Till läraren

Välkommen till Kängurutävlingen – Matematikens hopp 2025
Cadet

- 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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8						
9						
10						
11						
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					SUMMA	

Namn:.....

Klass:.....

Kängurutävlingen – Matematikens hopp 2025
Cadet

Three points problems

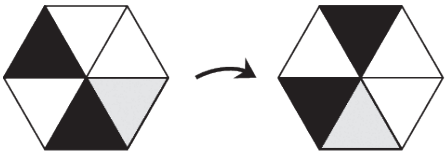
1. Lisa has four wooden numbers.
She can use them to form the number 2025.

Which of the following numbers is the largest she can form with these digits?

A: 2502 B: 5202 C: 5220 D: 5502 E: 5520

[*Austria*]

2. Isabelle rotates the hexagonal paper in the picture.
With each rotation, the hexagon turns by the same angle in the same direction.
The picture shows the result of a rotation.



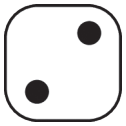
Which of the following number of rotations will make the paper look the same as it did originally?

A: 7 B: 8 C: 9 D: 10 E: 12

[*Germany*]

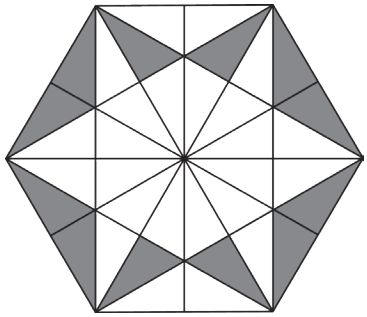
3. Sandra rolls three dice and gets a total of 8.
All three dice show different numbers of dots.

What number of dots could Sandra *not* have gotten on any of her dice?

A:  B:  C:  D:  E: 

[*Norway*]

4. A regular hexagon is divided into equal triangles.



How much of the hexagon is shaded?

A: $\frac{1}{2}$ B: $\frac{1}{3}$ C: $\frac{1}{4}$ D: $\frac{1}{5}$ E: $\frac{1}{6}$

[*Morocco*]

5. How many 12-minute periods are there in 12 hours?

A: 60 B: 24 C: 12 D: 10 E: 6

[*United Kingdom*]

6. Daniel is 5 years old. His brother Dominic is 6 years older.

   What will the sum of their ages be in 7 years?

   A: 26 B: 27 C: 28 D: 29 E: 30

   [*United Kingdom*]

7. Ohad wants to write the four numbers 2, 0, 2 and 5 in the four boxes.

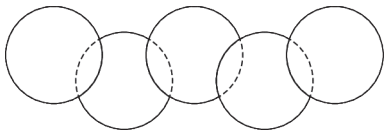
   $\square - \square + \square - \square$

   What is the smallest result that Ohad can get?

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

   [*Germany*]

8. Five circles overlap each other and each of them has an area of 8 cm^2. The area of the regions where two circles overlap is 1 cm^2.

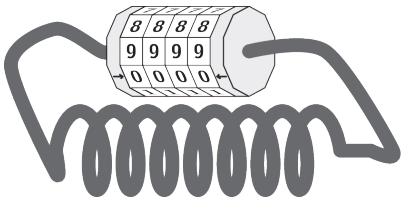
   What is the total area covered by the figure?

   A: 32 cm^2 B: 36 cm^2 C: 38 cm^2 D: 39 cm^2 E: 42 cm^2

   [*Afghanistan*]

Four points problems

9. The combination for a bicycle lock is "0000". But to someone looking from the side, it looks like "8888". When Paul looks from the side, he sees the combination of his friend's lock as 2815.

   What is the real combination for this lock?

   A: 4037 B: 4693 C: 0639 D: 0693 E: 9603

   [*Turkia*]

10. There are ten more truth tellers than liars in a room. Everyone in the room was asked, "Are you a truth teller?" Everyone answered, and a total of 20 people answered, "Yes."

