



Till läraren

## Välkommen till Kängurutävlingen – Matematikens hopp 2024 *Benjamin*

- Tävlingen genomförs under perioden 21 mars – 5 april. *Uppgifterna får inte användas tidigare.*
- Sista dag för redovisning av antalet deltagare är den *12 april*. Du får då tillgång till facit och ett kalkylblad där du matar in elevernas svar och sedan får du en sammanställning av klassens resultat.
- Redovisa resultatet senast *30 april*.
- *Tävlingen är individuell* och eleverna får arbeta i 60 minuter. De tre delarna ska genomföras vid *ett och samma tillfälle*.
- Eleverna behöver ha tillgång till papper för att kunna göra anteckningar och figurer. Linjal behövs inte.
- *Miniräknare eller sax får inte användas. Observera att telefoner, datorplattor och datorer inte heller får användas.*
- Läs igenom problemen själv i förväg så att eventuella oklarheter kan redas ut.
- Kontrollera att kopiorna blir tillräckligt tydliga så att nödvändiga detaljer syns.
- Besök *Kängurusidan* på [ncm.gu.se/kanguru](http://ncm.gu.se/kanguru) där vi publicerar eventuella rättelser och ytterligare information. Där finns också information om hur kalkylbladet fungerar.
- Samla in problemformulären efter tävlingen. Problemen får inte spridas utanför klassrummet förrän efter 30 april, men ni får gärna arbeta med problemen i klassen.

### *Mikael Passares stipendium*

Mikael Passare (1959–2011) var professor i matematik vid Stockholms universitet. Han hade ett stort intresse för matematikundervisning på alla nivåer och var den som tog initiativ till Kängurutävlingen i Sverige. Mikael Passares minnesfond har instiftat ett stipendium för att uppmärksamma elevers goda matematikprestationer. Information om hur du nominerar elever kommer tillsammans med facit och kommentarer.

### *Lycka till med årets Känguru!*

e-post: [kanguru@ncm.gu.se](mailto:kanguru@ncm.gu.se)

För administrativa frågor, vänd dig till Ann-Charlotte Forslund:  
[ann-charlotte.forslund@ncm.gu.se](mailto:ann-charlotte.forslund@ncm.gu.se)  
031–786 69 85

För innehållsfrågor, vänd dig till Ulrica Dahlberg eller Johan Häggström:  
[ulrica.dahlberg@ncm.gu.se](mailto:ulrica.dahlberg@ncm.gu.se)  
[johan.haggstrom@ncm.gu.se](mailto:johan.haggstrom@ncm.gu.se)



# Svarsblankett

Markera ditt svar i rätt ruta

Uppgift	A	B	C	D	E	Poäng
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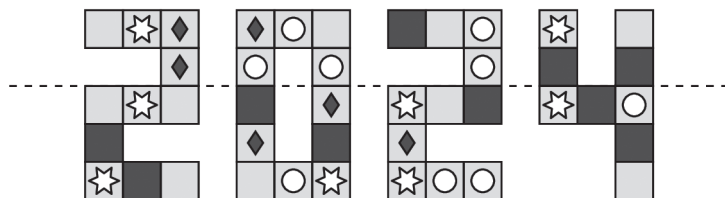
# Kängurutävlingen – Matematikens hopp 2024

## Benjamin



Three points problem

- 1 Alina folds the image below along the dashed line.



Which of the following squares folds onto an identical one?

- A: B: C: D: E:

[Iran]

- 2 The picture shows the first six squares of a hopping game. Mia keeps jumping in the same way.

In which of the following squares will Mia land only on her right foot?

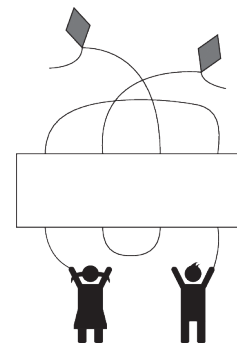
- A: square 10  
B: square 15  
C: square 20  
D: square 21  
E: square 22



[Österrike]

- 3 Which of the drawings should be placed in the space in the picture so that each child is connected to a *different* kite?

- A: B: C: D: E:

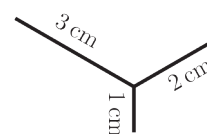


[Katalonien]

- 4 Mona draws the image shown to the right without lifting her pencil from the paper.

What is the shortest total length she could draw?

