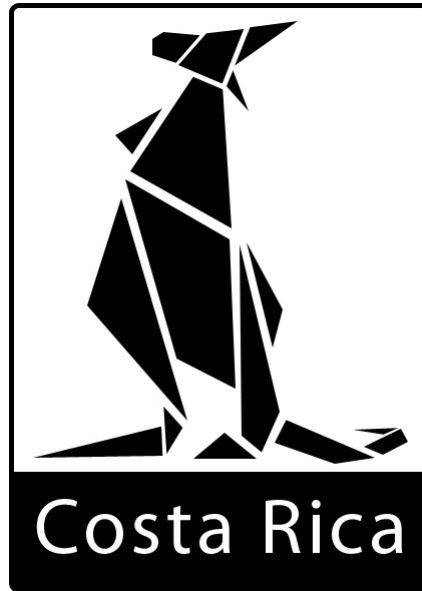


Canguro Matemático Costarricense



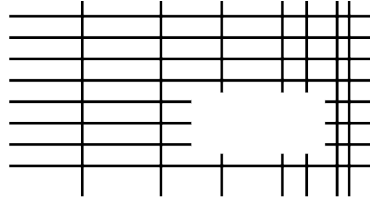
Cadet Test
Seventh grade

Name of the student: _____

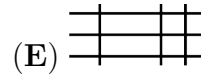
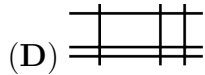
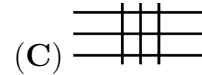
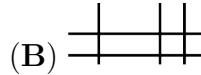
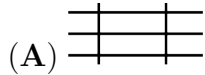
Name of the institution: _____

3 points

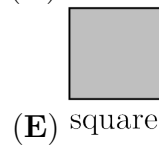
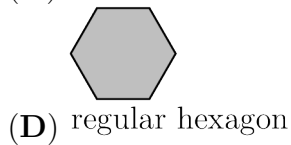
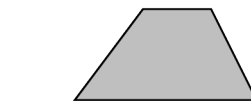
1. The diagram shows a set of horizontal and vertical lines with one part removed.



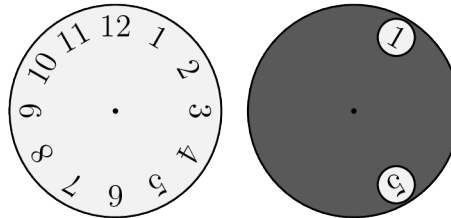
Which of the following could be the missing part?



2. Which of the shapes below cannot be divided into two trapezia by a single straight line?



3. A grey circle with two holes in it is placed on top of a clock-face, as shown.



The grey circle is turned around its centre such that an 8 appears in one hole. Which two numbers could be seen in the other hole?

(A) 4 or 12

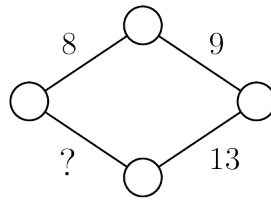
(B) 1 or 5

(C) 1 or 4

(D) 7 or 11

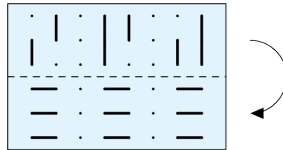
(E) 5 or 12

4. Werner wants to write a number at each vertex and on each edge of the rhombus shown.



He wants the sum of the numbers at the two vertices at the ends of each edge to be equal to the number written on the edge. What number will he write instead of the question mark?

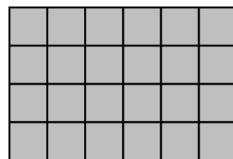
- (A) 11 (B) 12 (C) 13 (D) 14 (E) 15
5. Kristina has a piece of transparent paper with some lines marked on it.



She folds it along the dashed line. What can she now see?

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

6. A tiler wants to tile a floor of dimensions 4 m × 6 m using identical tiles. No overlaps or gaps are allowed.



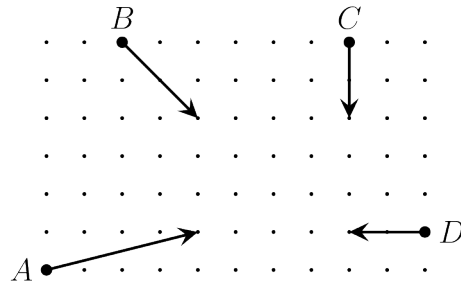
Which of the following tiles could not be used?

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

7. John has 150 coins. When he throws them on the table, 40% of them show heads and 60% of them show tails. How many coins showing tails does he need to turn over to have the same number show heads as show tails?

