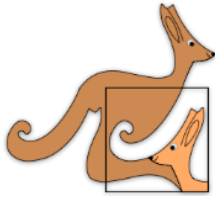# For training purposes only!

INTERNATIONAL CONTEST-GAME
MATH KANGAROO
CANADA, 2020

INSTRUCTIONS
GRADE 7-8

1. You have 75 minutes to solve 30 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.

1. 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 that form before giving it back to the contest supervisor.

2. The problems are arranged in three groups. A correct answer of the first 10 problems is worth 3 points. A correct answer of problems 11-20 is worth 4 points. A correct answer of problems 21-30 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 30 points. The maximum score possible is 150.

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

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

5. 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.

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

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

Good luck!
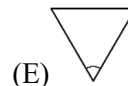
Canadian Math Kangaroo Contest team

mathkangaroo.ca
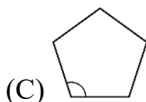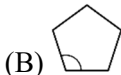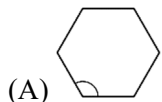
CANADIAN MATH KANGAROO CONTEST PROBLEMS

PART A: EACH CORRECT ANSWER IS WORTH 3 POINTS

1. In which of the regular polygons below is the marked angle the largest?

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

2. Miguel solves six Olympiad problems every day and Lázaro solves four Olympiad problems every day. How many days does it take Lázaro to solve the same number of problems as Miguel solves in eight days?
(A) 8   (B) 10   (C) 12   (D) 14   (E) 16

3. Every pupil in a class either swims or dances. Three fifths of the class swim and three fifths dance. Five pupils both swim and dance. How many pupils are in the class?
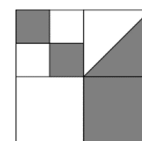(A) 15   (B) 20   (C) 25   (D) 30   (E) 35

4. The diagram shows a shape made up of 36 identical small triangles. What is the smallest number of such triangles that could be added to the shape to turn it into a hexagon?
(A) 10   (B) 12   (C) 15   (D) 18   (E) 24
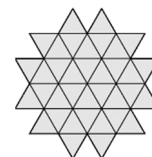
5. A large square is divided into smaller squares. In one of the squares a diagonal is also drawn. What fraction of the large square is shaded?
(A) $\frac{4}{5}$ (B) $\frac{3}{8}$ (C) $\frac{4}{9}$ (D) $\frac{1}{3}$ (E) $\frac{1}{2}$

6. There are 4 teams in a soccer tournament. Each team plays every other team exactly once. In each game, the winner scores 3 points and the loser – 0 points. In the case of a draw, both teams score 1 point. After all games have been played, which of the following total number of points is it impossible for any team to have scored?
(A) 4   (B) 5   (C) 6   (D) 7   (E) 8

7. The shortest path from Atown to Cetown runs through Betown. The two signposts shown are set up along this path. What distance was written on the broken sign?
(A) 1 km   (B) 3 km   (C) 4 km   (D) 5 km   (E) 9 km
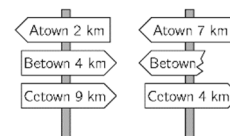
8. Kanga wants to multiply three different numbers from the following list: $-5, -3, -1, 2, 4,$ and 6. What is the smallest result she could obtain?
(A) -200 (B) -120 (C) -90 (D) -48 (E) -15

9. If John goes to school by bus and walks back, he travels for 3 hours. If he goes by bus both ways, he travels for 1 hour. How long does it take him if he walks both ways?
(A) 3.5 hours   (B) 4 hours   (C) 4.5 hours   (D) 5 hours   (E) 5.5 hours

10. A number is written in each cell of a 3×3 square. Unfortunately, the numbers are not visible because they are covered in ink. However, the sum of the numbers in each row and the sum of the numbers in two of the columns are all known, as shown by the arrows on the diagram. What is the sum of the numbers in the third column?
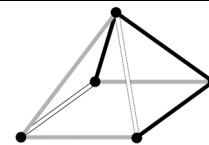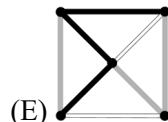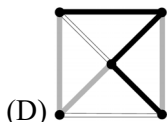(A) 41   (B) 43   (C) 44   (D) 45   (E) 47
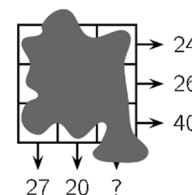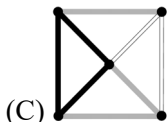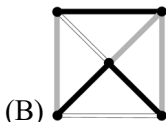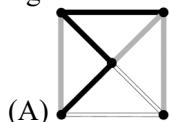
PART B: EACH CORRECT ANSWER IS WORTH 4 POINTS

