Canguro Matemático Costarricense



Cadet Test Seventh grade

Name of the student:

Name of the institution:_____

Kangourou Sans Frontières Costa Rica 2022 3 points

1. Meike paddled around five buoys, as shown.



Around which of the buoys did Meike paddle in a clockwise direction?

(A) 2, 3 and 4
(B) 1, 2 and 3
(C) 1, 3 and 5
(D) 2, 4 and 5
(E) 2, 3 and 5

2. Beate rearranges the five numbered pieces shown to display the smallest possible nine-digit number.

Which piece does she place at the right-hand end?



3. Kengu enjoys jumping on the number line. He always makes two large jumps followed by three small jumps, as shown, and then repeats this process over and over again. Kengu starts his jumping routine on 0.



On which of these numbers will Kengu land during his routine?

(A) 82 (B) 83 (C) 84 (D) 85 (E) 86

4. The number plate of Kangy's car fell off. He put it back upside down but luckily this didn't make any difference. Which one of the following could be Kangy's number plate?



5. Rob the Builder has a brick whose shortest side is 4 cm. He uses several such bricks to build the cube shown.



What are the dimensions, in cm, of his brick?

$(\mathbf{A}) \ 4 \times 6 \times 12$	$(\mathbf{B})\ 4\times6\times16$	$(\mathbf{C}) \ 4 \times 8 \times 12$
$(\mathbf{D}) \ 4 \times 8 \times 16$	$(\mathbf{E}) \ 4 \times 12 \times 16$	

6. Jessi writes the seven numbers 3, 4, 5, 6, 7, 8, and 9 in the circles in the picture so that the sums of the three numbers on each line are equal.



What is the largest possible sum of three numbers on a line that Jessi can get?

(A) 28 (B) 18 (C) 22 (D) 16 (E) 20

7. In the statement below there are five empty spaces. Sanja wants to fill four of them with plus signs and one with a minus sign so that the statement is correct.

6 9 12 15 18 21=45

Where should she place the minus sign?

 (\mathbf{A}) Between 6 and 9

(**B**) Between 9 and 12 (\mathbf{B})

 (\mathbf{C}) Between 12 and 15

- (\mathbf{D}) Between 15 and 18
- (\mathbf{E}) Between 18 and 21

8. Masoud and his friends built the number 2022 with 66 cubes, as shown in the picture.

They painted the whole surface of the structure yellow. How many of the cubes have exactly 4 faces painted?

- (A) 16 (B) 30 (C) 46 (D) 54 (E) 60
- 9. There are five big trees and three paths in a park.



In which region of the park should a new tree be planted so that for each path, there are the same number of trees on both sides?

- $(\mathbf{A}) \mathbf{A} \tag{\mathbf{B}} \mathbf{B}$
- $(\mathbf{C}) \mathbf{C} \tag{D} \mathbf{D}$
- (**E**) E

10. How many positive integers between 100 and 300 have only odd digits?

(A) 25 (B) 50 (C) 75	$(\mathbf{D}) \ 100$	$(\mathbf{E}) \ 150$
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4 points

11. Gerard wrote down the sum of squares of two numbers, as shown.



Unfortunately some of the digits cannot be seen because they are covered in ink. What is the last digit of the first number?

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

12. The distance between two shelves in the cupboard in Monica's kitchen is 36 cm. She knows that a stack of 8 of her favourite glasses is 42 cm tall and that a stack of 2 glasses is 18 cm tall.



What is the largest number of glasses that can be stacked and still fit onto a shelf?

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

13. On a standard dice, the sum of the numbers of dots on opposite faces is always 7. Four standard dice are glued together, as shown.



What is the minimum number of dots that could lie on the whole surface?

(A) 52 (B) 54 (C) 56 (D) 58 (E) 60

14. Three sisters, whose average age is 10, each have different ages. When they get together in pairs, the average ages of two such pairs are 11 and 12. What is the age of the eldest sister?

(A) 10 (B) 11 (C) 12 (D) 14 (E) 16





What is the total area of the regions in which he planted daisies?

(A) 48 m^2 (B) 46 m^2 (C) 44 m^2 (D) 40 m^2 (E) 36 m^2

16. In my office, there are two clocks. One clock gains one minute every hour and the other loses two minutes every hour. Yesterday I set them both to the correct time but when I looked at them today, I saw that the time shown on one was 11:00 and shown on the other was 12:00. What time was it when I set the two clocks?

(A) 23:00 (B) 19:40 (C) 15:40 (D) 14:00 (E) 11:20

17. Werner wrote several positive numbers numbers smaller than 7 on a piece of paper. Ria then crossed out all Werner's numbers and replaced each of them with their difference from 7. The sum of Werner's numbers was 22. The sum of Ria's numbers is 34. How many numbers did Werner write down?