    How many liars are there in the room?

    A: 0 B: 5 C: 15 D: 20 E: 25

    [*USA*]

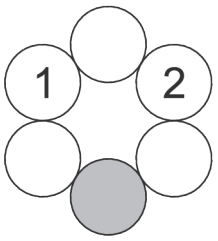
11. There are five hurdles in a 60-meter race. The first hurdle is after 12 meters. The distance between two consecutive hurdles is 8 meters.

    How far is it from the last hurdle to the finish line?

    A: 16 m B: 14 m C: 12 m D: 10 m E: 8 m

    [*Uganda*]

12. Edgar wants to write a number in each ring. He wants each number to be equal to the sum of the numbers in the two adjacent rings. He has already written two numbers as shown in the figure.



What number should he write in the gray circle?

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

13. Werner is running on a treadmill. He keeps looking at two stopwatches. The first watch shows the time that has passed since he started and the second watch shows the time remaining until the end of his workout.

At some point, the two stopwatches show the same time. What do they show then?

A. 17:50 B. 18:00 C. 18:12 D. 18:15 E. 18:20

[*Spain*]

14. Julio fills in each box with different prime numbers less than 20 so that the value of A is an integer.

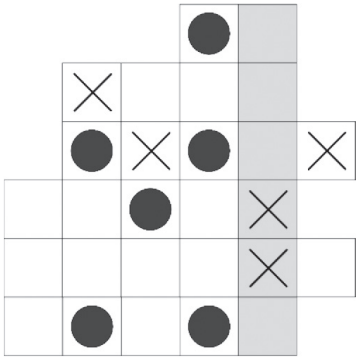
$$A = \frac{\square + \square + \square + \square + \square + \square + \square}{\square}$$

What is the maximum value that A can have?

A: 20 B: 14 C: 10 D: 8 E: 6

[*Philippines*]

15. Morten wants to fill in the squares in the figure shown so that each square contains either a cross or a circle. He also wants to ensure that there are no four consecutive identical symbols in any column, row, or diagonal.



When he has filled in all the boxes, what will the gray column contain?

A: 3 rings and 3 crosses B: 2 rings and 4 crosses

C: 4 rings and 2 crosses D: 5 rings and 1 crosses E: 1 rings and 5 crosses

[*Poland*]

16. In the six-digit integer *PAPAYA* different letters stand for different numbers and the same letter always represents the same number. It is also true that $Y = P + P = A + A + A$.

What value has $P \cdot A \cdot P \cdot A \cdot Y \cdot A$?

A: 432 B: 342 C: 324 D: 243 E: 234

[*United Kingdom*]

Five points problems

17. Sanja has two bowls with numbered balls.
The red bowl contains seven balls numbered 1, 2, 6, 7, 10, 11, and 12.
The blue bowl contains five balls numbered 3, 4, 5, 8, and 9.

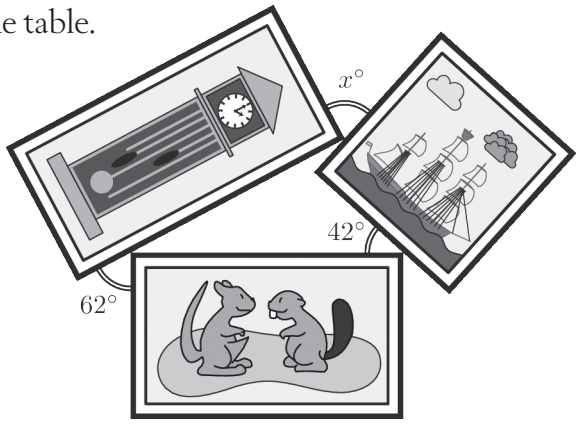
Which ball should Sanja move from the red one to the blue one so that the average value of the numbers on the numbered balls increases in each bowl?

A: 6 B: 7 C: 10 D: 11 E: 12

[*Canada*]

18. Louis places three rectangular pictures on the table.

How big is the angle x?