11. Which of the following shows what you would see when the object in the diagram on the right is viewed from above?

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

12. Mr. Pythagoras used the digits 1 to 16 to construct a 4 × 4 magic square. This means an arrangement where the sums of the four numbers in each row and in each column is the same. But by mistake Mr. Pythagoras interchanged two of the numbers. His result is shown in the picture. What is the sum of the two numbers interchanged?
(A) 13   (B) 15   (C) 19   (D) 21   (E) 23

1	12	7	14
8	13	2	10
11	3	16	5
15	6	9	4

13. Rosanna wants to walk 5 km on average each day in March. At bedtime on 16th March, she realized that she had walked 95 km so far. What distance does Rosanna need to walk on average for the remaining days of the month to achieve her target?
(A) 5.4 km   (B) 5 km   (C) 4 km   (D) 3.6 km   (E) 3.1 km

14. Anne, Ben, Catherine, David, Ella and Fred (in that order) are standing in line for a candy at the fair. The clown that is giving away the candy does it in the following way: sends the child in front of the line to the end of the line, then gives candy to the child in front of the line, then sends the child in front of the line to the end of the line, then gives candy to the child in front of the line, etc. until all children get candy. Which of the following is NOT true?
(A) Ben gets candy before David, but after Ella   (B) Fred gets candy after both David and Ben
(C) Anne gets candy after Ben, but before Ella   (D) Fred gets candy before both Ella and Catherine
(E) Catherine gets candy before Ella, but after Fred

15. Sacha's garden has the shape shown. All the sides are either parallel or perpendicular to each other. Some of the dimensions are shown in the diagram. What is the perimeter of Sacha's garden?
(A) 22   (B) 23   (C) 24
(D) 25   (E) 26
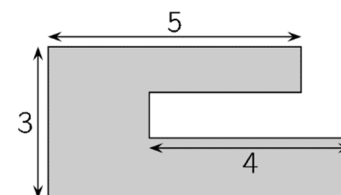
16. Andrew buys 27 identical small cubes, each with two adjacent faces painted red. He then uses all of these cubes to build a large cube. What is the largest number of completely red faces of the large cube he can make?
(A) 2   (B) 3   (C) 4   (D) 5   (E) 6

17. A large square consists of four identical rectangles and a small square. The area of the large square is 49 cm^2 and the length of the diagonal AB of one of the rectangles is 5 cm. What is the area of the small square?
(A) 1 cm^2 (B) 4 cm^2 (C) 9 cm^2 (D) 16 cm^2 (E) 25 cm^2
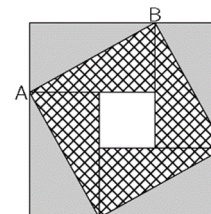
18. Twelve colored cubes are arranged in a row. There are 3 blue cubes, 2 yellow cubes, 3 red cubes and 4 green cubes, but not in that order. There is a yellow cube at one end and a red cube at the other end. The red cubes are all touching. The green cubes are also all touching. The tenth cube from the left is blue. What color is the cube sixth from the left?
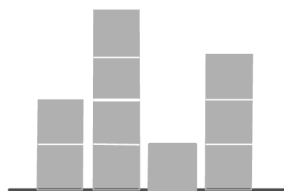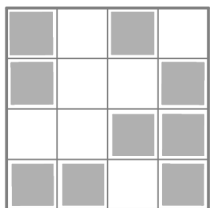(A) green   (B) yellow   (C) blue   (D) red   (E) red or blue

19. Irene made a "city" with identical wooden cubes. One of the diagrams shows the view from above the "city" and the other the view from one of the sides. However, it is not known from which side the side view was taken. What is the largest number of cubes that Irene could have used?

  (A) 25   (B) 24   (C) 23   (D) 22   (E) 21

20. Aisha has a strip of paper with the numbers 1, 2, 3, 4 and 5 written in five cells as shown.

| 1	2	3	4	5
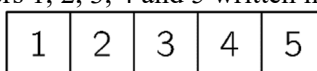
 She folds the strip so that the cells overlap, forming 5 layers.
 Which of the following configurations, from top layer to bottom layer, is it not possible to obtain?
 (A) 3, 5, 4, 2, 1 (B) 3, 4, 5, 1, 2 (C) 3, 2, 1, 4, 5 (D) 3, 1, 2, 4, 5 (E) 3, 4, 2, 1, 5
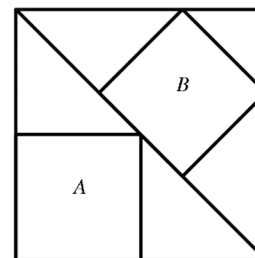
PART C: EACH CORRECT ANSWER IS WORTH 5 POINTS