18. The numbers 3, 4, 5, 6 and 7 are to be placed in the five circles below so that the number inside each triangle is the product of the three numbers on its vertices.



What is the sum of the three numbers on the vertices of the coloured triangle?

(A) 12 (B) 14 (C) 15 (D) 17 (E) 18

19. There are five big trees and three paths in a park.



In which region of the park should a new tree be planted so that for each path, there are the same number of trees on both sides?

$(\mathbf{A}) \mathbf{A}$	(\mathbf{B}) B
$(\mathbf{C}) \mathbf{C}$	(\mathbf{D}) D
$(\mathbf{E}) \mathbf{E}$	

20. Marc always cycles at the same speed and he always walks at the same speed. He can cover the round trip from his home to school and back again in 20 minutes when he cycles and in 60 minutes when he walks. Yesterday Marc started cycling to school but stopped and left his bike at Eva's house on the way before finishing his journey on foot. On the way back, he walked to Eva's house, collected his bike and then cycled the rest of the way home. His total travel time was 52 minutes. What fraction of his journey did Marc make by bike?

(A)
$$\frac{1}{6}$$
 (B) $\frac{1}{5}$ (C) $\frac{1}{4}$ (D) $\frac{1}{3}$ (E) $\frac{1}{2}$

5 points

21. In the picture below, each animal represents a positive integer and different animals represent different integers. The sum of the two integers in each column is written below that column.



What is the largest possible sum of the four integers in the first row?

22. The four villages A, B, C and D lie along a road in that order. The distance between neighbouring villages is 10 km. There are 10 students who live in village A, 20 students who live in village B, 30 students who live in village C and 40 students who live in village D. The villagers want to build a school so that the total distance travelled by the students when going to school is as small as possible. Where should they build the school?

(\mathbf{A}) in A	(\mathbf{B}) in B
(\mathbf{C}) in the middle between B and C	(\mathbf{D}) in C
(\mathbf{E}) in D	

23. To unlock this lock, you get the following four hints.





One of these digits is correct and in the right place.

One of these digits is correct but in the wrong place.

What is the correct code for the lock?

(A) 604 (B) 082 (C) 640



Two of these digits are correct but in the wrong place.





All of these digits are incorrect.

(E) 046

24. Anna has the shape as shown.



Which of the following shapes is the same as Anna's?



25. Werner chooses four of the numbers 2, 3, 4, 5 and 6 and writes one in each box so that the calculation is correct.



How many of the five numbers could Werner write in the shaded box?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5



27. 30 people are sitting round a circular table. Some of them are wearing a hat. Those who do wear a hat always tell the truth while those who do not wear a hat can either lie or tell the truth. Each person says "At least one of my two neighbours is not wearing a hat." What is the largest number of people who could be wearing a hat?

(A) 5 (B) 10 (C) 15 (D) 20 (E) 25

28. An isosceles triangle ABC, with AB = AC, is split into three smaller isosceles triangles, as shown, so that AD = DB, CE = CD, and BE = EC. Note that the diagram is not drawn to scale.



What is the size, in degrees, of angle BAC?

(A) 24 (B) 28 (C) 30 (D) 35 (E) 36

29. The three pictures show a structure made from cubes as seen from the top, from the front and from the right.



What is the maximum number of cubes that could have been used to build the structure?(A) 18(B) 19(C) 20(D) 21(E) 22

30. Jenny decided to enter numbers into the cells of a 3×3 table so that the sum of the numbers in all four possible 2×2 squares will be the same. The numbers in three of the corner cells have already been written, as shown.

2	4
?	3

Which number should she write in the fourth corner cell?

(A) 0 (B) 1 (C) 4 (D) 5 (E) 6

Name:_____

Institution:

01.	А	В	С	D	Е
02.	А	В	С	D	Е
03.	А	В	С	D	Е
04.	А	В	С	D	Е
05.	А	В	С	D	Е
06.	А	В	С	D	Е
07.	А	В	С	D	Е
08.	А	В	С	D	Е
09.	А	В	С	D	Е
10.	А	В	С	D	Е
11.	А	В	С	D	Е
12.	А	В	С	D	Е
13.	А	В	С	D	Е
14.	А	В	С	D	Е
15.	А	В	С	D	Е

16.	А	В	С	D	Е
17.	А	В	С	D	Е
18.	А	В	С	D	Е
19.	А	В	С	D	Е
20.	А	В	С	D	Е
21.	А	В	С	D	Е
22.	А	В	С	D	Е
23.	А	В	С	D	Е
24.	А	В	С	D	Е
25.	А	В	С	D	Е
26.	А	В	С	D	Е
27.	А	В	С	D	Е
28.	А	В	С	D	Е
29.	А	В	С	D	Е
30.	А	В	С	D	Е

