



Till läraren

Välkommen till Kängurutävlingen – Matematikens hopp 2025 *Junior*

- Tävlingen genomförs under perioden 20–28 mars. *Uppgifterna får inte användas tidigare.*
- Du får tillgång till facit och ett kalkylblad, lösenord finns på mailet du fått. 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 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

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

För innehållsfrågor, vänd dig till Ulrica Dahlberg:
ulrica.dahlberg@ncm.gu.se



Svarsblankett

Markera ditt svar i rätt ruta

Uppgift	A	B	C	D	E	Poäng
1						
2						
3						
4						
5						
6						
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SUMMA						

Namn:.....

Klass:.....

Kängurutävlingen – Matematikens hopp 2025

Junior



Tree points problem

1. The brochure shown has flaps with transparent windows.

What is the sum of the numbers that can be seen through the windows when both flaps are folded over?

□	□	□	4	9	2	□	□
□	□	□	3	5	7	□	□
□	□	□	8	1	6	□	□

- A: 7 B: 9 C: 12 D: 14 E: 15

[Tunisia]

2. In which of the following hexagons is one third of the area black while half of the area is white?



[Germany]

3. The base of a triangle increases by 50% and its height decreases by one third.

What is the ratio of the area of the new triangle to the original triangle?

- A) 2:1 B) 1:1 C) 1:2 D) 1:3 E) 1:4

[Spain]

4. Kangaroo Day takes place every year on the third Thursday in March.

What is the earliest possible date for Kangaroo Day?

- A: 14/3 B: 15/3 C: 20/3 D: 21/3 E: 22/3

[Afghanistan]

5. Lisa has four digits. She can form the number 2025.

2025

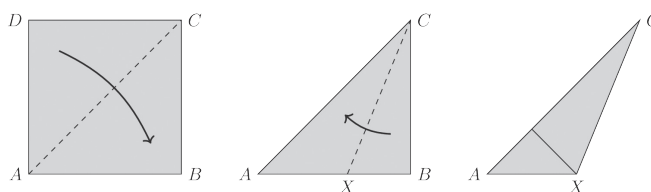
How many different numbers greater than 2025 can she form with these numbers?

- A: 3 B: 6 C: 8 D: 9 E: 11

[Austria]

6. Alex folds a square piece of paper along a diagonal to create a triangle. Then he folds the paper again so that one of the short sides of the triangle is on top of the long side of the triangle, creating the smaller triangle AXC .

What is the angle AXC ?



- A: 108° B: $112,5^\circ$ C: 120° D: 145° E: $157,5^\circ$

[Australia]



7. The four-digit number $80□□$ is missing the last two digits. The number is divisible by both 8 and 9.

What is the product of the two missing numbers?

A: 6 B: 16 C: 20 D: 24 E: 48

[Australia]

8. Luka has dogs, rabbits and cats. Eight of his pets are not dogs. Five of his pets are not rabbits. Seven of his pets are not cats.

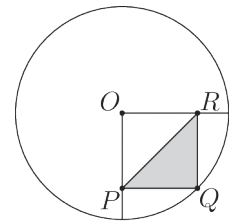
How many pets does Luka have?

A: 10 B: 11 C: 15 D: 16 E: 20

[Serbia]

Four points problem

9. A circle with center O has a radius of 10 cm. A square $OPQR$ is drawn inside the circle, where Q is a point on the circle.

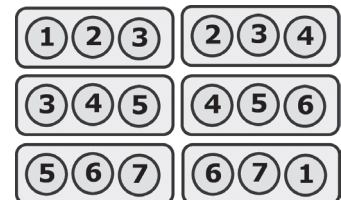


What is the area of the shaded triangle PQR ?

A: $12,5 \text{ cm}^2$ B: 25 cm^2 C: 50 cm^2 D: 75 cm^2 E: 100 cm^2

[Iraq]

10. An athlete has a collection of two gold and five silver medals. They are numbered from 1 to 7, in no particular order. The image shows six black and white photos of the medals. We know that in each photo exactly one of the medals is gold.



What is the sum of the numbers on the two gold medals?

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

[Greece]

11. Anna is looking at a photo on her mobile. The format is 16:9 and fills the entire screen. When she turns the mobile, the image becomes smaller.

What share of the screen area does the smaller image take up?



A: $\frac{3}{4}$ B: $\frac{9}{16}$ C: $\frac{27}{64}$ D: $\frac{32}{81}$ E: $\frac{81}{256}$

[Germany]

12. Kate and Tom both celebrate their birthdays today. Tom realizes that $\frac{1}{19}$ of Kate's age is equal to $\frac{1}{17}$ of his age. The sum of their ages is greater than 40 and less than 100.

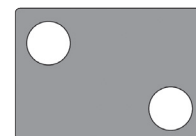
How old is Kate?