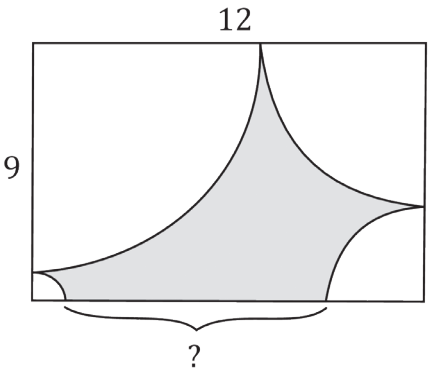


A: 64 B: 70 C: 72 D: 76 E: 80

[*Taiwan*]

19. Peter has drawn a quarter circle with the center in each corner of a flag with dimensions 12 cm · 9 cm.

What is the length of the distance indicated by the question mark?

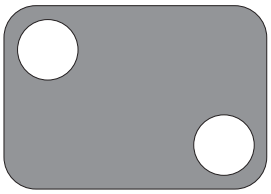


A: 5 cm B: 6 cm C: 7 cm D: 8 cm E: 9 cm

[*USA*]

20. Paul aims a few shots at the top left hole and hits 60 % of the shots. He then aims a few shots at the bottom right hole and hits 75 % of the shots. He shoots 17 times in total.

How many times did he aim for and hit the lower right hole?



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

[*Germany*]

21. Anurag's distance to school is 1 km. He leaves home at 8:00 AM.
If he walks at a speed of 4 km/h, he will arrive 5 minutes early.

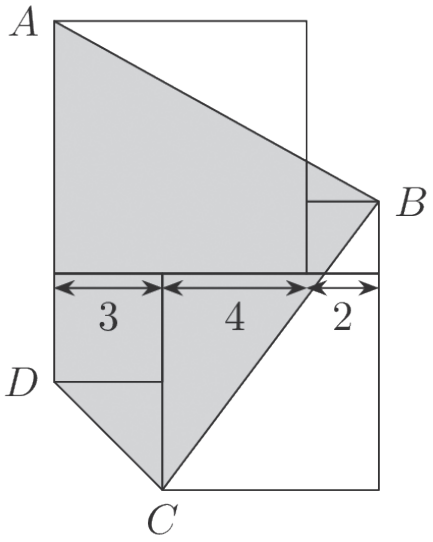
How many minutes early will he arrive if he instead cycles and maintains a speed of 15 km/h?

A: 12 B: 13 C: 14 D: 15 E: 16

[*USA*]

22. Ria places four squares side by side, as shown in the figure.

What is the area of the shaded quadrilateral?



A: 54 B: 60 C: 66 D: 72 E: 80

[*Vietnam*]

23. The letters p, q, r, s, and t represent five consecutive positive integers, but not necessarily in that order.
The sum of p and q is 69 and the sum of s and t is 72.

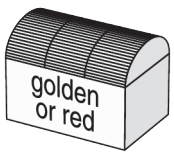
What is the value of r?

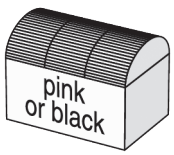
A: 29 B: 31 C: 34 D: 37 E: 39

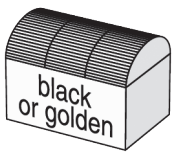
[*United Kingdom*]

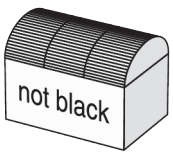
24. Adira keeps gold, red, black, pink and white beads in five small boxes. Each box contains beads of only one color. The statements on the boxes are true. Adira's friend Lilly wants to know which box contains the gold beads.
She gets to open and look in exactly one of the five boxes.

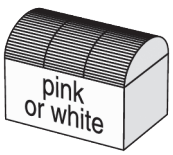
Which box must Lilly open to be sure which box contains the gold-colored beads?

A: 

B: 

C: 

D: 

E: 

[*Germany*]