Canguro Matemático Costarricense

Cadet Test
Seventh grade
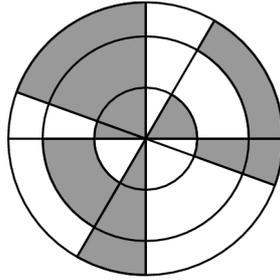
Student name:_____

Name of the school:_____

Kangourou Sans Frontières
Costa Rica 2021

3 points

 # 1. Which of the following symbols for signs of the Zodiac has an axis of symmetry?

(**A**) Saggitarius (**B**) Scorpio (**C**) Leo

(**D**) Cancer (**E**) Capricorn

 # 2. The figure shows three concentric circles with four lines passing through their common centre.

What percentage of the figure is shaded?

(**A**) 30% (**B**) 35% (**C**) 40% (**D**) 45% (**E**) 50%

 # 3. What is the value of $\dfrac{20 \cdot 21}{2 + 0 + 2 + 1}$?

(**A**) 42 (**B**) 64 (**C**) 80 (**D**) 84 (**E**) 105

 # 4. How many four-digit numbers have the property that their digits, from left to right, are consecutive and in ascending order?

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

 # 5. When the five pieces shown are fitted together correctly, the result is a rectangle with a calculation written on it.

What is the answer to this calculation?

(**A**) −100 (**B**) −8 (**C**) −1 (**D**) 199 (**E**) 208

 # 6. Each of the five vases shown has the same height and each has a volume of 1 litre. Half a litre of water is poured into each vase. In which vase would the level of the water be the highest?
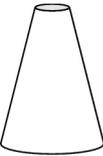

(**A**) (**B**) (**C**) (**D**) (**E**)

 # 7. A student correctly added the two two-digit numbers on the left of the board and got the answer 137.

$$\begin{array}{r} AB \\ + CD \\ \hline 137 \end{array} \qquad \begin{array}{r} ADCB \\ + CBAD \\ \hline ? \end{array}$$
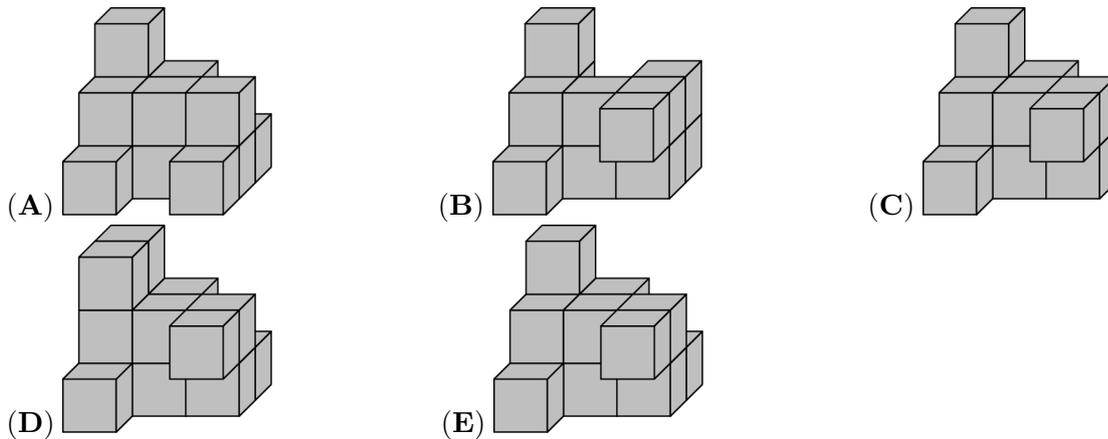
What answer will he get if he adds the two four-digit numbers on the right of the board?