- (A) 10 (B) 15 (C) 20 (D) 25 (E) 30

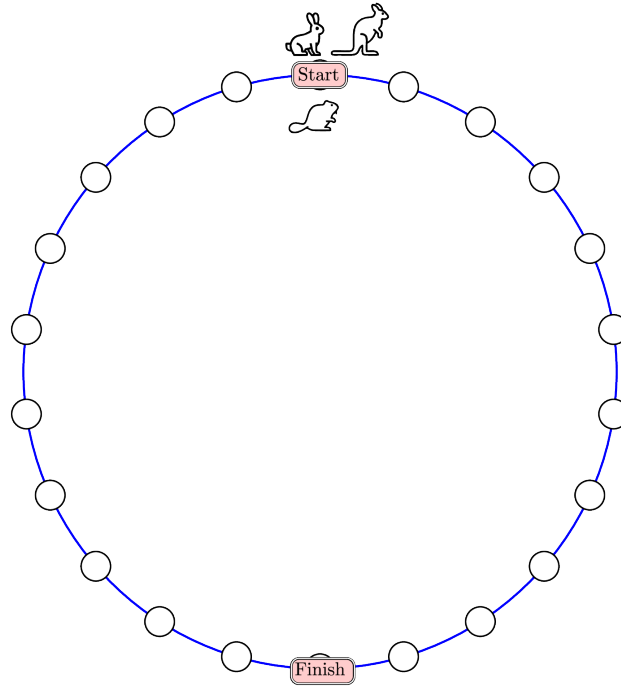
8. The diagram shows the initial position, the direction of travel and how far four bumper cars move in five seconds.



Which two cars will collide?

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

9. A rabbit, a beaver and a kangaroo are having a competition. The beaver moves one space at a time, the rabbit moves two spaces at a time and the kangaroo moves three spaces at a time. They all start from the point marked START. The winner is the animal who lands exactly on the point marked FINISH in the smallest number of complete moves.



Who wins the competition?

- (A) the beaver (B) the rabbit (C) the kangaroo (D) the kangaroo and the rabbit
 (E) the kangaroo and the beaver

10. Lonneke wants the sum of the numbers in the white cells to equal the sum of the numbers in the grey cells.

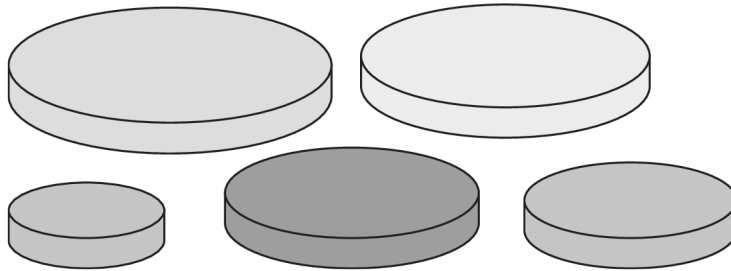
1	3	5	2	13
7	4	6	8	11

Which two numbers does she need to swap?

- (A) 1 and 11 (B) 2 and 8 (C) 3 and 7 (D) 4 and 13 (E) 7 and 13

4 points

11. Anna has five circular discs, each of a different size. She decides to build a tower using three of her discs so that each disc in her tower is smaller than the disc below it.



How many different towers could Anna construct?

- (A) 5 (B) 6 (C) 8 (D) 10 (E) 15

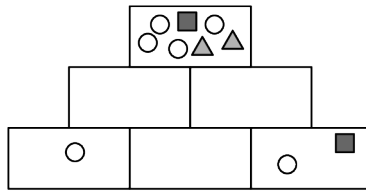
12. Evita wants to write the numbers 1 to 8 in the boxes of the grid shown, so that the sums of the numbers in the boxes in each row are equal and the sums of the numbers in the boxes in each column are equal. She has already written numbers 3, 4 and 8, as shown.

	4		
3		8	

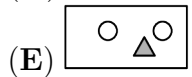
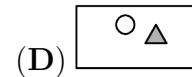
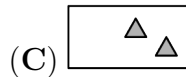
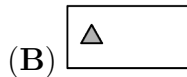
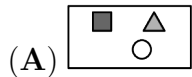
What number will she write in the shaded box?

- (A) 1 (B) 2 (C) 5 (D) 6 (E) 7

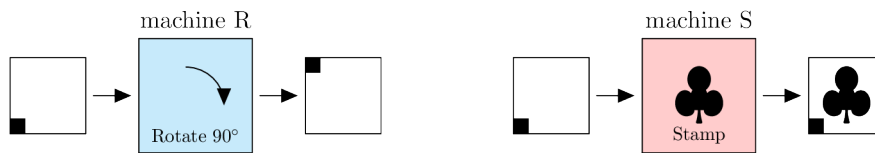
13. Tian wants to draw figures in the six boxes of the pyramid shown.



