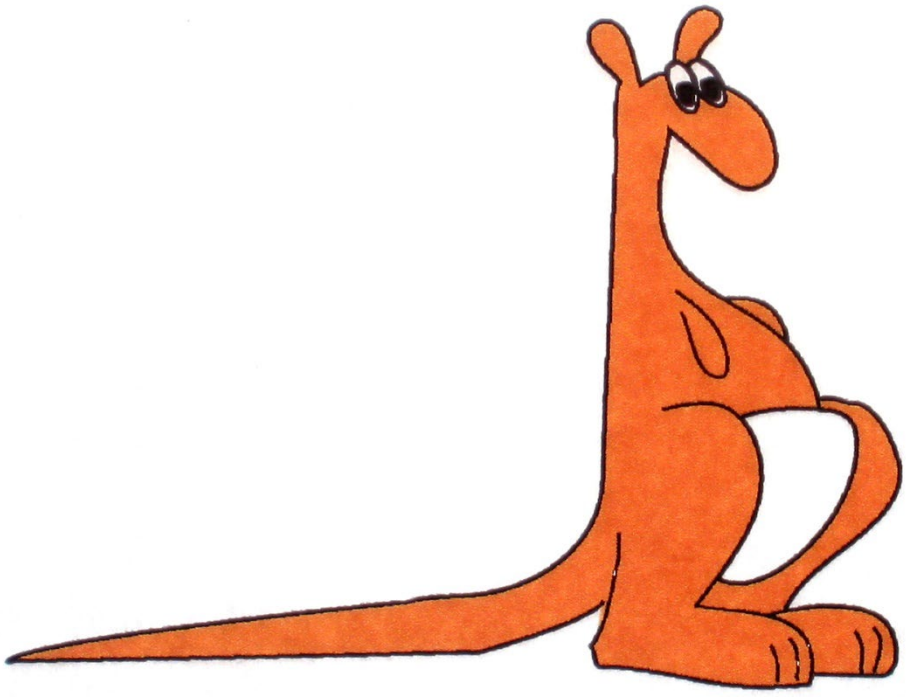
Kengurukonkurransen 2023

«Et sprang inn i matematikken»

Benjamin (6.–8. trinn)

Problems in English



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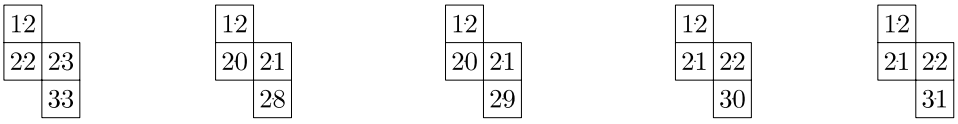
3 points

1. Holger fills the rest of the table with the numbers up to 40, following the system shown:

1	2	3	4	5	6	7	8
9	10	11	12				

Which of the pieces shown could he cut from the table?



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

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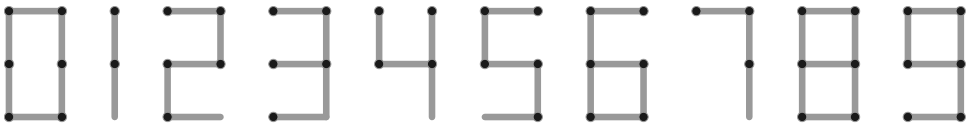
2. Matchsticks can be placed to build numbers, as shown. For example, to build the number 15, one needs 7 matchsticks, and one needs the same number of matchsticks to build the number 8.



What is the largest positive number that can be built with seven matchsticks?

(A) 31 (B) 51 (C) 74 (D) 711 (E) 800

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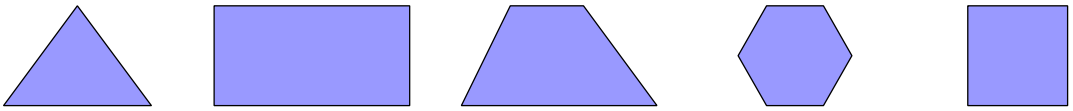
3. Which of the following shapes cannot be divided into two triangles by a single straight line?



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

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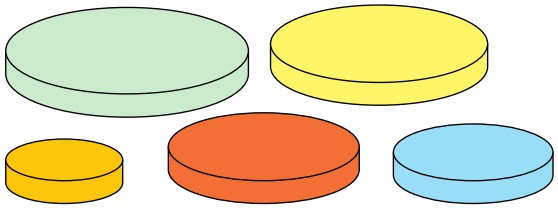
4. Anna has five circular discs of different sizes.
She wants to build a tower of four discs so that each disc in her tower is smaller than the disc immediately below it.



