Year 5 and 6 (ENGLISH VERSION)

Thursday, 16th March 2017   Time allowed: 75 minutes

1. For each question exactly one of the 5 options is correct.
2. Each participant is given 24 points at the beginning. For each correct answer 3, 4 or 5 points are added. No answer means 0 points are added. If a wrong answer is given, one quarter of the points is subtracted, i. e. 0.75 points, 1 point or 1.25 points, respectively. At the end, the maximum number of points is 120, the minimum is 0.
3. Calculators and other electronic devices are not allowed.

3 point problems

A1 $201 \times 7 + 20 + 17 =$

(**A**) 1104   (**B**) 1424   (**C**) 1444   (**D**) 1534   (**E**) 1614

A2 Amelie put four cards in a row: 2 0 1 7
Which row of cards can she obtain if she swaps exactly two cards?

(**A**) 0 1 2 7   (**B**) 2 7 1 0   (**C**) 0 2 7 1   (**D**) 7 2 0 1   (**E**) 7 1 0 2

A3 Kalle knows that $111 \times 111 = 12321$. What is 111×222?

(**A**) 34543   (**B**) 23432   (**C**) 22222   (**D**) 24642   (**E**) 25852

A4 In the rectangle shown, Tita colours one third of all small squares blue, one half of all small squares yellow and the rest red.
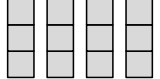How many small squares does Tita colour red?
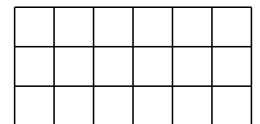
(**A**) 3   (**B**) 4   (**C**) 5   (**D**) 7   (**E**) 9

A5 Three rhinos, Puri, Obie and Rollo, go for a walk. Puri walks in front, Obie in the middle, and Rollo walks behind. Puri weighs 500 kg more than Obie. Obie weighs 1000 kg less than Rollo. Which of the following pictures shows the three rhinos in the right order?
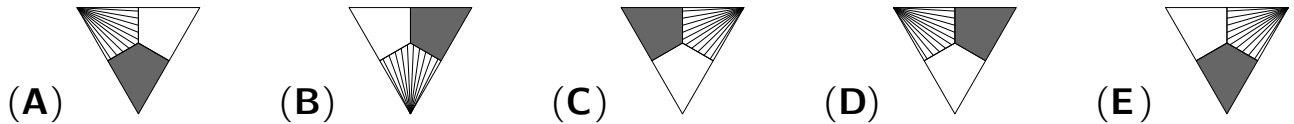
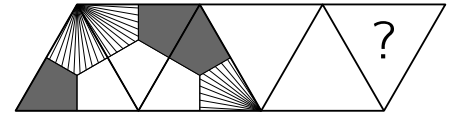(**A**)   (**B**)   (**C**)

(**D**)   (**E**)
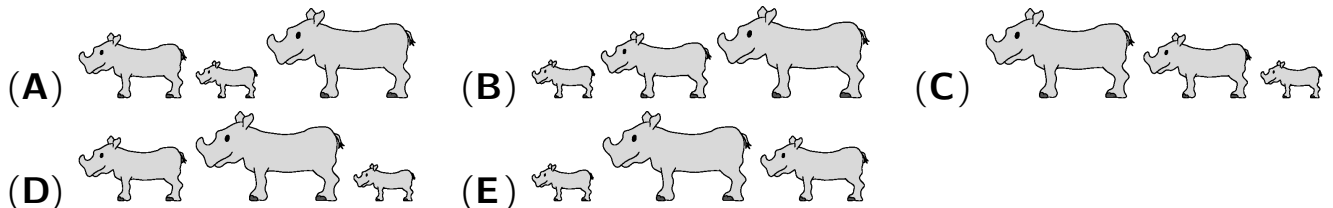
A6 A fly has 6 legs, a spider has 8 legs. Together, 3 flies and 2 spiders have as many legs as 9 chickens and

(**A**) 2 cats   (**B**) 3 cats   (**C**) 4 cats   (**D**) 5 cats   (**E**) 6 cats

A7 Lutz has 4 pieces . Which of the following shapes can he *not* make from them?

