

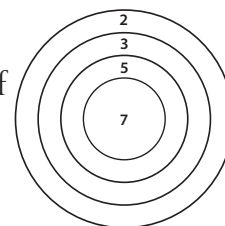
Kängurutävlingen – Matematikens hopp 2020

Junior



Three points problems

- 1 A dart-throwing competition was held at Ali's school. Each person's score was calculated by the product of the numbers the darts had hit. If Ali scored 18 in the competition. How many throws did he have?

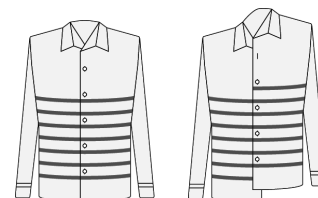


A: 12 B: 9 C: 6 D: 3 E: 2

- 2 When the answers to the following calculations are put in order from smallest to largest, which will be in the middle?

A: $1 + 2345$ B: $12 + 345$ C: $123 + 45$ D: $1234 + 5$ E: 12345

- 3 When Cosmo wears his new shirt properly as shown on the left, the horizontal stripes form seven closed rings around his waist. This morning he buttoned his shirt wrongly, as shown on the right. How many closed rings were there around Cosmo's waist this morning?



A: 0 B: 1 C: 2 D: 4 E: 6

- 4 The sum of four consecutive integers is 2. What is the least of these integers?

A: -3 B: -2 C: -1 D: 0 E: 1

- 5 The years 2020 and 1717 both consist of a two-digit number repeated twice. How many years after 2020 will the next year be which has this property?

A: 20 years B: 101 years C: 120 years D: 121 years E: 202 years

- 6 In the calculations shown each letter stands for a digit. They are used to make some two-digit numbers. The two numbers on the left have a total of 79. What is the total of the four numbers on the right?

A: 79 B: 158 C: 869 D: 1418 E: 7979

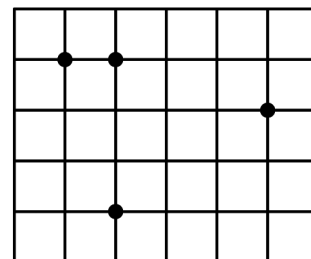
$\begin{array}{r} \text{A B} \\ + \text{C D} \\ \hline 79 \end{array}$	$\begin{array}{r} \text{A D} \\ \text{C D} \\ \text{A B} \\ + \text{C B} \\ \hline ? \end{array}$
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- 7 Mary had ten pieces of paper, some of which were squares, and the rest were triangles. She cuts three squares diagonally from corner to corner. She then counted the total number of vertices of the 13 obtained pieces of paper, which came to 42 vertices. How many triangles did she have before making the cuts?

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

- 8 In the given grid, of squares with side length 1, four points are marked. By forming a triangle using three of the given points, what is the smallest area that can be obtained?



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

Four points problems

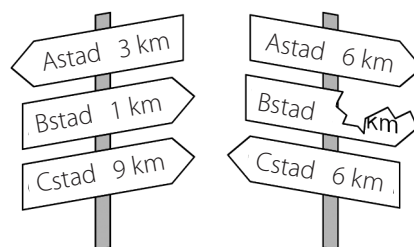
- 9 Helen wants to spend 18 consecutive days visiting her Grandma. Her Grandma reads her story books on story days Tuesday, Saturday and Sunday. If Helen wants to spend the greatest amount of story days with her Grandma, on which day of the week should she start her visit?

A: Monday B: Tuesday C: Friday D: Saturday E: Sunday

- 10 If a , b , c and d are integers satisfying $ab = 2cd$, which of the following numbers could not be the value of the product $abcd$?

A: 50 B: 100 C: 200 D: 450 E: 800

- 11 The shortest path from Astad to Cstad runs through Bstad. Walking on this path from Astad to Cstad we would first find the signpost shown on the left. Later we would find the signpost shown on the right. What distance was written on the broken sign?



