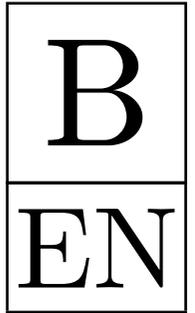


KANGAROO 2020

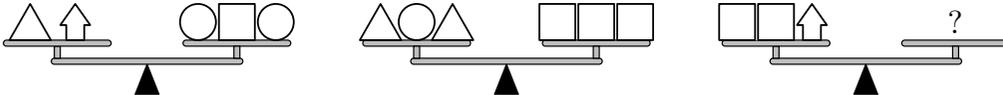


Time allowed: 75 minutes
Calculators are not permitted

Benjamin
5–6 grades

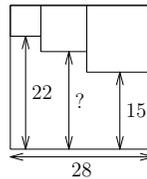
22. We call a 3-digit number *nice* if its middle digit is greater than the sum of its first and last digits. What is the largest possible number of consecutive *nice* 3-digit numbers?
A) 5 B) 6 C) 7 D) 8 E) 9
23. Nine tokens are laid on a table. Tokens are black on one side and white on the other. Initially, four tokens have the black side upwards. In each turn you have to flip three tokens. What is the least number of turns you need to have all tokens showing the same colour?
A) 1 B) 2 C) 3 D) 4 E) 5

24. Which of the following options will definitely balance the third scale?



- A) $\triangle\triangle\triangle\triangle\square$ B) $\triangle\triangle\triangle\triangle\circ$ C) $\triangle\circ\circ\circ\circ$ D) $\triangle\square\square\square\square$ E) $\circ\circ\square$
25. A test consists of 12 problems, which are distributed among the members of a grading team in such a way that each problem is graded by two members and each member grades exactly three different problems. How many members are there in the grading team?
A) 6 B) 8 C) 12 D) 18 E) 24

26. Three small squares are drawn inside a larger square as shown on the right. What is the length of the line marked with a question mark?
A) 17 B) 17.5 C) 18 D) 18.5 E) 19

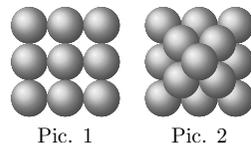


27. Squire Hlawa agreed to serve knight Zbyszko one year for 180 ducats and a sword. However, after five months Hlawa dismissed his service. For the time served Zbyszko gave him 40 ducats and a sword. How much is the sword worth?
A) 140 ducats B) 35 ducats C) 105 ducats D) 75 ducats E) 60 ducats

28. Gabija bought a bouquet consisting of 10 flowers: 4 roses, 3 tulips, 2 carnations and 1 lily. Four flowers were red, three were white, two pink and one yellow. None of the flowers were the same (by species and colour). Which flower was not in the bouquet?
A) White tulip B) Red lily C) Red rose D) Pink carnation E) Yellow rose

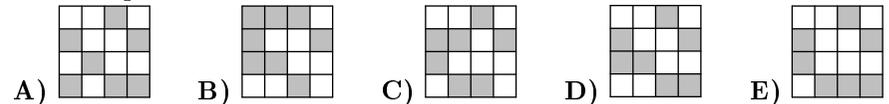
29. Magnus has to play 15 games in a chess tournament. At some point during the tournament he has won half of the games he has played, he has lost one third of the games he has played and two have ended in a draw. How many games has Magnus still to play?
A) 2 B) 3 C) 4 D) 5 E) 6

30. Don builds a pyramid with balls. The square base consists of 3×3 balls (see pic. 1). The middle layer has 2×2 balls, and there is one ball at the top (see pic. 2). There is glue at each contact point between two balls. How many glue points are there?
A) 20 B) 24 C) 28 D) 32 E) 36



Questions for 3 points

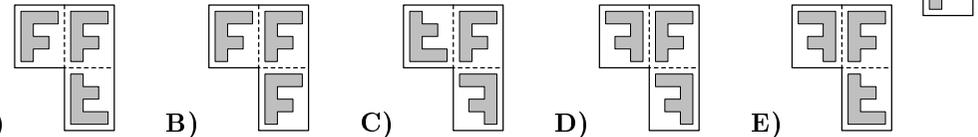
1. A large square is made up of smaller white and grey squares. What does the large square look like if the colours of the white and grey squares are interchanged?



2. As Amira is walking from Atown to Betown she passes the five signposts shown. One of them is incorrect. Which one?

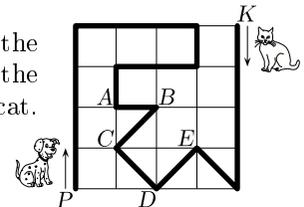


3. Pictures below show five pieces of transparent film. Flora folded one of them along the dotted lines and got the result shown on the right. Which piece did Flora fold?



