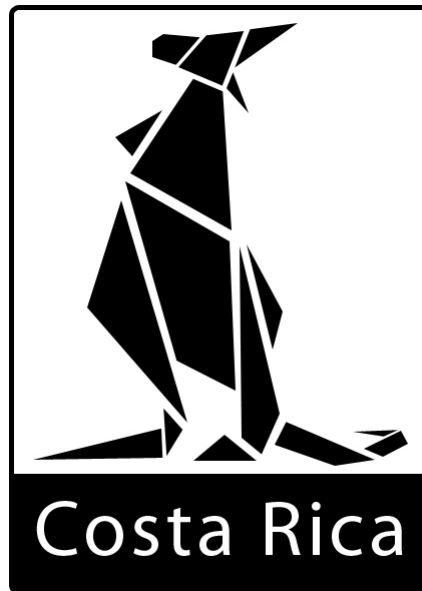


Canguro Matemático Costarricense



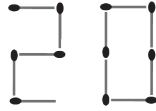
Junior Test
Ninth grade

Name of the student: _____

Name of the institution: _____

3 points

1. Carola is forming the four-digit number 2022 using some matches from a box. The box originally contained 30 matches. She has already started and formed the first two digits, as shown in the diagram.



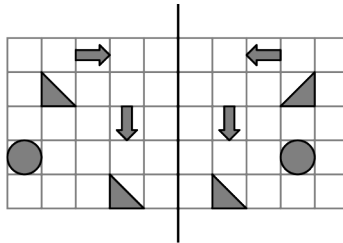
How many matches will remain in the box when she has finished forming 2022?

- (A) 20 (B) 19 (C) 10 (D) 9 (E) 5

2. An equilateral triangle of side 12 has the same perimeter as a square of side x . What is the value of x ?


- (A) 9 (B) 12 (C) 16 (D) 24 (E) 36

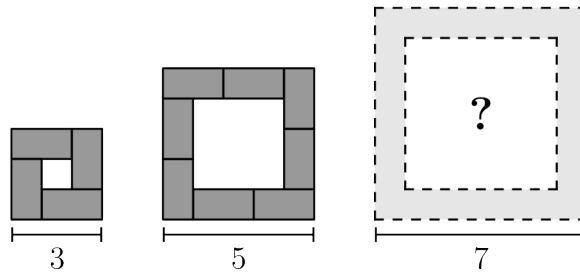
3. Some shapes are drawn on a piece of paper. The teacher folded the left-hand side of the paper over the thick line.



How many of the shapes on the left-hand side will fit exactly on top of a shape on the right-hand side?

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

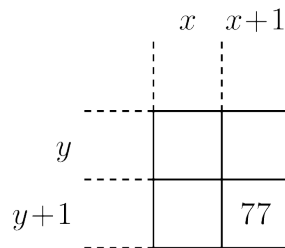
4. Katrin arranges tables of size 2×1  according to the number of participants in a meeting.



The diagrams show a top view of the tables for a small, a medium and a large meeting. How many tables are used for the large meeting?

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

5. A square of numbers is taken out from a multiplication table. Only one number is visible. The integers x and y are both positive and x is greater than y .



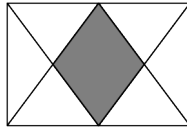
What is the value of x ?

- (A) 6 (B) 7 (C) 8
 (D) 10 (E) 11

6. I am less than my half and greater than my double. The sum of me and my square is zero. Who am I?

- (A) -2 (B) -1 (C) 0 (D) 1
 (E) 2

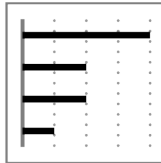
7. In the rectangle shown, the midpoints of the two longer sides are joined to all four vertices.



What fraction of the rectangle is shaded?

- (A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{2}{7}$ (D) $\frac{1}{3}$ (E) $\frac{2}{5}$

8. On Nadya’s smartphone, this diagram shows how much time she spent last week on each of her apps.



This week she halved the time spent on two of these apps, but spent the same amount of time on the other two apps. Which of the following could be the diagram for this week?

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

9. Werner wrote several positive 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?

- (A) 7 (B) 8 (C) 9 (D) 10 (E) 11

10. 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) $\frac{1}{2}$

4 points

11. There are five candidates in the school election. After 90% of the votes had been counted, the preliminary results were as follows:

Alex	Bella	Calvin	Diane	Eddy
14	11	10	8	2

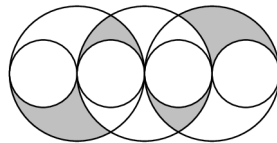
How many students still have a chance of winning the election?

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

12. I once met six siblings whose ages were six consecutive whole numbers. I asked each of them the question: "How old is your oldest sibling?" Which of the following could **not** be the sum of their six answers?

- (A) 95 (B) 125 (C) 167 (D) 205 (E) 233

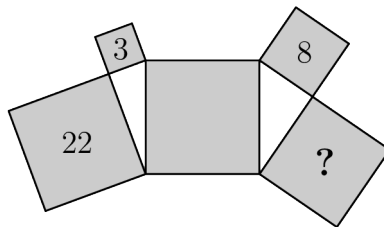
13. The diagram shows three large circles of equal radius and four small circles of equal radius where the centers of all circles and all points of contact lie on one straight line. The radius of each small circle is 1.



What is the shaded area?

- (A) π (B) 2π (C) 3π (D) 4π (E) 6π

14. Five squares and two right-angled triangles are arranged as shown.



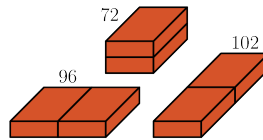
The numbers 3, 8 and 22 inside three of the squares indicate their areas in square metres. What is the area of the square containing the question mark?