How many different towers could Anna build?

(A) 4 (B) 5 (C) 9 (D) 12 (E) 20

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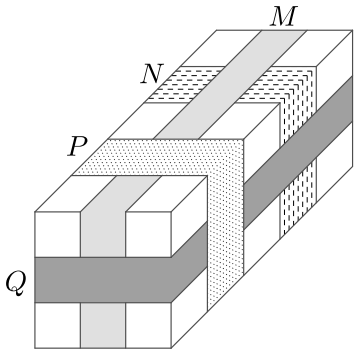
5. The picture shows a parcel around which four tapes labelled M, N, P and Q are placed.



In what order, from first to last, were the tapes placed?

(A) M, N, Q, P (B) N, M, P, Q (C) N, Q, M, P (D) N, M, Q, P (E) Q, N, M, P

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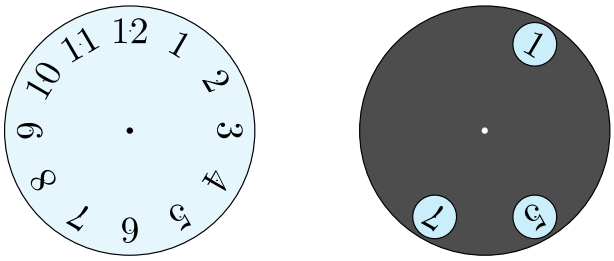
6. The grey circle with three holes punched in it is placed on top of the clock-face.
The grey circle is turned around its center.



Which three numbers is it possible to see at the same time?

(A) 2, 4 and 9 (B) 1, 5 and 10 (C) 4, 6 and 12 (D) 3, 6 and 9 (E) 5, 7 and 12

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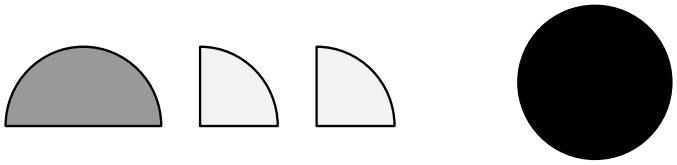
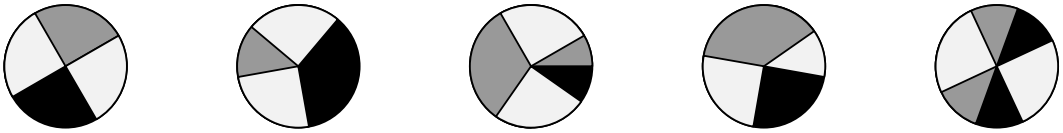
7. Jonte glued the three pieces of paper shown onto the black circle on the right.



Which of the following patterns could he not obtain?



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

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8. Francesca wrote down two consecutive whole numbers in order, but instead of digits she used symbols so she wrote: ■◆, ♥▲, ♥■.

What would she write next?

(A) ♥♥ (B) ■♥ (C) ■■ (D) ◆■ (E) ♥◆

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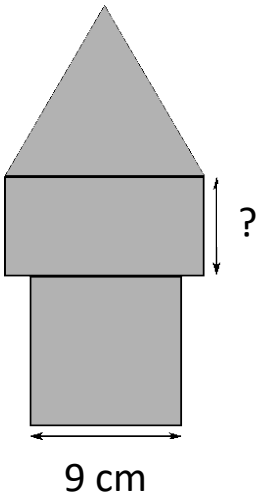
4 points

9. Katie painted a tower, as the figure shows.
The tower consists of three pieces, a square, a rectangle and an equilateral triangle.
The three pieces have the same perimeter.



If each side of the square is 9 cm, what is the length of the marked side of the rectangle?

(A) 2 (B) 4 (C) 6 (D) 8 (E) 10

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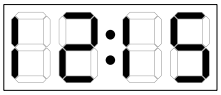
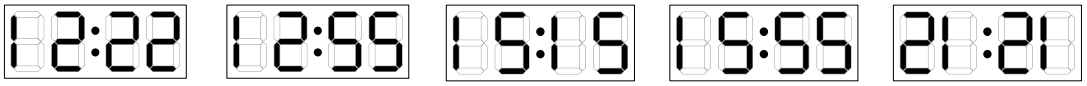
10. When I look in a mirror, I can see the image of my digital clock standing on the table behind me, as shown.



