Canguru de Matemática Brasil – Level C – 2020 – Second Application

3 points

1. What result of the following additions is **not** a prime number?

(A) 2 + 11   (B) 4 + 7   (C) 6 + 11   (D) 3 + 4   (E) 5 + 7

2. With the numbers 1, 2, 3 and 4, we can write several fractions whose value is less than 1, for example, $\frac{1}{3}$. How many different values, beyond the example, can be obtained?

(A) 3   (B) 4   (C) 5   (D) 6   (E) 8

3. Miguel decided to solve three math problems a day. Eight days later, Daniel started solving five problems a day, until the two of them tied in the amount of problems solved. How many problems each one solved until that day?

(A) 12   (B) 20   (C) 60   (D) 80   (E) 120

4. One square was divided into four equal squares, containing other equal colored squares and equal colored triangles, as shown in the picture. What fraction of the original square does the colored part represent?

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{4}{9}$ (D) $\frac{5}{8}$ (E) $\frac{3}{4}$
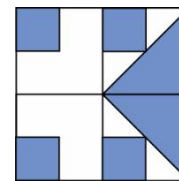
5. Three soccer teams compete in a championship. Each team plays exactly once with each of the other teams. In each match, the victorious team wins 4 points, the loser loses 1 point, and in case of a tie, each team wins 2 points. Once the championship is over, what will be the largest possible sum of the points obtained by the three teams?

(A) 8   (B) 9   (C) 10   (D) 11   (E) 12

6. The figure of side 1 is formed by six equal triangles, made with 12 sticks. How many matchsticks are needed to complete the figure of side 2, partially represented?

side 1   side 2
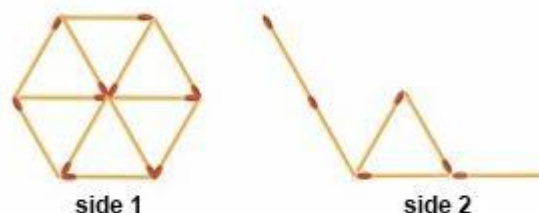
(A) 18   (B) 24   (C) 32   (D) 36   (E) 48

7. Carlos wants to square the sum of three chosen numbers from the list $-5, -3, -1, 0, 2, 7$. What is the smallest result he can get?

(A) 0   (B) 1   (C) 4   (D) 9   (E) 16

8. When Julia goes from home to school, she can walk half-way and half-way she can go by bus. If she only walks, she will spend 45 minutes more. How much less time does it take her to go to school if she uses only the bus?

  (A) 25 minutos   (B) 45 minutos   (C) 1 hora   (D) 1 hora e meia   (E) 2 horas

9. Juca wrote a whole number greater than zero in each of the boxes on the 3×3 board on the right, so that the sums of the numbers in each row and in each column are equal. The only thing Juca remembers is that there are no three numbers repeated. What number is written in the box of the center?
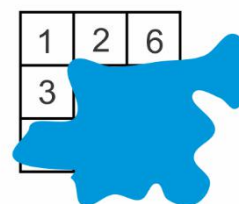
  (A) 1   (B) 2   (C) 4   (D) 5   (E) 6

10. In the figure, formed by a square and an equilateral triangle, the letters indicate the measurements of the angles. Which of the following equality is true?
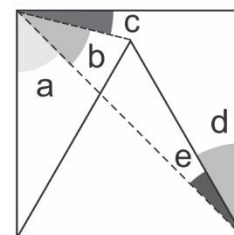
  (A) $a = d$ (B) $b + c = d$ (C) $a + c = d + e$ (D) $a + b = d + e$ (E) $e + d = a$

4 points

11. As soon as he left his city towards Caecá, Charles saw the sign on the left. When he came back from Caecá, he saw the sign on the right. At that point, how far was it to get to his city?
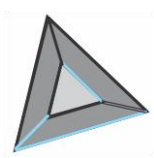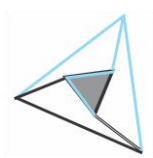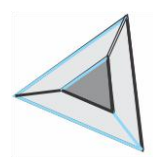
| Arati 12km |
| Baibá 33km |
| Caecá 52km |