21. Zaida took a square piece of paper and folded two of its sides to the diagonal, as shown, to obtain a quadrilateral. What is the size of the largest angle of the quadrilateral?
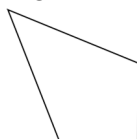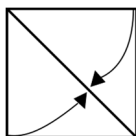
  (A) 112.5°   (B) 120.5°   (C) 125°   (D) 135°   (E) 150°

22. Two squares lie inside a large square, as shown in the figure. The side of square A is ½ of the side of the large square. The side of square B is 1/3 of the diagonal of the large square. What is the area of the square A if the area of the square B is 16?
 (A) 16   (B) 18   (C) 20   (D) 22   (E) 24

23. How many four-digit numbers A are there, such that half of the number A is divisible by 2, a third of A is divisible by 3, and a fifth of A is divisible by 5?
 (A) 1   (B) 7   (C) 9   (D) 10   (E) 11

24. In the final of the dancing competition, each of the three members of the jury gives the five competitors 0 points, 1 point, 2 points, 3 points or 4 points. No two competitors get the same mark from any individual judge. Adam knows all sums of the marks and a few single marks, as shown.
 How many points did Adam get from judge III?

	Adam	Berta	Clara	David	Emil
I	2	0			
II		2	0		
III					
Sum	7	5	3	4	11

  (A) 0   (B) 1   (C) 2   (D) 3   (E) 4
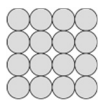
25. The triangle ABC is divided into 5 equal area triangles as is shown on the picture. What is the ratio FD/AC?
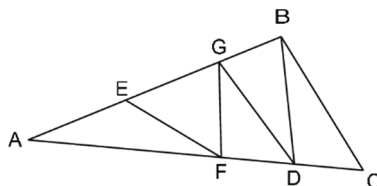
(A) 1/3   (B) 4/9   (C) 4/15   (D) 5/12   (E) 5/18

26. Sophia has 52 identical isosceles right-angled triangles. She wants to make a square using some of them. How many different sized squares can she make?

(A) 6   (B) 7   (C) 8   (D) 9   (E) 10

27. Cleo builds a pyramid with metal spheres. The square base consists of 4×4 spheres as shown in the figure. The floors consist of 3×3 spheres, 2×2 spheres and a final sphere at the top. At each point of contact between two spheres, a blob of glue is placed. How many blobs of glue will Cleo place?

(A) 72   (B) 85   (C) 88   (D) 92   (E) 96

28. Four children are in the four corners of a 10 m × 25 m pool. The trainer is standing somewhere on one side of the pool. When he calls them, three children get out and walk as short distance as possible around the pool to meet him. They walk 50 m in total. What is the shortest distance the trainer needs to walk to get to the fourth child?

(A) 10 m   (B) 12 m   (C) 15 m   (D) 20 m   (E) 25 m

29. Anne, Boris and Carl ran a race. They started at the same time, and their speeds were constant. When Anne finished, Boris had 15 m to run and Carl had 35 m to run. When Boris finished, Carl had 22 m to run. What is the distance they ran?

(A) 135 m   (B) 140 m   (C) 150 m   (D) 165 m   (E) 175 m

30. The statements below give clues to the identity of a four-digit number.

4 1 3 2   Two digits are correct but in the wrong places.

9 8 2 6   One digit is correct and in the right place.

5 0 7 9   Two digits are correct with one of them being in the right place and the other one in the wrong place.

2 7 4 1   One digit is correct but in the wrong place.

7 6 4 2   None of the digits are correct.

What is the last digit of the four-digit number?

(A) 0   (B) 1   (C) 3   (D) 5   (E) 9

For training purposes only!

International Contest-Game
Math Kangaroo Canada, 2020

Answer Key
Grade 7-8

1	**A** B C D E	**11**	A B C D **E**	**21**	**A** B C D E
2	A B **C** D E	**12**	A B C **D** E	**22**	A **B** C D E
3	A B **C** D E	**13**	A B **C** D E	**23**	A B C **D** E
4	A B C **D** E	**14**	**A** B C D E	**24**	A **B** C D E
5	A B C D **E**	**15**	A B **C** D E	**25**	A B **C** D E
6	A B C D **E**	**16**	A B **C** D E	**26**	A B **C** D E
7	**A** B C D E	**17**	**A** B C D E	**27**	A B C D **E**
8	A **B** C D E	**18**	**A** B C D E	**28**	A B C **D** E
9	A B C **D** E	**19**	A **B** C D E	**29**	A B C **D** E
10	A **B** C D E	**20**	A B C D **E**	**30**	A B **C** D E