What image will I see when I look in the mirror 30 minutes later?



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

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11. Goran has four blocks, stacked as shown.

In a single move, Goran can take some, or all, of the blocks from the top of the stack and place them upside down, as shown.

He wants the blocks to be stacked in this order :

What is the smallest number of moves he needs to make to get to the correct order?

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

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12. 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

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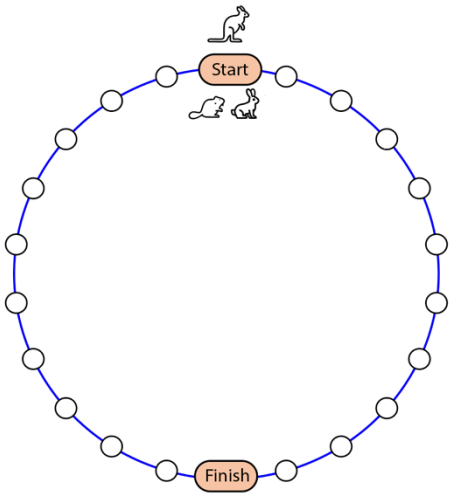
13. A rabbit, a beaver and a kangaroo are having a competition.The beaver moves one space at a time, the rabbit moves two spaces at a time and the kangaroo moves three spaces at a time. They all start from the point marked START. The winner is the animal who lands exactly on the point marked FINISH in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

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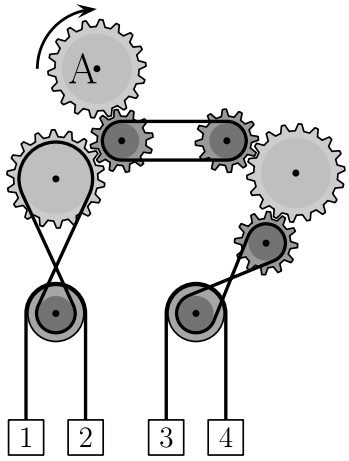
14. The gear marked A is turned clockwise, as shown.



Which two boxes will move upwards?

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

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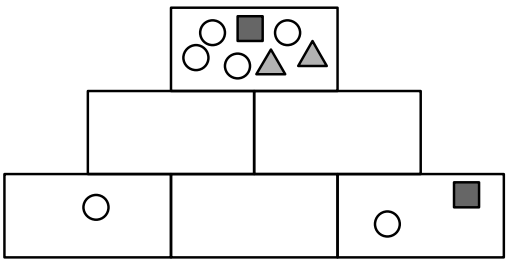
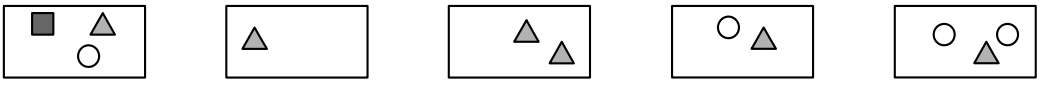
15. Tian wants to draw figures in the six boxes of the pyramid shown. Each box should contain all of the figures in the two boxes directly below it and nothing more. She has drawn the figures in some of the boxes already.



Which figures should she draw in the box in the middle of the bottom row?



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

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16. Martha chose one of the five structures below and combined it with the structure on the right. The table shows the number of cubes in each column in the combined structure when seen from above.

3	2	3
2	1	2
1	0	1

Which of the five structures did Martha choose?

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

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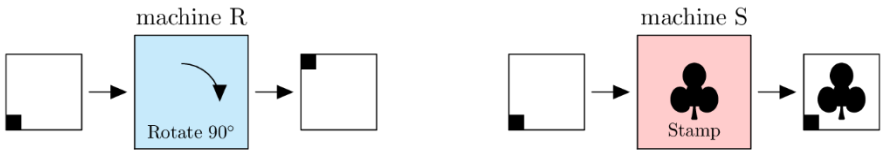
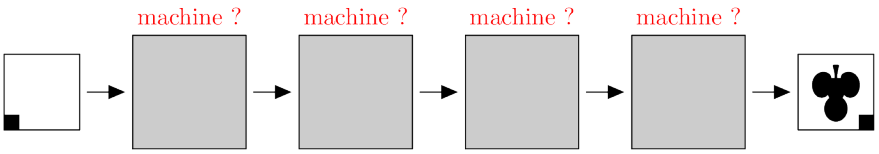
5 points

17. 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) S-R-R-R (B) R-S-R-R (C) S-R-S-R (D) R-R-R-S (E) S-R-R-S

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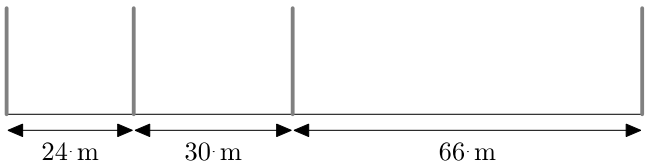
18. Four stakes are placed along a 120 m track, as shown.



