

Canguro Matemático Costarricense



Cadet Test
Seventh grade

Name: _____

Institution: _____

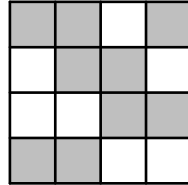
Kangourou Sans Frontières
Costa Rica 2020

3 points

1. How many of the following four numbers 2, 20, 202, 2020 are prime?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

2. A large square is made up of smaller white and grey squares.



What does the large square look like if the colours of the white and grey squares are interchanged?

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

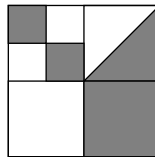
3. Miguel solves six Olympiad problems every day and Lázaro solves four Olympiad problems every day. How many days does it take Lázaro to solve the same number of problems as Miguel solves in four days?

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

4. Which of these fractions has the largest value?

- (A) $\frac{8+5}{3}$ (B) $\frac{8}{3+5}$ (C) $\frac{3+5}{8}$ (D) $\frac{8+3}{5}$ (E) $\frac{3}{8+5}$

5. A large square is divided into smaller squares. In one of the squares a diagonal is also drawn.



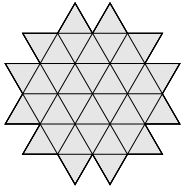
What fraction of the large square is shaded?

- (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 match, the winner scores 3 points and the loser scores 0 points. In the case of a draw, both teams score 1 point. After all matches have been played, which of the following total number of points is it impossible for any team to have scored?

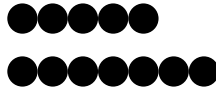
- (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

7. The 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

8. Kim has several chains of length 5 and of length 7.



By joining chains one after the other, Kim can create different lengths.
Which of these lengths is impossible to make?

- (A) 10 (B) 12 (C) 13 (D) 14 (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?

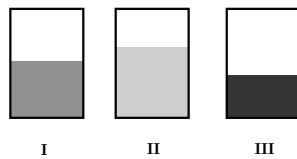
- (A) 3.5 hours (B) 4 hours (C) 4.5 hours (D) 5 hours (E) 5.5 hours

10. Maria has 10 sheets of paper. She cuts some of the sheets into five parts each. After that Maria has 22 pieces in total. How many sheets did she cut?

- (A) 3 (B) 2 (C) 6 (D) 7 (E) 8

4 points

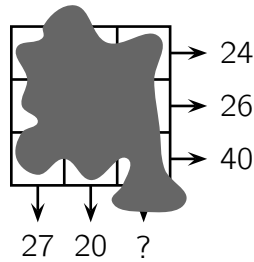
11. Mary put the same amount of liquid in three rectangular vessels. Viewed from the front, they seem to have the same size, but the liquid has risen to different levels in the three vessels.



Which of the following images represents the three vessels when viewed from above?

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

12. 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.



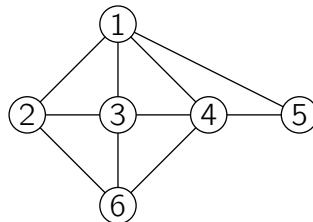
What is the sum of the numbers in the third column?

- (A) 41 (B) 43 (C) 44 (D) 45 (E) 47

13. When Elise the bat leaves her cave, a digital clock shows **20:20**. When she returns and is hanging upside down, she sees **20:20** on the clock again. How long has she been away from her cave?

- (A) 3 hours and 28 minutes (B) 3 hours and 40 minutes (C) 3 hours and 42 minutes
 (D) 4 hours and 18 minutes (E) 5 hours and 42 minutes

14. The picture below shows the friendships of the six girls Ann, Beatrice, Chloe, Diana, Elisabeth and Fiona. Each number represents one of the girls and each line joining two numbers represents a friendship between those two girls. Chloe, Diana and Fiona each have four friends. Beatrice is friends with only Chloe and Diana.



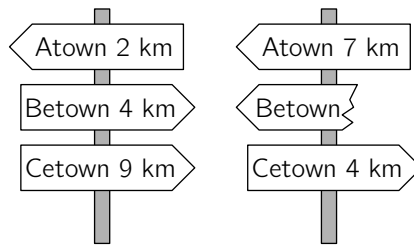
Which number represents Fiona?

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

15. Anna wants to walk 5 km on average each day in March. At bedtime on 16th March, she realised that she had walked 95 km so far. What distance does she 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

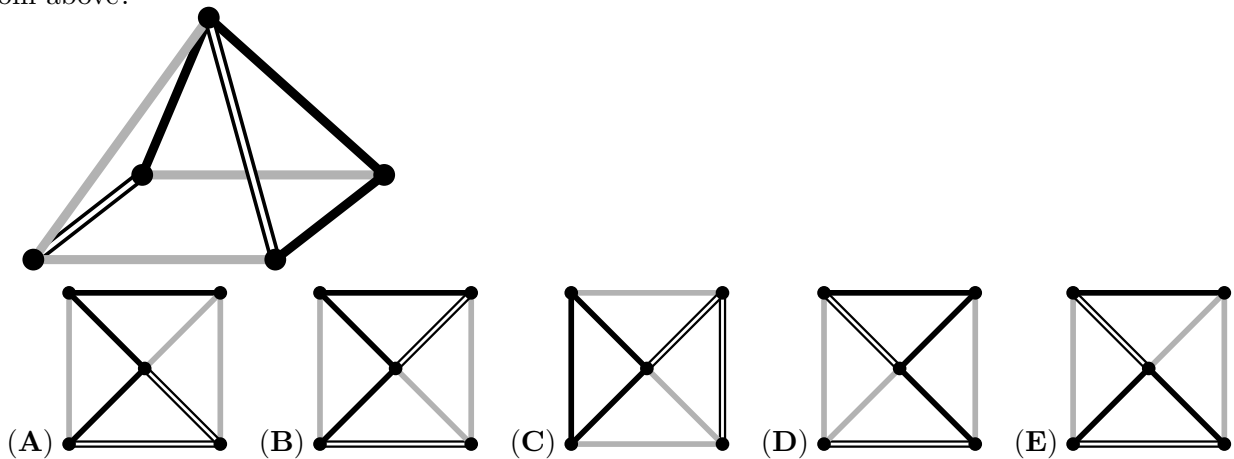
16. The shortest path from Atown to Cetown runs through Betown. The two signposts shown are set up along this path.



