For training purposes only!
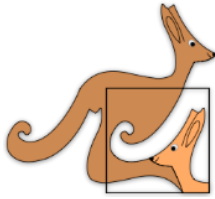
1. You have 60 minutes to solve 24 multiple choice problems. For each problem, decide which answer is correct and fill in (blacken) the oval that has the same letter as the appropriate answer. If you fill in (blacken) more than one oval for a question, your response will be marked as wrong.

2. Record your answers in the response form. Remember that this is the only sheet that is marked, so make sure you have all your answers transferred to the response form before giving it back to the contest supervisor.

3. The problems are arranged in three groups. A correct answer of the first 8 problems is worth 3 points. A correct answer of problems 9-16 is worth 4 points. A correct answer of problems 17-24 is worth 5 points. For each incorrect answer, one point is deducted from your score. Each unanswered question is worth 0 points. To avoid negative scores, you start from 24 points. The maximum score possible is 120.

4. The use of external material or aid of any kind is **not permitted**.

5. The figures *are not* drawn to scale. They should be used only for illustration purposes.

6. Remember, you have about 2 to 3 minutes for each problem; hence, if a problem appears to be too difficult, save it for later and move on to another problem.

7. At the end of the allotted time, please **give the response form to the contest supervisor**.

8. Do not forget to pick up your Certificate of Participation on your way out!

Good luck!

Canadian Math Kangaroo Contest team

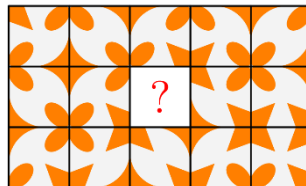# CANADIAN MATH KANGAROO CONTEST PROBLEMS

PART A: EACH CORRECT ANSWER IS WORTH 3 POINTS

1. A mushroom grows the same amount every day. The pictures below were taken by Mary, one picture each day from Monday to Friday.
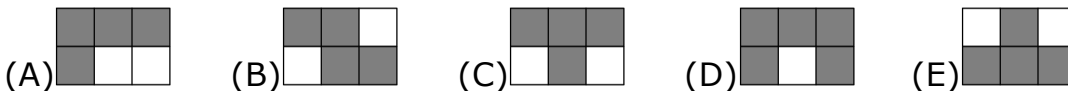
   Which of these pictures was taken on Tuesday?

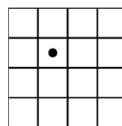   (A)   (B)   (C)   (D)   (E)

2. What piece completes the pattern?

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

$16 + 4$	$19 + 1$	$28 - 8$
2×10	$16 - 4$	7×3

3. Tyler shades all the squares in the grid where the result is 20.

   What shape does he get?

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

4. The figure shown below is a 4×4 square grid. How many squares in the figure (possibly of different sizes) do not contain the black dot?
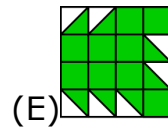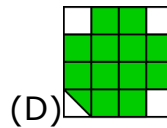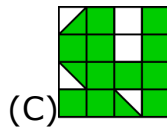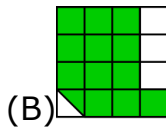
   (A) 20   (B) 18   (C) 16   (D) 14   (E) 12

5. Which of the following figures has the largest shaded part?
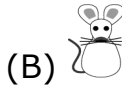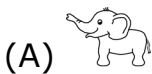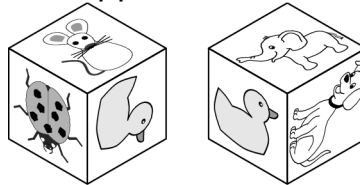
(A)　　　(B)　　　(C)　　　(D)　　　(E)
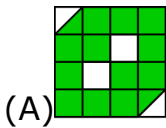
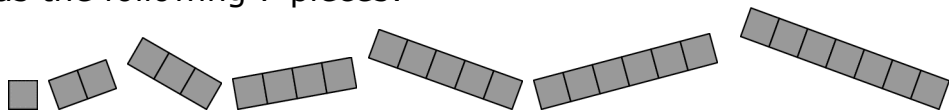6. Jorge glues these 6 stickers to the faces of a cube:

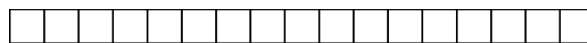The pictures below show the cube in two positions.

Which sticker is on the opposite face to the duck ?

(A)　　　(B)　　　(C)　　　(D)　　　(E)

7. Tom has the following 7 pieces:

He uses some of these pieces to fully cover this grid without overlap.

He uses as many different pieces as possible. How many pieces does Tom use?

(A) 3　　　(B) 4　　　(C) 5　　　(D) 6　　　(E) 7

8. Diana has ten boxes. She put five pencils in five different boxes and four erasers in four different boxes. Now, two of the boxes contain both an eraser and a pencil. How many boxes are empty?

(A) 4　　　(B) 3　　　(C) 2　　　(D) 1
(E) None of the ten boxes are empty

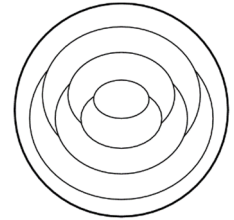## PART B: EACH CORRECT ANSWER IS WORTH 4 POINTS

9. Cindy colours each region on the pattern either red, blue or yellow. She colours regions that touch each other with different colours. She colours the outer ring (region) of the pattern red. How many regions does Cindy colour red?
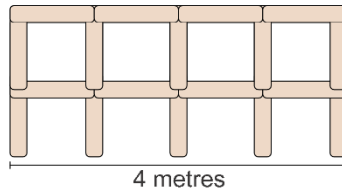
   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

10. In 2020, there are two zeros. How many years in our century (2001-2100 inclusive) have this feature?
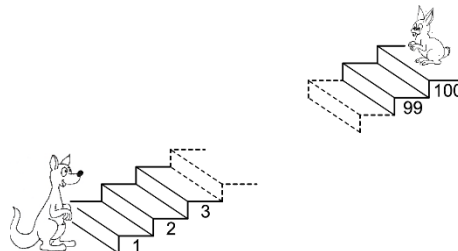
   (A) 15 (B) 16 (C) 17 (D) 18 (E) 19

11. Lonneke builds a fence using 1-meter-long poles: ▭ .
   The picture shows a 4-meter-long fence.

   4 metres

   How many poles does Lonneke need to build a 10-meter-long fence?