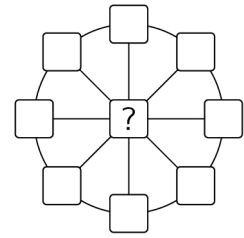
A: 1 km B: 2 km C: 3 km D: 4 km E: 5 km

- 12 An isosceles triangle has a side of length 20 cm. Of the other two side lengths, one is equal to $\frac{2}{5}$ of the other. Which of the following values is the perimeter of this triangle?

A: 36 cm B: 48 cm C: 60 cm D: 90 cm E: 120 cm



- 13 In each of the nine cells of the figure shown a number shall be written so that the sum of the three numbers on each diameter is 13 and the sum of the eight numbers on the circumference is 40. What number must be written in the central cell?

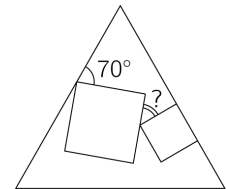


A: 3 B: 5 C: 8 D: 10 E: 12

- 14 Masha put a multiplication sign between the 2nd and 3rd digits of the number 2020 and noted that the resulting product $20 \cdot 20$ is a square number. How many numbers between 2010 and 2099 (including 2020) have the same property?

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

- 15 Two squares of different size are drawn inside an equilateral triangle. One side of one of these squares lies on one of the sides of the triangle as shown. What is the size of the angle marked by the question mark?



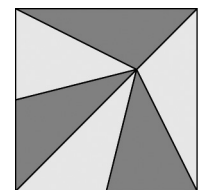
A: 25° B: 30° C: 35° D: 45° E: 50°

- 16 Let $17x + 51y = 102$. What is the value of $9x + 27y$?

A: 54 B: 36 C: 34 D: 18 E: The value is undetermined

Five points problems

- 17 A square shaped stained glass window of 81 dm^2 is made out of six triangles of equal area (see figure). A fly is sitting exactly on the spot where the six triangles meet.



How far from the bottom of the window is the fly sitting?

A: 3 dm B: 5 dm C: 5,5 dm D: 6 dm E: 7,5 dm

- 18 The digits from 1 to 9 are randomly arranged to make a 9-digit number. What is the probability that the resulting number is divisible by 18?

A: $\frac{1}{2}$ B: $\frac{4}{9}$ C: $\frac{5}{9}$ D: $\frac{1}{3}$ E: $\frac{3}{4}$



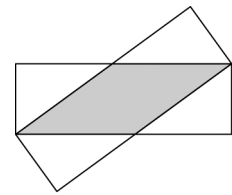
19 There are some squares and triangles on the table. Some of them are blue and the rest are red. Some of these figures are large and the rest are small. We know that:

- 1 if the figure is large, it's a square
- 2 if the figure is blue, it's a triangle.

Which of the statement A–E must be true?

- A: all red figures are squares B: all squares are large C: all small figures are blue.
 D: all triangles are blue E: all blue figures are small

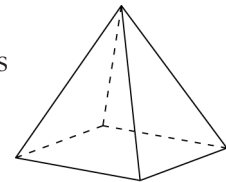
20 Two identical rectangles with sides of length 3 cm and 9 cm are overlapping as in the diagram.



What is the area of the overlap of the two rectangles?

- A: 12 cm² B: 13,5 cm² C: 14 cm² D: 15 cm² E: 16 cm²

21 Kanga labelled the vertices of the square-based pyramid using 1, 2, 3, 4 and 5 once each. For each face Kanga calculated the sum of the numbers on its vertices. Four of these sums equalled 7, 8, 9 and 10.



What is the sum of the fifth face?

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

22 In each of the squares, a number should be written so that the sums of the 4 numbers in each row and in each column are the same.

1		6	3
	2	2	8
	7		4
		7	

What number goes into the shaded square?

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

23 Alice, Belle and Cathy had an arm-wrestling contest. In each game two girls wrestled, while the third rested. After each game, the winner played the next game against the girl who had rested. In total, Alice played 10 times, Belle played 15 times and Cathy played 17 times. Who lost the second game?

- A: Alice B: Belle C: Cathy D: Alice or Belle E: Belle or Cathy

24 Eight consecutive three-digit positive integers have the following property: each of them is divisible by its last digit. What is the sum of the digits of the smallest of the eight integers?

- A: 10 B: 11 C: 12 D: 13 E: 14