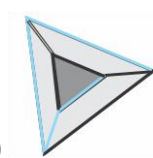| Baibá   8km |
| Arati 29km |

  (A) 12 km   (B) 21 km   (C) 29 km   (D) 41 km   (E) 52 km

12. Ana planned to walk an average of 5 km per day in March. In the first 10 days she walked an average of 4,4 km per day and in the following 6 days she walked an average of 3,5 km per day. What is the average daily distance she should walk on the remaining days in order to fulfill her plan?

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

**13.** Which of the pictures below shows what you will see if you look from above the piece represented on the right?
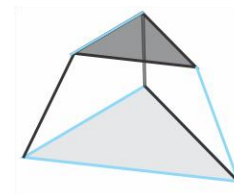
  (A)   (B)   (C)   (D)   (E)

14. In a class, students only swim or only dance or do both. Three eighths of the students in the class swim. There are exactly five students who do both, that is, they swim and dance. At least how many students are in class?

(A) 16   (B) 24   (C) 32   (D) 40   (E) 48

15. The garden of Sonia's house is shaped like a 12-meter square and is divided into three lawns of the same area. The central lawn is shaped like a parallelogram, whose smaller diagonal is parallel to two sides of the square, as shown in the picture. What is the length of this diagonal, in meters?
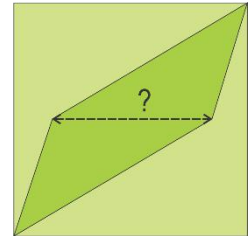
(A) 7,2   (B) 7,6   (C) 8,0   (D) 8,4   (E) 8,8

16. Andrew bought 27 little cubes of the same color, each with three adjacent faces painted red and the other three of another color. He wants to use all these little cubes to build a bigger cube. What is the largest number of completely red faces that he can get for this cube?

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

17. A square is formed by four identical rectangles and a central square, as in the figure. The area of the square is 81 cm^2 and the square formed by the diagonals of these rectangles has an area equal to 64 cm^2 . What is the area of the central square?
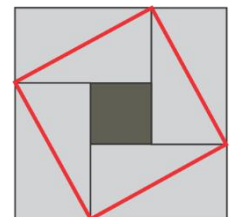
(A) 25 cm^2 (B) 27 cm^2 (C) 36 cm^2 (D) 47 cm^2 (E) 49 cm^2

18. A store announced a 30% discount on a sale. However, one day before this promotion, the store increased the prices of all its products by 20%. What was the real discount that this store gave on the day of the sale?

(A) 10%   (B) 12%   (C) 15%   (D) 16%   (E) 20%

19. Irene made a "city" using identical wooden cubes. We have, beside, a view from above and a side view of this "city". We do not know which side of the "city" is being shown. What is the smallest amount of cubes Irene may have used to make its assembly?
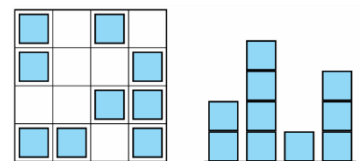
(A) 10   (B) 12   (C) 13   (D) 14   (E) 15

20. Amelia has a paper strip with five equal cells containing different drawings, according to the figure. She folds the strip in such a way that the cells overlap in five layers. Which of the sequences of layers, from top to bottom, is **not** possible to obtain?

(A) ☆,□,■,○,●   (B) ☆,○,■,□,●   (C) ☆,■,○,□,●   (D) ☆,□,●,○,■   (E) ☆,●,□,■,○

5 points

21. In each of the four corners of a swimming pool, 10 m wide by 25 meters long, there is a child. The swimming instructor is sitting almost in the middle of one of the edges of the pool. When he calls the children, they all choose the longest path along the edges to reach the instructor. What was the sum of the distances covered by the four children?

