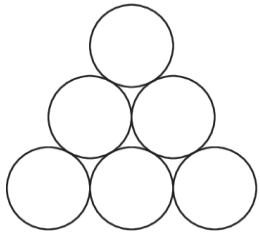
25. In the diagram, the diameter of the inner circle forms part of the diameter of the outer circle. The outer circle has a chord of length 16 that is parallel to its diameter and is also a tangent to the inner circle. What is the area of the shaded region?

- (A)  $36\pi$  (B)  $49\pi$  (C)  $64\pi$   
(D)  $81\pi$  (E) the information provided is not sufficient



26. A sequence of numbers  $a_1, a_2, a_3, a_4, \dots, a_{10}$  is such that from the third term onwards, each term is equal to the mean of all the previous terms. That is,  $a_3$  is the mean of  $a_1$  and  $a_2$ ;  $a_4$  is the mean of  $a_1, a_2$ , and  $a_3$ ; and so on. In this sequence  $a_1 = 8$  and  $a_{10} = 26$ . What is the value of  $a_2$ ?

- (A) 28 (B) 32 (C) 38 (D) 44 (E) 50

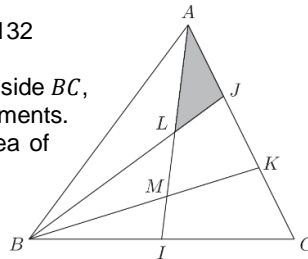


27. Six circles are arranged in the shape of a triangle, as shown. John writes the digits from 1 to 6 inside the circles so that the sums of the numbers in the circles on all three sides of this triangle are the same. He then calculates the sum of the numbers in the three circles at the vertices of the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

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

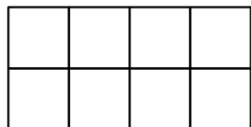
28. At a party, there are twelve children, including three pairs of twins. How many ways are there to distribute six blue hats and six red hats to the children, so that in each pair of twins, both children are wearing hats of the same colour?

- (A) 72 (B) 86 (C) 92 (D) 102 (E) 132



29. Triangle  $ABC$  has an area of 60. Point  $I$  is the midpoint of side  $BC$ , and the points  $J$  and  $K$  divide side  $AC$  into three equal segments. Point  $L$  is the intersection of  $AI$  and  $BJ$ . Find the area of triangle  $ALJ$ .

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



30. Anastasia wants to write the numbers from 1 to 8 into the cells of a  $2 \times 4$  grid. The number in each cell must be smaller than the number in the cell to its right and smaller than the number in the cell below it. In how many different ways can Anastasia fill the grid?

- (A) 6 (B) 8 (C) 10 (D) 12 (E) 14

### 3 point problems

1. The leaflet shown includes transparent windows that allow you to see what is underneath when the leaflet is folded into thirds. What is the sum of the numbers that can be seen through the windows when the leaflet is folded?

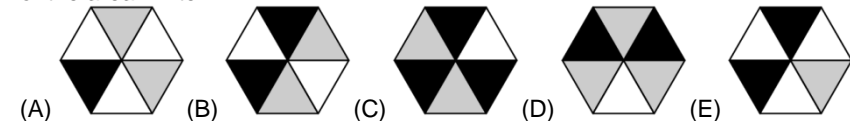
		4	9	2		
		3	5	7		
		8	1	6		

- (A) 7 (B) 9 (C) 12 (D) 14 (E) 15

2. The base of a triangle increases by 50% and its height decreases by one-third. What is the ratio of the area of the new triangle to that of the original triangle?

- (A) 2:1 (B) 1:1 (C) 1:2 (D) 1:3 (E) 1:4

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



4. Kangaroo Day takes place every year on the third Thursday of March. Which date is the earliest possible day for Kangaroo Day?

- (A) 14/3 (B) 15/3 (C) 20/3 (D) 21/3 (E) 22/3

5. A recipe requires 1 cup of rice and  $1\frac{1}{2}$  cups of water. Rouven wants to use  $1\frac{1}{2}$  cups of rice. How many cups of water does he need?