(**A**) 13737   (**B**) 13837   (**C**) 14747   (**D**) 23737   (**E**) 137137

 # 8. A $3 \times 3 \times 3$ cube is made from white, grey and black $1 \times 1 \times 1$ cubes, as shown in the first diagram. The other two diagrams show the white part and the black part of the cube.
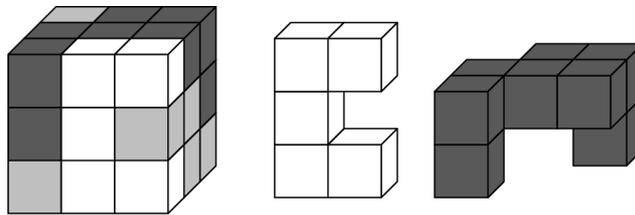
Which of the following diagrams shows the grey part?

(**A**)   (**B**)   (**C**)

(**D**)   (**E**)

 # 9. A bike lock has four wheels numbered with the digits 0 to 9 in order. Each of the four wheels is rotated by 180° from the code shown in the first diagram to get the correct code.

$$\boxed{6}\boxed{3}\boxed{4}\boxed{8} \quad 180°$$

What is the correct code for the bike lock?

(**A**) 0815   (**B**) 1893   (**C**) 1972   (**D**) 4892   (**E**) 8436

**# 10.** Byron is 5cm taller than Aaron, but 10cm shorter than Caron. Darren is 10cm taller than Caron, but 5cm shorter than Erin. Which of the following statements is true?

(**A**) Aaron and Erin are equal heights   (**B**) Aaron is 10cm taller than Erin

(**C**) Aaron is 10cm shorter than Erin   (**D**) Aaron is 30cm taller than Erin

(**E**) Aaron is 30cm shorter than Erin

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4 points

 # 11. Three rectangles of the same height are positioned as shown. The numbers within the rectangles indicate their areas in cm^2.
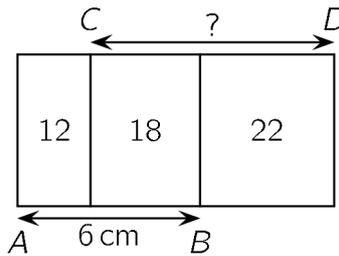

If $AB = 6$ cm, how long is CD?

(**A**) 7 cm   (**B**) 7.5 cm   (**C**) 8 cm   (**D**) 8.2 cm   (**E**) 8.5 cm

 # 12. Ronja had four white tokens and Wanja had four grey tokens. They played a game in which they took turns to place one of their tokens to create two piles. Ronja placed her first token first. Which pair of piles could they not create?

 # 13. My little brother has a 4-digit bike lock with the digits 0 to 9 on each part of the lock as shown. He started on the correct combination and turned each part the same amount in the same direction and now the lock shows the combination 6348.
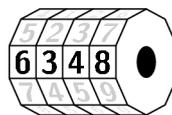
Which of the following CANNOT be the correct combination of my brother's lock?
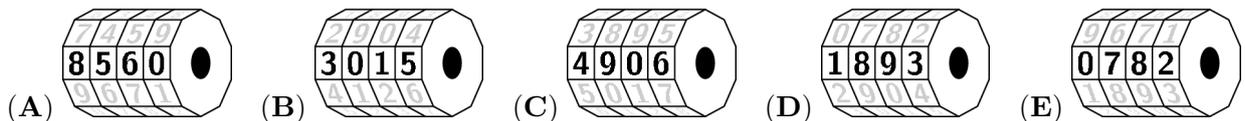
14. There is a single train track between points X and Y.

A train company wants one train to leave from X and one train to leave from Y at the same time daily. Moving with constant speed it takes 180 minutes for a train to make a trip from X to Y and 60 minutes from Y to X. They want to build a double track to avoid a crash. Where should the double track be?