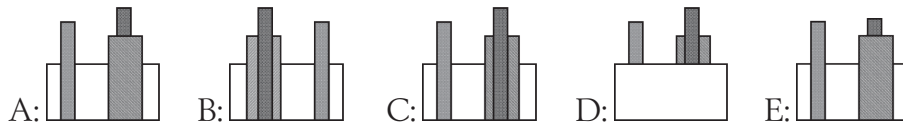
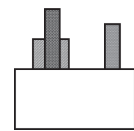
- A: 6 cm B: 7 cm C: 8 cm D: 9 cm E: 10 cm



[Tyskland]

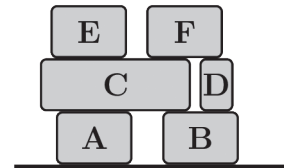


- 5 Dina has set up her three bricks on the floor behind a wall. When seen from the front, the bricks look like this. How do the bricks look from the back?

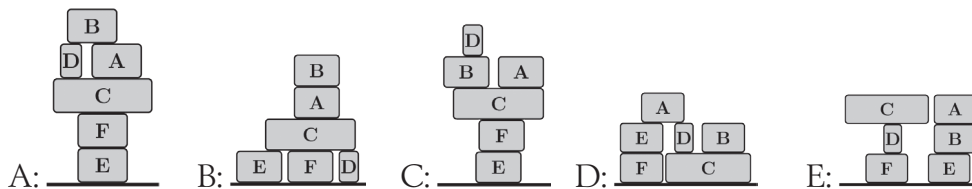


[Schweiz]

- 6 There are six boxes stacked as shown in the picture. Kangaroo takes them down one at a time and stacks them in a different way. He can only move a box when there is no other box on top of it. Each box is moved only once.

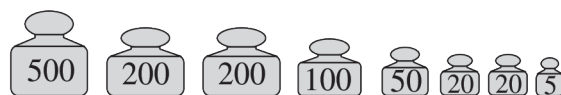


Which of the following towers can he NOT build?

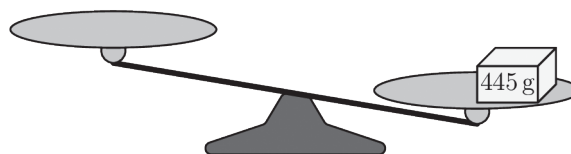


[Grekland]

- 7 Peter has a package of 445 g and the following eight weights:



He puts the package on one side of the scale as shown. He puts on weights to balance the scale and sees that this can be done in different ways. He wants to use as few weights as possible.



What is the *minimum number* of weights he needs to balance the scale?

- A: 2      B: 3      C: 4      D: 5      E: 6

[Polen]

- 8 Kangaroo stays in a hotel with many rooms. The rooms are numbered in ascending order, starting from 1. Kangaroo counted the digits in the numbers on the doors of the rooms and found that the digit 2 appears 14 times and the digit 5 appears 3 times.

What is the largest room number in the hotel?

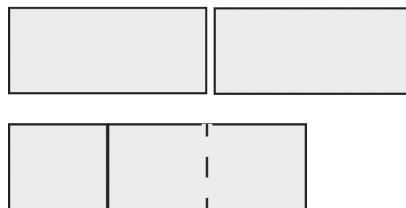
- A: 25      B: 26      C: 34      D: 35      E: 41

[Slovakien]



Four points problem

- 9 Two identical rectangles, each with an area of 18, overlap to form a new rectangle, as shown. The new rectangle can be divided into three identical squares.

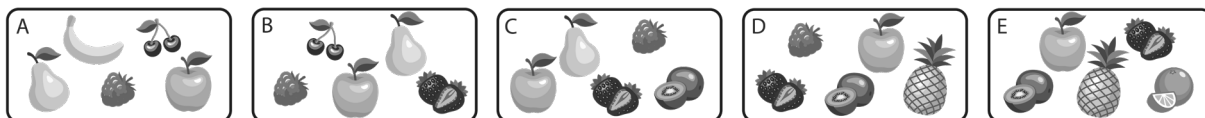


What is the area of the new rectangle?

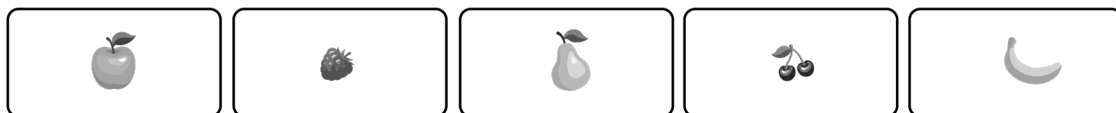
- A: 24      B: 27      C: 30      D: 32      E: 36

[Norge]

- 10 Kangaroo has five fruit boxes marked A, B, C, D and E.