A: 19 B: 34 C: 38 D: 57 E: 76

[Georgia]



13. Paul shoots a total of 27 shots against a target with two holes. He hits 50% of shots when aiming for the upper left hole and 80% of shots when aiming for the lower right hole. He misses a total of 9 shots.



How many times did he aim and hit the upper left hole?

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

[Germany]

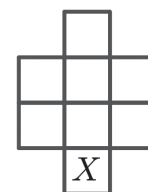
14. Sara has a bag of 18 marbles, numbered from 1 to 18.

What is the least number of marbles Sara should take out of the bag blindly to guarantee that she has taken at least three marbles with prime numbers on them?

- A: 11 B: 12 C: 13 D: 14 E: 15

[Taiwan]

15. David must place the numbers 1 to 8 in the eight boxes in the picture, one number in each box. He wants two consecutive numbers not to share a side or a corner.



What numbers can David place in the box marked X?

- A: 1 or 8 B: 2 or 7 C: 3 or 6 D: 4 or 5 E: 7 or 8

[Catalonia]

16. The integer N is the largest six-digit integer where the product of all its digits are equal to 180.

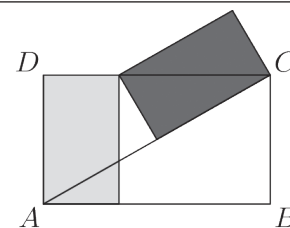
What is the sum of the digits in N?

- A: 21 B: 22 C: 23 D: 24 E: 25

[Indonesia]

Five points problem

17. The two shaded rectangles are congruent. The two shaded rectangles each have an area of 4 au.



What is the area of the large rectangle ABCD?

- A: 10 B: $8\sqrt{3}$ C: 8 D: 12 E: $4\sqrt{3}$

[China]

18. The product of three prime numbers is 11 times the sum of the three prime numbers.

What is the largest possible value that the sum can take?

- A: 14 B: 17 C: 21 D: 25 E: 26

[Georgia]



19. Five bricks are placed on the ground. Peter can only remove a brick if there are no bricks on top of it. He chooses one of the available bricks at random and removes it, until all bricks are removed.

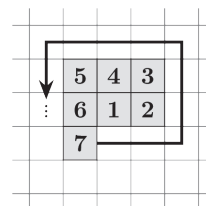


What is the probability that the brick numbered 4 is the third brick removed?

- A: $\frac{1}{3}$ B: $\frac{1}{4}$ C: $\frac{1}{5}$ D: $\frac{1}{6}$ E: $\frac{1}{8}$

[China]

20. Daniel writes numbers in the boxes. Each square has a side length of 0,5 cm. He starts with one square and then numbers the squares 2, 3, 4, 5 ... in a counter-clockwise direction. He stops when he has numbered 2025 squares.



What is the perimeter of this shape?

- A: 25 cm B: 45 cm C: 80 cm D: 90 cm E: 180 cm

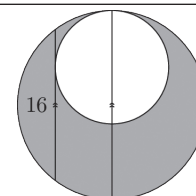
[Austria]

21. $ABCDEF$ is a six-digit integer consisting of the following digits: 1, 2, 3, 4, 5, and 6. The number formed by the first two digits AB in unchanged order is a multiple of 2. Likewise, ABC is a multiple of 3. $ABCD$ is a multiple of 4, $ABCDE$ is a multiple of 5, and the whole number $ABCDEF$ is a multiple of 6. What is the sixth digit, F ?

- A: 2 B: 4 C: 6 D: both 2 and 4 are possible E: both 4 and 6 are possible

[China]

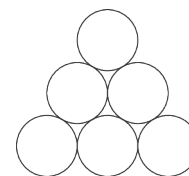
22. The diameter in the figure of the inner circle is part of the diameter of the outer circle. The outer circle has a chord of length 16 which is parallel to its diameter and is also a tangent to the inner circle. What is the area of the shaded area?



- A: 36π B: 49π C: 64π D: 81π E: more information is required

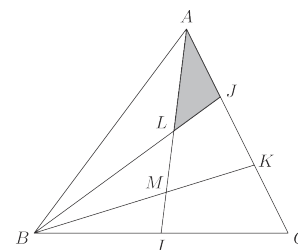
[China]

23. Six circles form a triangle, as shown. John writes the numbers from 1 to 6 in the circles so that the sum of the numbers in the circles on all three sides of the triangle is equal. He then calculates the sum of the numbers in the three circles at the corners of the triangle. How many possible sums can he get?



- A: 1 B: 2 C: 3 D: 4 E: 5

24. Triangle ABC has an area of 60 area units. Point I is the midpoint of side BC , and points J and K divide side AC into three equal segments. The point L is the intersection of AI and BK . What is the area of triangle ALJ ?



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

[Syria]