(**A**) X ——————————— Y

(**B**) X ——————————— Y

(**C**) X ——————————— Y

(**D**) X ——————————— Y

(**E**) X ——————————— Y

15. Maurice asked the canteen chef for the recipe for his pancakes.

Ingredientes para 100 panqueques

25 Huevos   4 Litros de leche
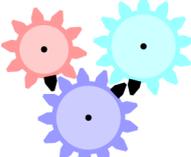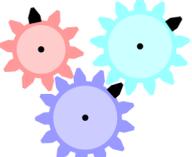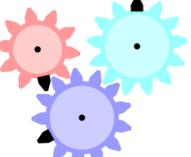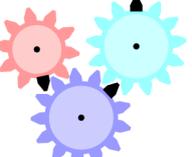
5 kg Harina   1 kg de mantequilla

Maurice has 6 eggs, 400g flour, 0,5 liters of milk and 200g butter. What is the largest number of pancakes he can make using this recipe?

(**A**) 6   (**B**) 8   (**C**) 10   (**D**) 12   (**E**) 15

16. The picture shows three gears with a black gear tooth on each.
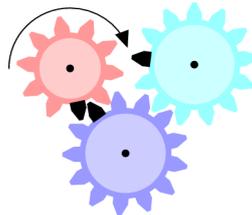
Which picture shows the correct position of the black teeth after the small gear has turned a full turn clockwise?

(**A**)   (**B**)   (**C**)   (**D**)   (**E**)
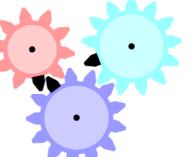
**# 17.** A rectangular chocolate bar is made of equal squares. Neil breaks off two complete strips of squares and eats the 12 squares he obtains. Later, Jack breaks off one complete strip of squares from the same bar and eats the 9 squares he obtains. How many squares of chocolate are left in the bar?

(**A**) 72   (**B**) 63   (**C**) 54   (**D**) 45   (**E**) 36

 # 18. A jar one fifth filled with water weighs 560 g. The same jar four fifths filled with water weighs 740 g. What is the weight of the empty jar?

(**A**) 60 g   (**B**) 112 g   (**C**) 180 g   (**D**) 300 g   (**E**) 500 g

 # 19. The diagram shows three hexagons with numbers at their vertices, but some numbers are invisible. The sum of the six numbers around each hexagon is 30.
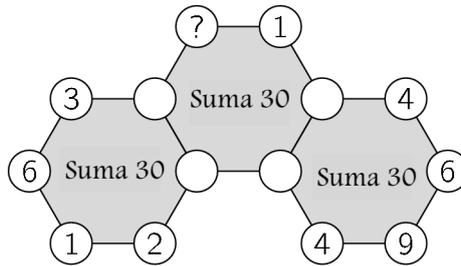
What is the number on the vertex marked with a question mark?

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

 # 20. Costa is building a new fence in his garden. He uses 25 planks of wood, each of which are 30 cm long. He arranges these planks so that there is the same slight overlap between any two adjacent planks.

The total length of Costa's new fence is 6.9 metres. What is the length in centimetres of the overlap between any pair of adjacent planks?

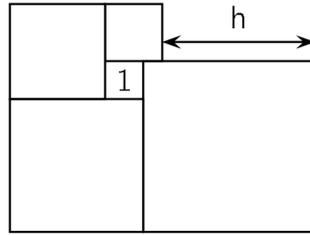(**A**) 2.4   (**B**) 2.5   (**C**) 3   (**D**) 4.8   (**E**) 5

5 points

 # 21. There are 20 questions in a quiz. Each correct answer scores 7 points, each wrong answer scores −4 points, and each question left blank scores 0 points. Eric took the quiz and scored 100 points. How many questions did he leave blank?

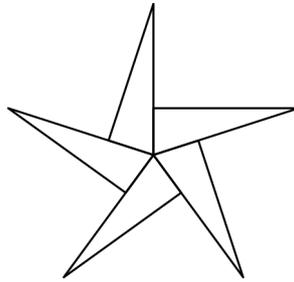(**A**) 0   (**B**) 1   (**C**) 2   (**D**) 3   (**E**) 4

 # 22. Five squares are positioned as shown. The small square indicated has area 1.

What is the value of h?

(**A**) 3   (**B**) 3.5   (**C**) 4   (**D**) 4.2   (**E**) 4.5

 # 23. Five identical right-angled triangles can be arranged so that their larger acute angles touch to form the star shown in the diagram.