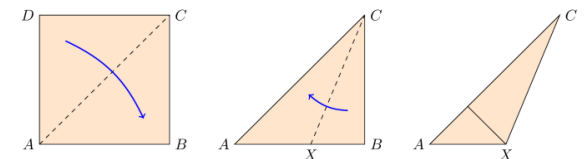
- (A) 1 (B)  $1\frac{1}{4}$  (C)  $1\frac{3}{4}$  (D)  $2\frac{1}{4}$  (E)  $2\frac{1}{2}$

6. 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?

2 0 2 5

- (A) 3 (B) 6 (C) 8 (D) 9 (E) 11

7. Alex folds the square  $ABCD$  along a diagonal to form the triangle  $ABC$ . Then he folds the triangle  $ABC$  so that the side  $BC$  of this triangle lies on top of the side  $AC$ , forming the smaller triangle  $AXC$ , as shown. What is the size of angle  $AXC$ ?

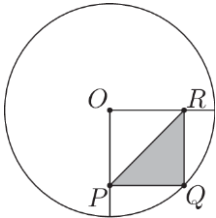


- (A)  $108^\circ$  (B)  $112.5^\circ$  (C)  $120^\circ$  (D)  $145^\circ$  (E)  $157.5^\circ$

Laiks uzdevumu risināšanai – 75 minūtes!

8. The 4-digit number  $80\square\square$  is missing its last two digits. The number is divisible by 8 and 9. What is the product of these two missing digits?  
 (A) 6 (B) 16 (C) 20 (D) 24 (E) 48

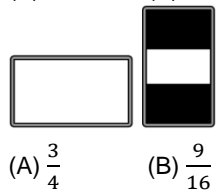
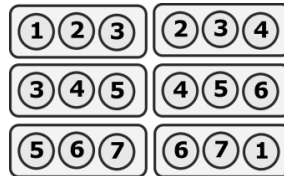
9. Luka has some dogs, some rabbits and some cats. Eight of his pets are not dogs, five of them are not rabbits, and seven of them are not cats. How many pets does Luka have?  
 (A) 10 (B) 11 (C) 15 (D) 16 (E) 20



10. A circle with center  $O$  and radius  $10\text{ cm}$  is given. A square  $OPQR$  is drawn inside the circle, where  $Q$  is a point on the circle. What is the area of the shaded triangle  $PQR$ ?  
 (A)  $12.5\text{ cm}^2$  (B)  $25\text{ cm}^2$   
 (C)  $50\text{ cm}^2$  (D)  $75\text{ cm}^2$  (E)  $100\text{ cm}^2$

4 point problems

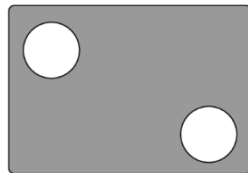
11. An athlete has two gold and five silver medals in his collection. He numbered them from 1 to 7 and took 6 photos in the order shown in the picture. It is known that in each photo exactly one of the medals is gold. What is the sum of the numbers of the two gold medals?  
 (A) 7 (B) 8 (C) 9 (D) 10 (E) 11



12. The photo on Anna's smartphone fills the whole screen. The format is 16:9. When Anna turns the smartphone, the picture gets smaller. What fraction of the screen area is taken up by the smaller picture?  
 (A)  $\frac{3}{4}$  (B)  $\frac{9}{16}$  (C)  $\frac{27}{64}$  (D)  $\frac{32}{81}$  (E)  $\frac{81}{256}$

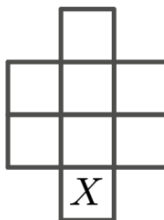
13. Kate and Tom are celebrating their birthday today. Tom notices that  $\frac{1}{19}$  of Kate's age is equal to  $\frac{1}{17}$  of his age. The sum of their ages is greater than 40 and less than 100. How old is Kate?  
 (A) 19 (B) 34 (C) 38 (D) 57 (E) 76

14. Paul shoots a total of 27 times at two targets. He hits 50% of the shots he aims at the top left target and 80% of the shots he aims at the bottom right target. He misses a total of 9 shots. How many times did he aim for and hit the top left target?  
 (A) 4 (B) 5 (C) 6 (D) 7 (E) 8



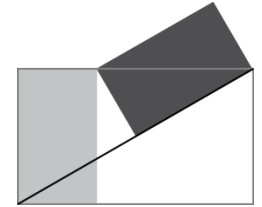
15. Sarah has 18 marbles in her bag, numbered from 1 to 18. What is the smallest number of marbles Sarah should remove without looking in order to guarantee that there are at least three marbles with prime numbers on them?  
 (A) 11 (B) 12 (C) 13 (D) 14 (E) 15