(**A**) 　(**B**) 　(**C**) 　(**D**) 　(**E**)
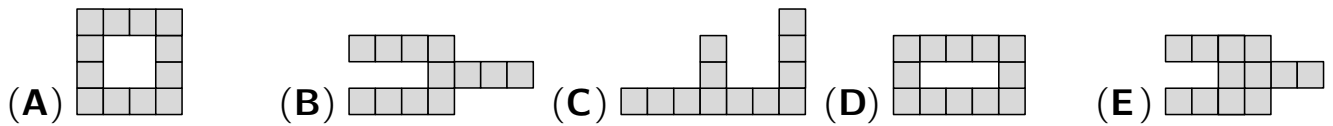
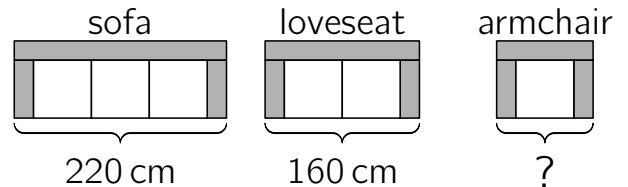**A8** On the strip of paper shown, neighbouring triangles are mirrored at their common side.
What does the sixth triangle look like?

(**A**) 　(**B**) 　(**C**) 　(**D**) 　(**E**)

4 point problems

B1 The "Modern Furniture Store" sells sofas, loveseats and armchairs made from identical modular pieces, as shown. All the armrests and all the seats have the same width. What is the width of the armchair?


(**A**) 60 cm　　(**B**) 80 cm　　(**C**) 90 cm　　(**D**) 100 cm　　(**E**) 120 cm

B2 Karim writes all the numbers from 1 to 20 in a row and obtains the 31-digit number:

$$1234567891011121314151617181920$$

Then he deletes 24 of these digits such that the remaining number is as large as possible.
Which number does Karim obtain?

(**A**) 9781920　(**B**) 9671819　(**C**) 9567892　(**D**) 9912345　(**E**) 9818192

B3 Mats glued ten cubes of side length 1 cm together and obtained the construction shown. It fits exactly in the regular box, as shown. What are the measures of this box?
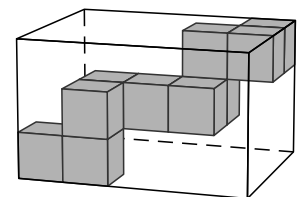
(**A**) 3 cm × 3 cm × 4 cm　　　(**B**) 3 cm × 4 cm × 6 cm

(**C**) 3 cm × 4 cm × 5 cm　　　(**D**) 4 cm × 4 cm × 6 cm　　　(**E**) 4 cm × 4 cm × 5 cm

B4 Marla folded a piece of paper and punched one hole in the paper. The unfolded paper has the 4 holes shown on the right. How could Marla have folded the paper?


(**A**) 　(**B**) 　(**C**) 　(**D**) 　(**E**)
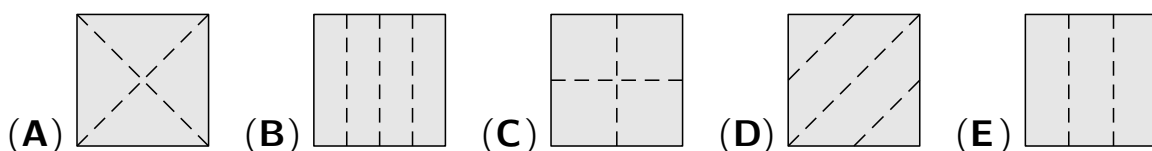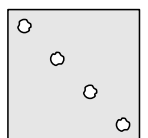
B5 Peter went hiking in the mountains for 5 days. He started on Monday, and his last trip was on Friday. Each day he walked 2 km more than the day before. In total, he walked 70 km. What distance did Peter walk on Thursday?

(**A**) 12 km   (**B**) 13 km   (**C**) 14 km   (**D**) 15 km   (**E**) 16 km

B6 For a board game Doro has a special die which has a number on each face. The sums of the numbers on opposite faces are all equal. Five of the numbers are 5, 6, 9, 11 and 14. Which number is on the sixth face?

(**A**) 7   (**B**) 8   (**C**) 12   (**D**) 13   (**E**) 15

B7 In the diagram, the upper left corner of the large square is the midpoint of the small square. The intersecting sides of the two squares are perpendicular. What is the total area of the grey figure?
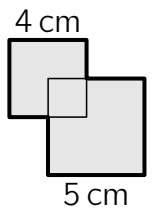
(**A**) 37 cm^2 (**B**) 38 cm^2 (**C**) 39 cm^2 (**D**) 40 cm^2 (**E**) 41 cm^2

B8 Mike, Liam, Luca and Gabriel scored goals in a handball match. Each of them scored a different number of goals. Mike scored the least number of goals. The other three scored 20 goals together. What is the *largest* number of goals Mike could have scored?