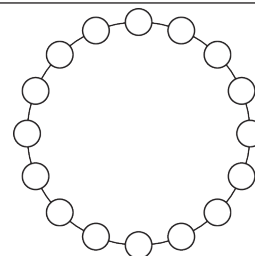
He takes away fruit until there was only one fruit in each box, as shown in the pictures below. Which letter is on the box where there is only an apple left?



- A: A      B: B      C: C      D: D      E: E

[Grekland]

- 11 Each of the circles shown contains a number. Numbers in neighbouring circles differ by 1. One of the circles contains the number 5 and another one contains the number 13.



How many *different* numbers must there be in the circles?

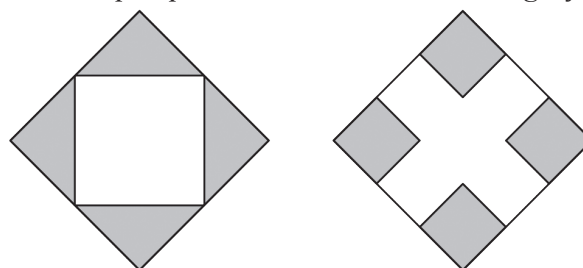
- A: 9      B: 19      C: 13      D: 14      E: 16

[Grekland]

- 12 The two large squares in the picture have the same area. In the left square, the midpoints of adjacent sides are joined to create four grey triangles. In the right square, each side is divided into three equal parts to create four smaller grey squares in the corners.

The grey area in the left square is 9.

How large is the grey area in the right square?

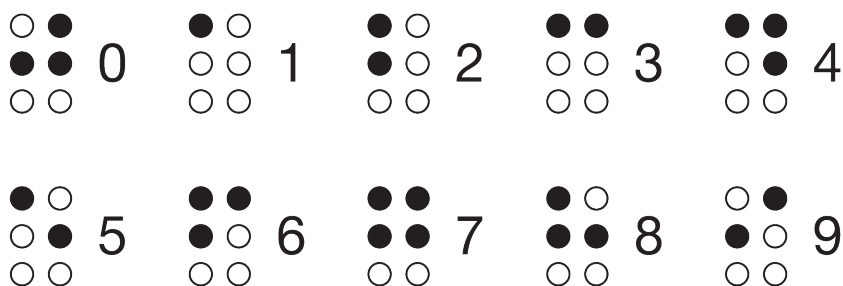


- A: 4      B: 8      C: 9      D: 10      E: 12

[Kina]



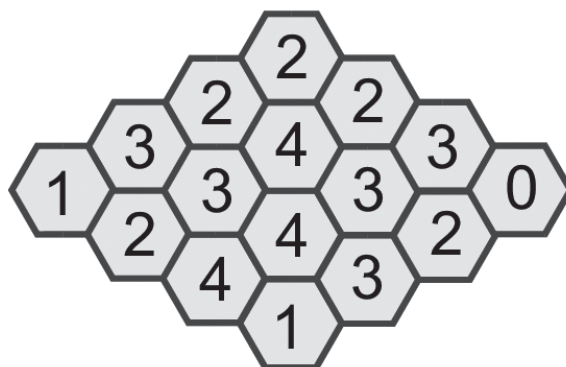
- 13 The Braille system for blind people creates numbers through raised or depressed dots in different patterns. Raised dots are in this representation of the digits 0–9 shown as black dots.



How many *different* two-digit numbers contain exactly five black dots?

- A: 16      B: 18      C: 30      D: 32      E: 34

- 14 The figure below shows a beehive with 16 cells. Some of the cells contain honey. The number in each cell indicates how many of its neighbouring cells contain honey. Two cells are neighbours if they share a common edge. How many cells in the beehive contain honey?

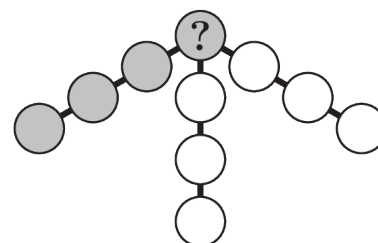


- A: 7      B: 8      C: 9      D: 10      E: 11

[Turkiet]

- 15 Annie wants to place the numbers 1 to 10 in the circles in the diagram, with one number in each circle. She wants the sum of the numbers in each straight line to be 23.

What number must she place in the circle containing the question mark?

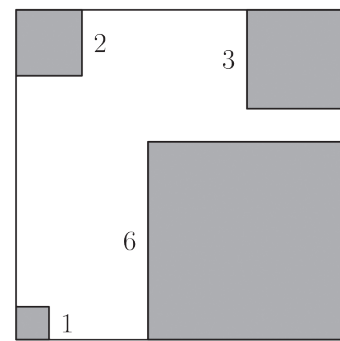


- A: 4      B: 5      C: 6      D: 7      E: 8

[Grekland]



- 16 Christian has cut four small squares from the corners of the larger square, so that the remaining area is half of the area of the original square. The side-lengths of the small squares are shown in the diagram.