   (A) 22 (B) 30 (C) 33 (D) 40 (E) 42

12. In the picture below, every time the kangaroo jumps up 7 steps, the rabbit hops down 3 steps.

   The stairway has 100 steps. On which step do they meet?

   (A) 53 (B) 60 (C) 63 (D) 70 (E) 73

13. Amelie wants to build a crown using these tokens. When two tokens share a side, the corresponding numbers match. Four tokens have already been placed. Which number goes in the triangle marked with an X?
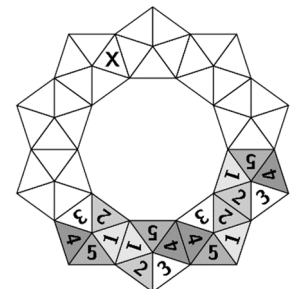
   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

14. The sum of three numbers is 50. Karin subtracts a secret number from each of these three numbers. She gets 24, 13 and 7 as the results.
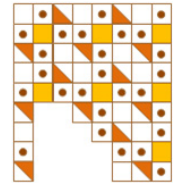
   Which one of the following is one of the original three numbers?

   (A) 9 (B) 11 (C) 13 (D) 17 (E) 23

15. Part of a bathroom wall is shown in the picture. The tiles are arranged in a regular pattern but some tiles have fallen off.
   How many of them were this shape ▣ ?
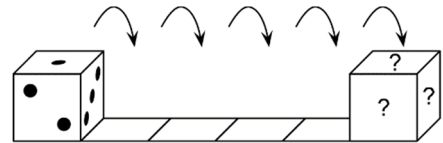
   (A) 3 (B) 5 (C) 6 (D) 9 (E) 13

16. Several teams came to the summer Kangaroo camp. Each team has either 5 or 6 members. There are 43 people in total. How many teams are at this camp?

   (A) 4 (B) 6 (C) 7 (D) 8 (E) 9

PART C: EACH CORRECT ANSWER IS WORTH 5 POINTS

17. A standard dice has 7 as the sum of the dots on opposite faces. The dice is put on the first square as shown and then rolls towards the right.

   When the dice gets to the last square, what is the total number of dots on the three faces marked with the question marks?

   (A) 6 (B) 7 (C) 9 (D) 11 (E) 12

18. Six people each order one scoop of ice cream.

   They order 3 scoops of vanilla, 2 scoops of chocolate and 1 scoop of lemon. They top the ice creams with 3 cherries, 2 wafers and 1 chocolate chip.

   They use one topping on each scoop, such that no two ice creams are alike. Which of the following combinations is not possible?

   (A) chocolate with a cherry   (B) vanilla with cherry
   (C) lemon with a wafer   (D) chocolate with a wafer
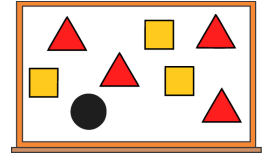   (E) vanilla with a chocolate chip

19. The teacher writes the numbers from 1 to 8 on the board. The teacher then covers the numbers with triangles, squares and a circle. If you add the four numbers covered by the triangles, the sum is 10.

If you add the three numbers covered by the squares, the sum is 20. Which number is covered by the circle?

(A) 3   (B) 4   (C) 5   (D) 6   (E) 7

20. Jane has some pictures of parrots . She wants to colour only the head, tail and wings of each parrot either red, blue or green so that all three colours are used on each picture. She colours one parrot's head red, its wings green and its tail blue. How many more parrots can she colour so that all the parrots are coloured differently?

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

21. There is a row of books of different size on a shelf. There are 20 books to the left of the largest book and 22 books to the right of the smallest book. The largest book and the smallest book are both adjacent to the oldest one. What is the smallest possible number of books on the shelf?

(A) 40   (B) 41   (C) 42   (D) 43   (E) 45

22. What shape would be impossible to cut into three different looking parts of five shaded squares?


(A)   (B)   (C)   (D)   (E)
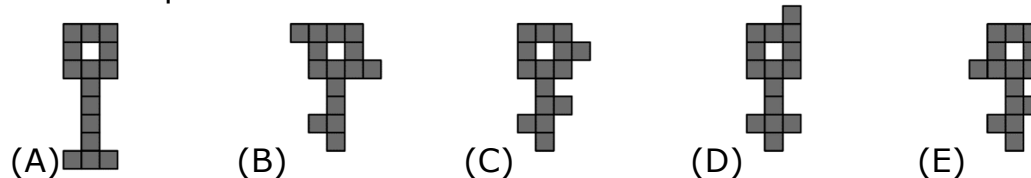
23. Ann replaces letters in the calculation KAN – ROO + GA with numbers from 1 to 6 and then calculates the result. The same letters are replaced by the same numbers and different letters by different numbers.

What is the largest possible result she could get?

(A) 563   (B) 567   (C) 576   (D) 578   (E) 656

24. Janik has a strip of paper of four cells, with numbers 1,2,3,4 written in them, as shown in the diagram.

| 1 | 2 | 3 | 4 |
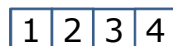
He can fold the strip so that the cells form 4 layers. Among the following options, which cells order – from top to bottom – is not possible to obtain?

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