What distance was written on the broken sign?

- (A) 1 km (B) 3 km (C) 4 km (D) 5 km (E) 9 km

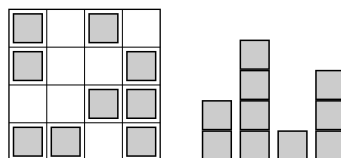
17. Which of the following shows what you would see when the the object in the diagram is viewed from above?



18. Every pupil in a class either swims or dances or both. 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

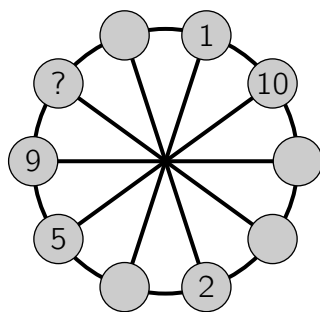
19. Irene made a "city" with identical wooden cubes. One of the diagrams shows the view from above the "city" and the other the view from one of the sides. However, it is not known from which side the side view was taken.



What is the largest number of cubes that Irene could have used?

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

20. The numbers from 1 to 10 have to be placed in the small circles, one in each circle. Numbers in any two neighbouring circles must have the same sum as the numbers in the two diametrically opposite circles. Some of the numbers are already placed.

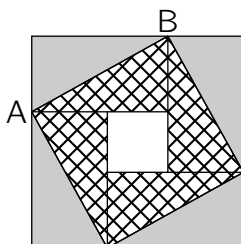


What number should be placed in the circle with the question mark?

- (A) 3 (B) 4 (C) 6 (D) 7 (E) 8

5 points

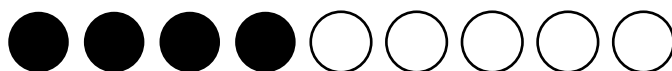
21. A large square consists of four identical rectangles and a small square. The area of the large square is 49 cm^2 and the length of the diagonal AB of one of the rectangles is 5 cm.



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

22. Nine tokens are black on one side and white on the other. Initially, four tokens have the black side upwards.



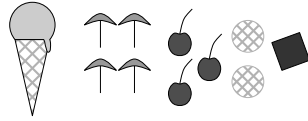
In each turn you have to flip three tokens. What is the least number of turns you need to have all tokens showing the same colour?

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

23. Four children are in the four corners of a $10 \text{ m} \times 25 \text{ m}$ pool. Their trainer is standing somewhere on one side of the pool. When he calls them, three children get out and walk as short a distance as possible round 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

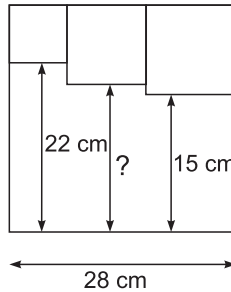
24. Ten people each order one scoop of ice cream. They order 4 scoops of vanilla, 3 scoops of chocolate, 2 scoops of lemon and 1 scoop of mango. They top the ice creams with 4 umbrellas, 3 cherries, 2 wafers and 1 chocolate chip. They use one topping on each scoop, such that no two ice creams are alike.



Which of the following combinations is **NOT** possible.

- (A) chocolate with a cherry (B) mango with an umbrella (C) vanilla with an umbrella
 (D) lemon with a wafer (E) vanilla with a chocolate chip

25. Three small squares are drawn inside a larger square as shown.



What is the length of the line marked with a question mark?

- (A) 17 cm (B) 17.5 cm (C) 18 cm (D) 18.5 cm (E) 19 cm

26. Twelve coloured 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 colour is the cube sixth from the left?

- (A) green (B) yellow (C) blue (D) red (E) red or blue

27. 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 the sums of the marks and a few single marks, as shown.

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

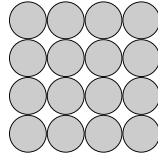
How many points did Adam get from judge III?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

28. 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

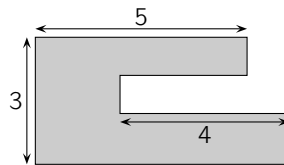
29. Cleo builds a pyramid with metal spheres. The square base consists of 4×4 spheres as shown in the figure. The floors consist of 3×3 spheres, 2×2 spheres and a final sphere at the top. At each point of contact between two spheres, a blob of glue is placed.



How many blobs of glue will Cleo place?

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

30. 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

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

06. A B C D E

07. A B C D E

08. A B C D E

09. A B C D E

10. A B C D E

11. A B C D E

12. A B C D E

13. A B C D E

14. A B C D E

15. A B C D E

16. A B C D E

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