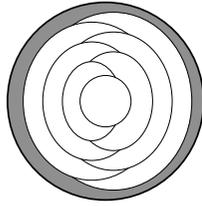
4. Mikas wants to bake 24 muffins for his birthday party. To bake six muffins two eggs are needed. Eggs are sold in boxes of six. How many boxes does Mikas need to buy?
A) 1 B) 2 C) 3 D) 4 E) 8

5. A dog and a cat run in the park along the path marked by the thick black line. The dog starts from *P* at the same time as the cat starts from *K*. The dog runs three times as fast as the cat. At which point do they meet?
A) At *A* B) At *B* C) At *C* D) At *D* E) At *E*



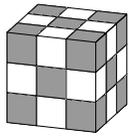
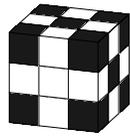
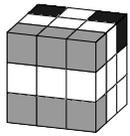
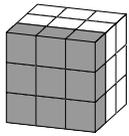
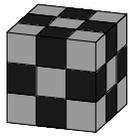
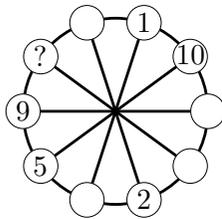
6. Kim has several chains of length 5 and of length 7. By joining some of these chains one after the other, Kim has created a longer chain. Which number cannot be the length of this chain?
A) 10 B) 12 C) 13 D) 14 E) 15

7. Maria has 10 sheets of paper. She cuts some of the sheets into five parts each. After that Maria has 22 pieces in total. How many sheets did she cut?
 A) 3 B) 2 C) 6 D) 7 E) 8
8. Cindy colours each region of the pattern below either red, grey or yellow so that adjacent regions have different colours. She has already coloured the outer region grey. How many regions of the completed pattern are coloured grey?
 A) 2 B) 3 C) 4 D) 5 E) 6
9. Four baskets contain 1, 4, 6 and 9 apples respectively. At least how many apples should be moved between the baskets to have the same number of apples in each basket?
 A) 3 B) 4 C) 5 D) 6 E) 7
10. Three positive integers have product 12 (repetition of the factors is allowed). Which of the following numbers could not possibly be the sum of the three integers?
 A) 7 B) 8 C) 9 D) 12 E) 14



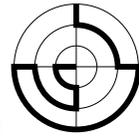
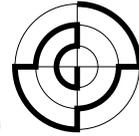
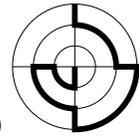
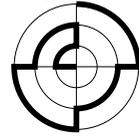
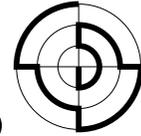
Questions for 4 points

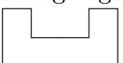
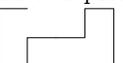
11. The numbers from 1 to 10 have to be placed in the small circles, one in each circle. Numbers in any two neighbouring circles must have the same sum as the numbers in the two diametrically opposite circles. Some of the numbers are already placed. What number should be placed in the circle with the question mark?
 A) 3 B) 4 C) 6 D) 7 E) 8
12. When Elise the bat leaves her cave, a digital clock shows 20:20. When she returns and is hanging upside down, she sees on the clock again 20:20. How long has she been away from her cave?
 A) 5 hours and 18 minutes B) 3 hours and 40 minutes C) 4 hours and 18 minutes
 D) 4 hours and 42 minutes E) 5 hours and 42 minutes
13. A father is 36 years old and three of his children are 13, 6 and 4 years old. At least how many years have to pass so that the age of the father is definitely smaller than the sum of his children's ages?
 A) 5 B) 6 C) 7 D) 13 E) 14
14. Mary has 10 white cubes, 9 grey cubes and 8 black cubes, all of the same size. She glues all these cubes together to build a big cube. One of the cubes below is the one she builds. Which one is it?



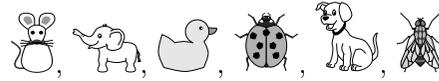
15. An elf and a troll meet. The troll always lies, while the elf always tells the truth. They both say exactly one of the following sentences: which one?
 A) You are telling the truth B) We both are telling the truth C) I always lie
 D) I am telling the truth E) One and only one of us is telling the truth

16. The diagrams show five paths marked with a thick line. Which path is the shortest?



17. Giorgio has two equal pieces of wire of shape . Which of the following shapes cannot be obtained putting together these two pieces?
 A)  B)  C)  D)  E) 

18. Amy glues the six stickers shown onto the faces of a cube:



The pictures on the right show the cube in two different positions. Which sticker is on the face opposite the face with the mouse on?

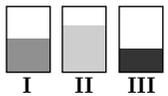
- A)  B)  C)  D)  E) 

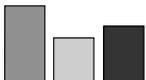
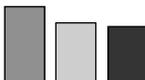
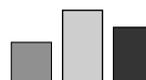


19. Natalie wants to make 12 dolls out of a cube of modelling clay. At least how many cuts does she have to make in order to divide the cube into 12 equal parts?
 A) 3 B) 4 C) 5 D) 6 E) 8
20. The picture on the right shows the friendships of the six girls Ann, Beatrice, Chloe, Diana, Elisabeth and Fiona. Each number represents one of the girls and each line joining two numbers represents a friendship between those two girls. Chloe, Diana and Fiona each have four friends. Beatrice is friends with only Chloe and Diana. Which number represents Fiona?
 A) 2 B) 3 C) 4 D) 5 E) 6

Questions for 5 points

21. Mary put the same amount of liquid in three rectangular vessels. Viewed from the front, they seem to have the same size, but the liquid has risen to different levels in the three vessels. Which of the following images represents the three vessels when viewed from above?



- A)  B)  C)  D)  E) 