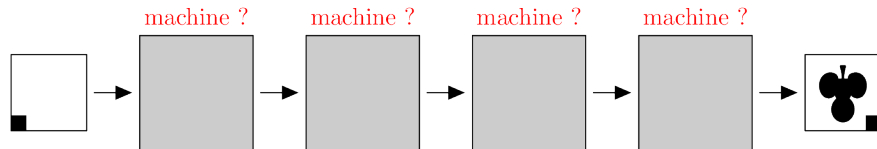
Each box should contain all of the figures in the two boxes directly below it and nothing more. She has drawn the figures in some of the boxes already. Which figures should she draw in the box in the middle of the bottom row?



14. Else has two machines. Machine R rotates the paper 90° clockwise. Machine S stamps the paper with a ♣.



In which order are the machines used to create the image shown?



(A) SRRR

(B) RSRR

(C) SRSR

(D) RRRS

(E) SRRS

15. Martin has three cards with numbers written on both sides. The card with number 1 on one side has number 4 on the opposite side, the card with 2 on has 5 on the opposite side and the card with 3 on has 6 on the opposite side.

Martin randomly places three cards on the table and adds the three numbers he sees.

	Front	Back
Card 1	1	4
Card 2	2	5
Card 3	3	6

How many different sums can Martin get?

(A) 3

(B) 4

(C) 5

(D) 6

(E) 10

16. In a second hand shop, two hats are sold for the same price as five skirts, three skirts for the same price as eight t-shirts and two t-shirts for the same price as three caps. Which of the following collections is the most valuable?

- (A) a hat and five skirts
- (B) a hat, three skirts and a cap
- (C) eight skirts and six t-shirts
- (D) thirty-seven caps
- (E) three skirts and three caps

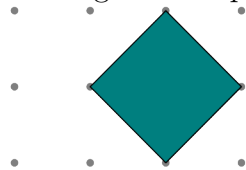
17. Sonia and Robert are playing a game. They can alternately take 1, 2, 3, 4 or 5 tiles from a pile of tiles. Whoever takes the last tile or tiles loses. At one point of the game, there are 10 tiles left in the pile and it is Sonia's turn to take some tiles. How many tiles should Sonia leave to Robert to be sure that she will win?

- (A) 9
- (B) 8
- (C) 7
- (D) 6
- (E) 5

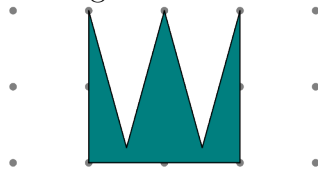
18. Which of the following four shapes has the greatest area?



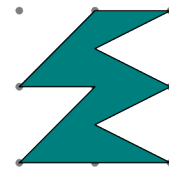
W



diamond



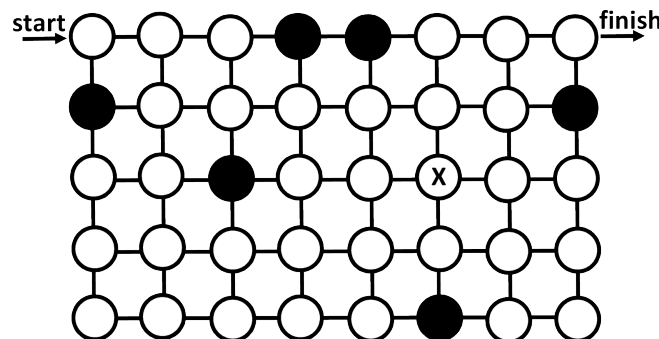
the crown



lightning

- (A) W
- (B) diamond
- (C) the crown
- (D) lightning
- (E) they all have the same area

19. An explorer wants to find a path through the maze shown from the point marked 'start' to the point marked 'finish'.



She can only move horizontally or vertically and she can only pass through white circles. She also has to pass through all the white circles exactly once. When she reaches the circle marked X, what will her next move be?

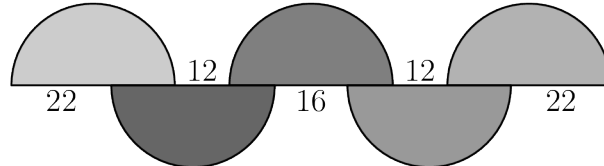
- (A) ↑
- (B) ↓
- (C) →
- (D) ←
- (E) there is no such path

20. Theodorika wrote down three consecutive whole numbers in order, but instead of digits she used symbols so wrote $\square\diamond\diamond$, $\heartsuit\triangle\triangle$, $\heartsuit\triangle\square$. What would she write next?