(**A**) 2   (**B**) 3   (**C**) 4   (**D**) 5   (**E**) 6

5 point problems

C1 Six kangaroo pictures are put in a line as shown in the diagram. Then, two pictures with kangaroos lying nose-to-nose are exchanged. This is repeated until no further such exchanges are possible. How many exchanges must be made?

(**A**) 5   (**B**) 7   (**C**) 9   (**D**) 10   (**E**) 12

C2 Niklas wants to write the numbers 1, 2, 3, 4, and 5 in the five squares in the figure, such that in the direction of the arrows the numbers in the squares become larger. In how many ways can Niklas do this?
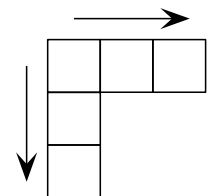
(**A**) 2   (**B**) 4   (**C**) 5   (**D**) 6   (**E**) 8

C3 Two grey cubes and one white cube were glued together to form the bar shown on the right. Which of the following cubes could be built from 9 such bars?
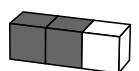
(**A**)   (**B**)   (**C**)   (**D**)   (**E**)

C4 When Vanessa is getting her pocket money, her uncle is present. He offers: "I will perform three actions with your pocket money:

   (1) I will add 1 Euro.   (2) I will subtract 1 Euro.   (3) I will double the amount.

Choose wisely the order of these actions!" Which order must she choose to get the most?

   (**A**) (1)(3)(2)   (**B**) (1)(2)(3)   (**C**) (2)(3)(1)   (**D**) (2)(1)(3)   (**E**) (3)(1)(2)

C5 The square floor in the picture is covered with grey tiles and white tiles. Some of the tiles are triangles, some are squares. What is the *smallest* number of grey tiles that need to be swapped with a white tile so that the pattern looks the same from each of the four directions shown?
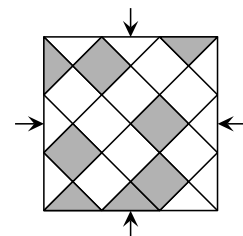
   (**A**) 3 triangles and 1 square   (**B**) 1 triangle and 3 squares

   (**C**) 1 triangle and 2 squares   (**D**) 2 triangles and 2 squares

   (**E**) 1 triangle and 1 square

C6 Ala, Beata and Celina went separately to a basket containing 8 balls with the numbers 24, 28, 32, 35, 40, 52, 54 und 60. One of the girls likes numbers divisible by 3, one likes numbers divisible by 4, and one likes numbers divisible by 5. Each of the girls took all the balls with numbers she likes. Ala took the balls with the numbers 28, 32 and 52, Beata took the balls with 24, 54 and 60, and Celina took the balls with 35 and 40. In which order did the girls approach the basket?
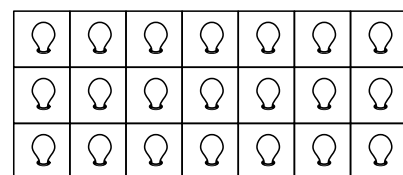
   (**A**) Celina, Ala, Beata   (**B**) Ala, Beata, Celina   (**C**) Beata, Celina, Ala

   (**D**) Beata, Ala, Celina   (**E**) Ala, Celina, Beata

C7 Dorian wants to write a positive integer in each box in the diagram so that each number above the bottom row is the sum of the two numbers in the boxes immediately underneath. What is the *largest* number of odd numbers that Dorian can write?
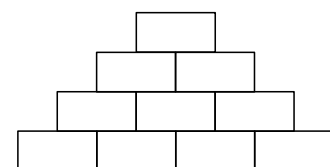
   (**A**) 4   (**B**) 5   (**C**) 6   (**D**) 7   (**E**) 8

C8 In each cell of the 3×7 board shown there is a lamp. Two lamps on this board are called neighbours if they are in cells which share a common side. Initially some lamps are lit, and each minute every lamp, that has at least two neighbours that are already lit, is also lit. What is the *smallest* number of lamps that need to be lit initially, in order to ensure that, after some time, all lamps will be lit?

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