What is the smallest number of stakes that should be added so that the track is divided into sections of equal length?

(A) 12 (B) 15 (C) 17 (D) 20 (E) 37

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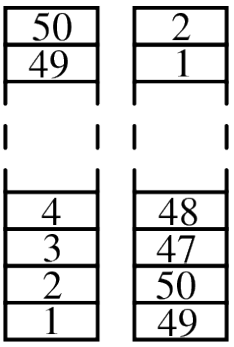
19. On a table there is a tower made of blocks numbered from 1 to 50. Emma builds a new tower in the following way. She takes two blocks from the top of the original tower and puts them on the table as the base of the new tower. She continues by taking the two top blocks from the remainder of the original tower and putting them on the top of the new tower, as seen in the diagram.



Which of the following pairs of numbers are on adjacent blocks in the new tower?

(A) 29 and 28 (B) 34 and 35 (C) 29 and 26 (D) 31 and 33 (E) 27 and 30

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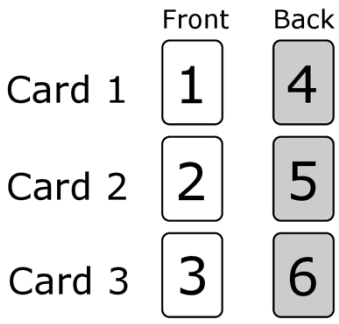
20. Martin has three cards with numbers written on both sides. The card with number 1 on one side has number 4 on the opposite side, the card with 2 on has 5 on the opposite side and the card with 3 on has 6 on the opposite side. Martin randomly places three cards on the table and adds up the three numbers he sees.



How many different sums can Martin get?

(A) 3 (B) 4 (C) 5 (D) 6 (E) 10

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21. 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

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22. 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

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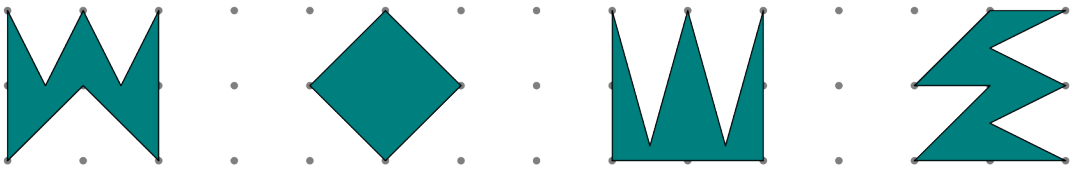
23. Which of the following four shapes has the greatest area?



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

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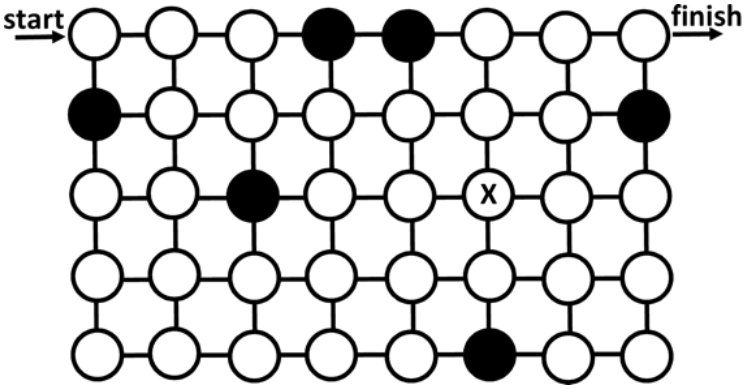
24. An explorer wants to find a path through the maze shown from the point marked 'start' to the point marked 'finish'. She can only move horizontally or vertically and she can only pass through white circles. She also has to pass through all the white circles exactly once.



When she reaches the circle marked X, what will her next move be?

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

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Answer sheet for the student

Name: ……..

Mark your answer in the schema below.

Problem	A	B	C	D	E	Points
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
					Sum	

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