It is also possible to form a different star by arranging more of these triangles so that their smaller acute angles touch. How many triangles are needed to form the second star?

(**A**) 10   (**B**) 12   (**C**) 18   (**D**) 20   (**E**) 24

 # 24. A rectangular strip of paper of dimensions 4×13 is folded as shown in the diagram. Two rectangles are formed with areas P and Q where $P = 2Q$.
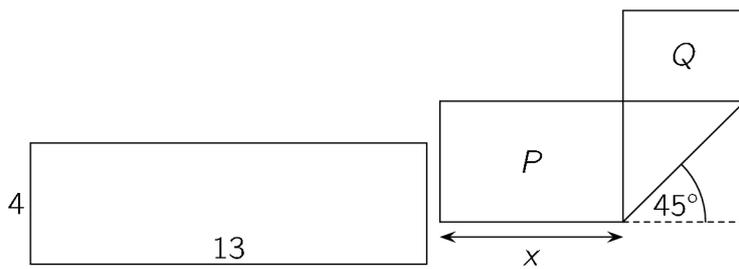
What is the value of x?

(**A**) 5   (**B**) 5.5   (**C**) 6   (**D**) 6.5   (**E**) $4\sqrt{2}$

 # 25. A box of fruit contains twice as many apples as pears. Christy and Lily divided them up so that Christy had twice as many pieces of fruit as Lily. Which one of the following statements is always true?

(**A**) Christy took at least one pear.

(**B**) Christy took twice as many apples as pears.

(**C**) Christy took twice as many apples as Lily.

(**D**) Christy took as many apples as Lily got pears.

(**E**) Christy took as many pears as Lily got apples.

 # 26. Three villages are connected by paths as shown. From Downend to Uphill, the detour via Middleton is 1km longer than the direct path. From Downend to Middleton, the detour via Uphill is 5km longer than the direct path. From Uphill to Middleton, the detour via Downend is 7km longer than the direct path.
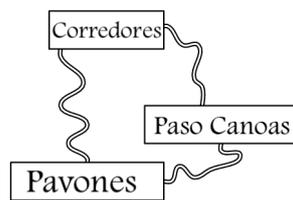

How long is the shortest of the three direct paths between the villages?

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

 # 27. In a particular fraction the numerator and denominator are both positive. The numerator of this fraction is increased by 40%. By what percentage should its denominator be decreased so that the new fraction is double the original fraction?

(**A**) 10%   (**B**) 20%   (**C**) 30%   (**D**) 40%   (**E**) 50%

 # 28. A triangular pyramid is built with 20 cannon balls, as shown. Each cannon ball is labelled with one of A, B, C, D or E. There are four cannon balls with each type of label. The picture shows the labels on the cannon balls on three of the faces of the pyramid.
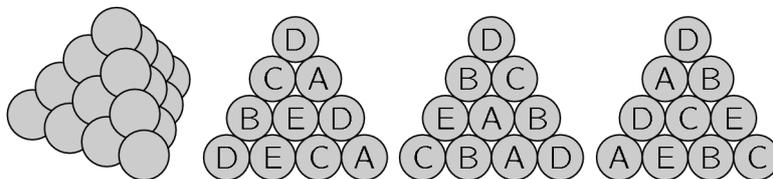
What is the label on the hidden cannon ball in the middle of the fourth face?

(**A**) A   (**B**) B   (**C**) C   (**D**) D   (**E**) E

 # 29. The 6-digit number $2ABCDE$ is multiplied by 3 and the result is the 6-digit number $ABCDE2$. What is the sum of the digits of this number?

(**A**) 24   (**B**) 27   (**C**) 30   (**D**) 33   (**E**) 36

 # 30. A soccer ball is made of white hexagons and black pentagons, as seen in the picture. There are a total of 12 pentagons.

How many hexagons are there?

(**A**) 12   (**B**) 15   (**C**) 18   (**D**) 20   (**E**) 24

Name:_____

School:_____

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

Costa Rica