16. David wants to place the numbers 1 to 8 in the eight cells of the diagram, with one number in each cell. He wants the cells that contain two consecutive numbers not to share a side or a vertex. Which numbers can David put in cell marked  $X$ ?  
 (A) 1 or 8 (B) 2 or 7 (C) 3 or 6 (D) 4 or 5 (E) 7 or 8



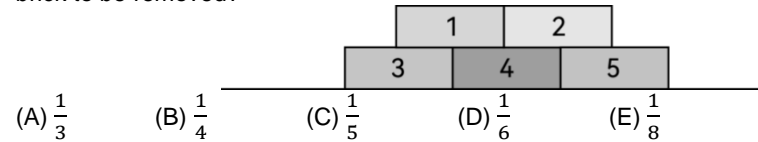
17. The integer  $N$  is the largest six-digit integer with the product of all its digits equal to 180. What is the sum of the digits of  $N$ ?  
 (A) 21 (B) 22 (C) 23 (D) 24 (E) 25

18. The two shaded rectangles are congruent. Each of these rectangles have area 4. What is the area of the large rectangle?  
 (A) 10 (B)  $8\sqrt{3}$  (C) 8 (D) 12 (E)  $4\sqrt{3}$



19. The product of three prime numbers is 11 times more than their sum. Find the largest possible value that sum could take.  
 (A) 14 (B) 17 (C) 21 (D) 25 (E) 26

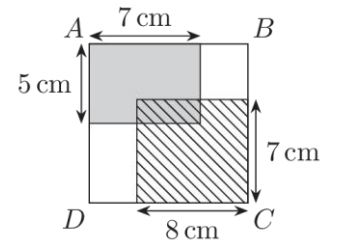
20. Five bricks are placed on the ground, as shown. Peter can only remove a brick if there are no bricks on top of it. He selects one of the available bricks at random and removes it, until all the bricks are removed. What is the probability that the brick numbered 4 is the third brick to be removed?



- (A)  $\frac{1}{3}$  (B)  $\frac{1}{4}$  (C)  $\frac{1}{5}$  (D)  $\frac{1}{6}$  (E)  $\frac{1}{8}$

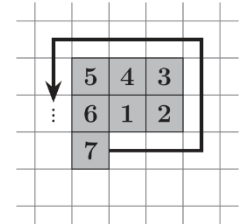
5 point problems

21. The square  $ABCD$  contains two rectangles. One is grey and the other striped, with dimensions as shown in the diagram. The area of the overlapping part of the two rectangles is  $18\text{ cm}^2$ . What is the perimeter  $ABCD$ ?  
 (A) 28 cm (B) 34 cm  
 (C) 36 cm (D) 38 cm (E) 40 cm



22. A four-digit integer  $\overline{ABCD}$  is multiplied by integer  $\overline{D}$ . The result is a different four-digit integer  $\overline{DXYA}$ , that has the units and thousands digits of the original integer interchanged. How many four-digit integers  $\overline{ABCD}$  have this property?  
 (A) 1 (B) 2 (C) 9 (D) 10 (E) 11

23. Garry numbers certain squares on a sheet of grid paper. Each square has a side-length of  $0.5\text{ cm}$ . He writes 1 in one square and then numbers the squares 2, 3, 4, 5, ..., moving in a counter-clockwise direction, as shown. He stops when he has numbered 2025 squares, and looks at the shape made up of all the numbered squares. What is the perimeter of this shape?  
 (A) 25 cm (B) 45 cm (C) 80 cm (D) 90 cm (E) 180 cm



24.  $\overline{ABCDEF}$  is a six-digit integer made up of the digits 1, 2, 3, 4, 5, and 6, with no repeated digits. It is known that two-digit integer  $\overline{AB}$  is multiple of 2, three-digit integer  $\overline{ABC}$  is multiple of 3, four-digit integer  $\overline{ABCD}$  is multiple of 4, five-digit integer  $\overline{ABCDE}$  is multiple of 5, and the full integer  $\overline{ABCDEF}$  is a multiple of 6. What is the sixth digit  $F$ ?  
 (A) 2 (B) 4 (C) 6  
 (D) both 2 and 4 are possible (E) both 4 and 6 are possible