(A) 90 m
(B) 120 m
(C) 140 m
(D) 160 m
(E) 210 m

22. Twelve colored cubes are lined side by side. There are three blue cubes, two yellow cubes, three red cubes, and four green cubes, but not in that order. There is a red cube at one end and a yellow one at the other. The red cubes are all together, and the green cubes are all together. The tenth cube from the left is blue. How many ways can the cubes be queued?

(A) 2
(B) 3
(C) 6
(D) 9
(E) 12

23. Sofia has 52 isosceles triangles of 1 cm² area. She wants to make a square using some of these triangles. What is the area of the largest square she can make?

(A) 32 cm²
(B) 36 cm²
(C) 42 cm²
(D) 50 cm²
(E) 52 cm²

24. Let N be the smallest positive number such that half of N is divisible by 2, one-third of N is divisible by 3, one-quarter of N is divisible by 4, one-fifth of N is divisible by 5, one-sixth of N is divisible by 6, one-eighth of N is divisible by 8, and one-ninth of N is divisible by 9. The square root of N is a number of how many digits?

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

25. Jonas was traveling with his car and saw on the car display the following information: speed 90 km/h, distance travelled 116,0 km and time 21h00min. Jonas continued driving at the same speed and that same night he realized that the four-digit sequence showing the distance traveled was the same four-digit sequence showing the time. At what time did this happen?

(A) 21h30min
(B) 21h50min
(C) 22h00min
(D) 22h10min
(E) 22h30min

26. Lady Josephine bought a pack of beans. The beans come mixed with impurities such as pebbles and sand, and the label reads that these impurities correspond to 8% of the contents of the package. Lady Josephine removes part of these impurities, which are reduced to 4% of the content of the package. What fraction of the total amount of impurities was removed from the package?

(A) $\dfrac{1}{2}$
(B) $\dfrac{25}{48}$
(C) $\dfrac{7}{12}$
(D) $\dfrac{5}{8}$
(E) $\dfrac{25}{36}$

27. Zilda took a square sheet of paper of side 1 and made two folds taking two consecutive sides of the sheet to a diagonal of it, as shown in the picture, obtaining a quadrilateral (highlighted outline). What is the area of this quadrilateral?
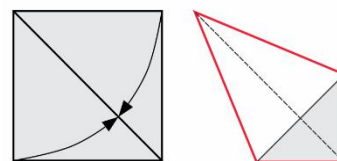
(A) $\dfrac{7}{10}$
(B) $2-\sqrt{2}$
(C) $\dfrac{3}{5}$
(D) $\sqrt{2}-1$
(E) $\dfrac{\sqrt{2}}{2}$

28. Cleuza assembled the $2 \times 2 \times 2$ block formed by equal balls beside, using one drop of glue at each contact point between two balls, in a total of 12 drops. She then glued a few more spheres until she completed a $4 \times 3 \times 2$ block. How many extra drops of glue did she get to use?
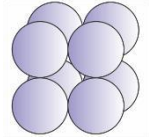
(A) 12   (B) 24   (C) 34   (D) 36   (E) 44

29. Sonia writes three consecutive whole numbers, one on each side of a triangle. Then she writes on each vertex of the triangle the sum of the numbers written on the sides that touch this vertex and multiplies these three numbers, obtaining the product 504. What is the product of the three numbers written on the sides of the triangle?

(A) 24   (B) 60   (C) 120   (D) 210   (E) 336

30. The statements below give the clues to identifying a four-digit N number.

2 7 4 1 A digit is right, but it's in the wrong place.

4 1 3 2 Two digits are right, but they are in the wrong places.

7 6 4 2 None of the digits are right.

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

5 0 7 9 Two digits are right, one is in the right place and the other is in the wrong place.

What is the digit of the hundreds of the number N?

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