What is the perimeter of the remaining shape?

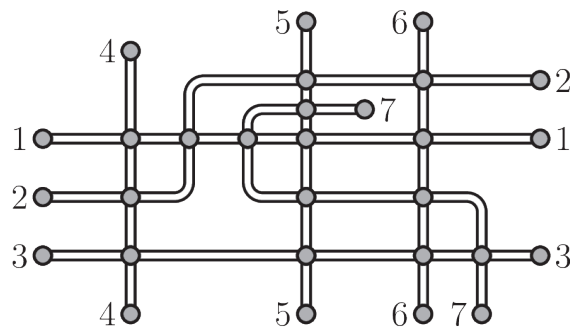
- A: 36      B: 40      C: 44      D: 48      E: 52

[Iran]

Five points problem

- 17 The figure shows the plan of the seven train routes of a small town.

The circles indicate the stations.  
Martin wants to paint the lines so that all lines who share a common station are painted with different colours.



What is the smallest number of colours he can use?

- A: 3      B: 4      C: 5      D: 6      E: 7

[Grekland]

- 18 There are three identical special dice on the table.

What is the sum of the numbers on the faces that touch the table?

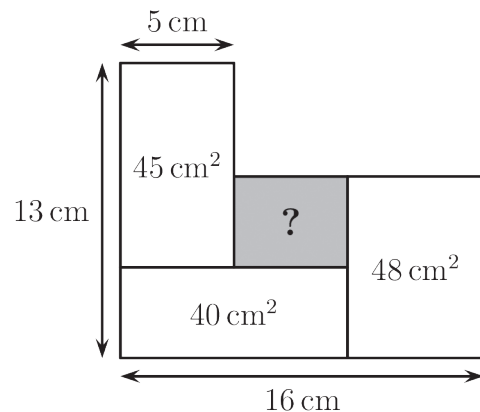


- A: 26      B: 40      C: 43      D: 47      E: 56

[Slovakien]

- 19 The diagram shows four touching rectangles.

What is the area of the shaded rectangle?

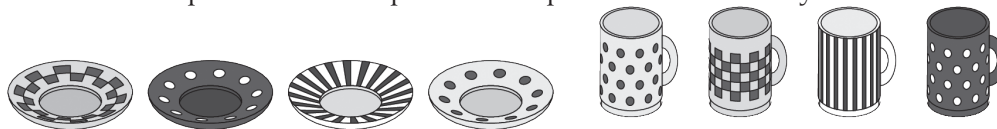


- A: 12 cm<sup>2</sup>      B: 14 cm<sup>2</sup>      C: 16 cm<sup>2</sup>      D: 18 cm<sup>2</sup>      E: 20 cm<sup>2</sup>

[Myanmar]



- 20 Simon takes four cups out of the cupboard and puts them randomly on the four saucers.



Which statement is correct?

- A: It is certain that none of the 4 cups stands on its matching saucer.  
 B: It is certain that exactly 1 cup stands on its matching saucer.  
 C: It is impossible for exactly 2 cups to stand on its matching saucer.  
 D: It is impossible for exactly 3 cups to stand on its matching saucer.  
 E: It is impossible for all 4 cups to stand on its matching saucer.

[Tyskland]

- 21 A grandmother has some candies. She decides to divide them up amongst her grandchildren so that each has a bag containing same number of candies. She puts the largest possible number of candies in each bag and, when she is done, there are 20 candies in each bag and 12 candies are left over.

What is the smallest possible number of candies she could have?

- A: 52      B: 232      C: 272      D: 411      E: 432

[Katalonien]

- 22 Dan plans to cut a rope into 12 equal pieces and marks points where he needs to cut. Muhammad plans to cut the same rope into 16 equal pieces and marks points where he needs to cut. Then Maya cuts the rope at all the marked points.

How many pieces does Maya get?

- A: 24      B: 25      C: 27      D: 28      E: 29

[Israel]

- 23 Emma is playing with the seven caterpillar puzzle pieces shown.



She wants to build a caterpillar that has 1 head, 1 tail and either 1, 2 or 3 puzzle pieces in between.

How many different caterpillars could Emma build?

- A: 10      B: 14      C: 16      D: 20      E: 28

[Tyskland]

- 24 Amelia writes a three-digit number on the whiteboard. Then Brandon writes a fourth digit to the right of the previous ones. He says "Look! The number increased by 2024".

What digit did Brandon write?

- A: 2      B: 3      C: 4      D: 8      E: 9

[Katalonien]