- (A) $\heartsuit\heartsuit\diamond$ (B) $\square\heartsuit\square$ (C) $\heartsuit\triangle\diamond$ (D) $\heartsuit\diamond\square$ (E) $\heartsuit\triangle\heartsuit$.

5 points

21. The diagram shows five equal semicircles and the lengths of some line segments.



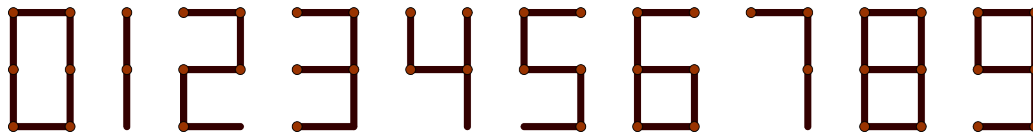
What is the radius of the semicircles?

- (A) 12 (B) 16 (C) 18 (D) 22 (E) 36

22. Some edges of a cube are to be coloured red so that every face of the cube has at least one red edge. What is the smallest possible number of edges that could be coloured red?

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

23. Matchsticks can be used to write digits, as shown in the diagram.



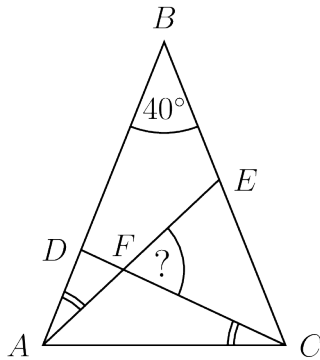
How many different positive integers can be written using exactly six matchsticks in this way?

- (A) 2 (B) 4 (C) 6 (D) 8 (E) 9

24. The edges of a square are 1 cm long. How many points on the plane are exactly 1 cm away from two of the vertices of this square?

- (A) 4 (B) 6 (C) 8 (D) 10 (E) 12

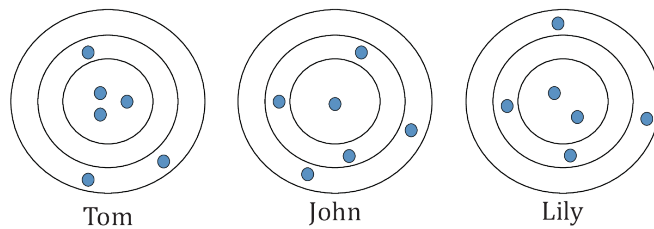
25. Triangle ABC is isosceles with $\angle ABC = 40^\circ$. The two marked angles, $\angle EAB$ and $\angle DCA$, are equal.



What is the size of the angle $\angle CFE$?

- (A) 55° (B) 60° (C) 65° (D) 70° (E) 75°

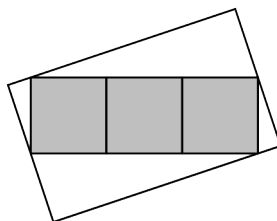
26. Tom, John and Lily each shot six arrows at a target. Arrows hitting anywhere within the same ring score the same number of points. Tom scored 46 points and John scored 34 points, as shown.



How many points did Lily score?

- (A) 37 (B) 38 (C) 39 (D) 40 (E) 41

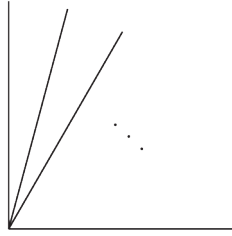
27. The diagram shows a rectangle made from three grey squares, each of area 25 cm^2 , inside a larger white rectangle. Two of the vertices of the grey rectangle touch the mid-points of the shorter sides of the white rectangle and the other two vertices of the grey rectangle touch the other two sides of the white rectangle.



What is the area, in cm^2 , of the white rectangle?

- (A) 125 (B) 136 (C) 149 (D) 150 (E) 172

28. Angel has drawn a right angle. He wants to draw some straight lines coming off the vertex of the 90 degree angle, as shown, so that for any of the values 10° , 20° , 30° , 40° , 50° , 60° , 70° and 80° you can choose a pair of lines with the angle between them equal to that value.



What is the smallest number of lines that should be drawn?

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

29. The sum of 2023 consecutive integers is 2023. What is the sum of digits of the largest of these integers?

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

30. Snow White organised a chess competition for the seven dwarves, in which each dwarf played one game with every other dwarf. On Monday, Grumpy played 1 game, Sneezy played 2, Sleepy 3, Bashful 4, Happy 5 and Doc played 6 games. How many games did Dopey play on Monday?

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

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