- (A) 14m^2 (B) 15m^2 (C) 16m^2 (D) 17m^2 (E) 18m^2

19. A painter wanted to mix 2 litres of blue paint with 3 litres of yellow paint to make 5 litres of green paint. However, by mistake he used 3 litres of blue and 2 litres of yellow so that he made the wrong shade of green. What is the smallest amount of this green paint that he must throw away so that, using the rest of his green paint and some extra blue and/or yellow paint, he could make 5 litres of paint of the correct shade of green?

- (A) $\frac{5}{3}$ litres (B) $\frac{3}{2}$ litres (C) $\frac{2}{3}$ litres (D) $\frac{3}{5}$ litres (E) $\frac{5}{9}$ litres

20. A builder has two identical bricks. She places them side by side in three different ways, as shown.



The surface areas of the three shapes obtained are 72, 96 and 102. What is the surface area of the original brick?

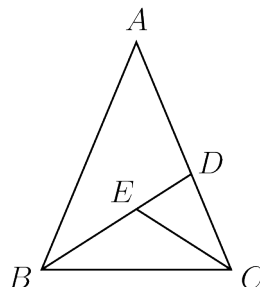
- (A) 36 (B) 48 (C) 52 (D) 54 (E) 60

5 points

21. Several points are marked on a line. Renard then marked another point between each two adjacent points on the line. He repeated this process a further three times. There are now 225 points marked on the line. How many points were marked on the line initially?

- (A) 10 (B) 12 (C) 15 (D) 16 (E) 25

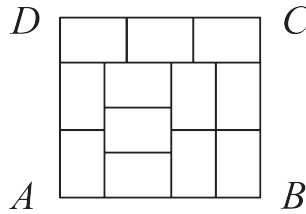
22. An isosceles triangle ABC , with $AB = AC$, is split into three smaller isosceles triangles, as shown, so that $AD = DB$, $CE = CD$, and $BE = EC$. Note that the diagram is not drawn to scale.



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

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

23. The diagram shows a large rectangle $ABCD$ divided into 12 identical small rectangles.



What is the ratio AD/DC ?

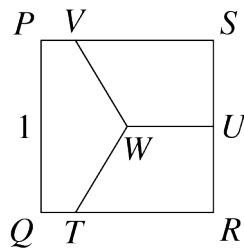
- (A) $8/9$ (B) $5/6$ (C) $7/8$
 (D) $2/3$ (E) $9/8$

24. A rabbit and a hedgehog had a race around a 550 m long circular track. Both ran at constant speeds. The rabbit's speed was 10 m/s, and the hedgehog's speed was 1 m/s. They started at the same time. However, the hedgehog ran in the opposite direction to the rabbit. When they met, the hedgehog immediately turned round and ran after the rabbit. How long after the rabbit did the hedgehog reach the finish?

- (A) 45 sec (B) 50 sec (C) 55 sec (D) 100 sec (E) 505 sec

25. The diagram shows square $PQRS$ of side-length 1. The midpoint of RS is marked U and the centre of the square is marked W .

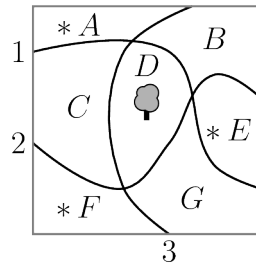
Line segments TW, UW and VW split the square into three regions of equal area.



What is the length of SV ?

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

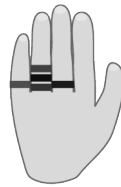
26. There are three paths through our city park. A tree is planted in the middle of the park, as shown.



What is the smallest number of trees that need to be planted so that there are the same number of trees on both sides of each of the paths?

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

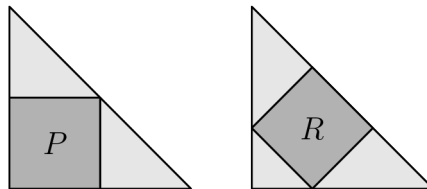
27. Veronica has five rings on her fingers, as shown in the diagram.



She takes them off one at a time. In how many different ways can she do this?

- (A) 16 (B) 20 (C) 24 (D) 30 (E) 45

28. Two congruent isosceles right-angled triangles each have a square inscribed, as shown in the diagram. The square marked P has an area of 45.



What is the area of the square marked R ?

- (A) 35 (B) 40 (C) 45 (D) 50 (E) 60

29. Eight teams participate in a football tournament. Each team plays against each other team exactly once. In each match, the winner gets 3 points and the loser does not get any points. If a match is drawn, each team gets 1 point. At the end of the tournament the total number of points obtained by all the teams is 61. What is the largest number of points that the champion team could have obtained?

- (A) 21 (B) 19 (C) 18 (D) 17 (E) 16

30. The inhabitants of a city always speak by means of questions. There are two types of inhabitants: the "positives", who always ask questions for which the answer is "yes" and the "negatives" who always ask questions for which the answer is "no". I met Albert and Berta and Berta asked me "Are Albert and I both negative?". What type of inhabitants are Albert and Berta?

- (A) Both are positives (B) Both are negatives
(C) Albert positive, Berta negative (D) Albert negative, Berta positive
(E) There are not enough information to decide.

Name: _____

Institution: _____

01. A B C D E

02. A B C D E

03. A B C D E

04. A B C D E

05. A B C D E

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07. A B C D E

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09. A B C D E

10. A B C D E

11. A B C D E

12. A B C D E

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14. A B C D E

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17. A B C D E

18. A B C D E

19. A B C D E

20. A B C D E

21. A B C D E

22. A B C D E

23. A B C D E

24. A B C D E

25. A B C D E

26. A B C D E

27. A B C D E

28. A B C D E

29. A B C D E

30. A B C D E

