

# Kängurutävlingen – Matematikens hopp 2020

## Cadet

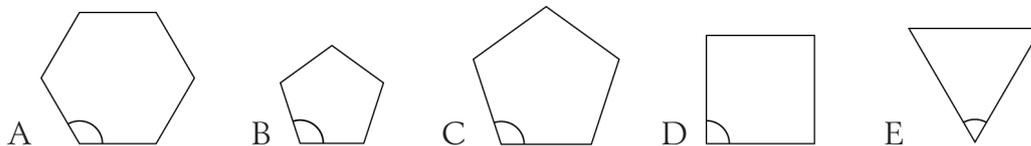


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### Three points problems

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- 1 In which of the regular polygons below is the marked angle the largest?



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- 2 Miguel solves six mathematics problems every day and Lars solves four problems every day. How many days does it take Lars to solve the same number of problems as Miguel solves in four days?

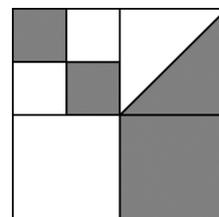
A: 4      B: 5      C: 6      D: 7      E: 8

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- 3 Which of these fractions has the largest value?

A:  $\frac{8+5}{3}$       B:  $\frac{8}{3+5}$       C:  $\frac{3+5}{8}$       D:  $\frac{8+3}{5}$       E:  $\frac{3}{8+5}$

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- 4 A large square is divided into smaller squares. In one of the squares a diagonal is also drawn. What fraction of the large square is shaded?

A:  $\frac{4}{5}$       B:  $\frac{3}{8}$       C:  $\frac{4}{9}$       D:  $\frac{1}{3}$       E:  $\frac{1}{2}$



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- 5 There are 4 teams in a soccer tournament. Each team plays every other team exactly once. In each match, the winner scores 3 points and the loser scores 0 points. In the case of a draw, both teams score 1 point. After all matches have been played, which of the following total number of points is it impossible for any team to have scored?

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

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- 6 Klara wants to multiply three different numbers from the following list:  
-5, -3, -1, 2, 4 and 6.  
What is the smallest result she could obtain?

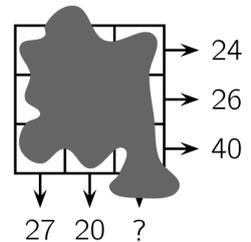
A: -200      B: -120      C: -90      D: -48      E: -15



- 7 If John goes to school by bus and walks back, or vice versa, he travels for 3 hours. If he goes by bus both ways, he travels for 1 hour.  
How long does it take him if he walks both ways?

A: 3,5 hours    B: 4 hours    C: 4,5 hours    D: 5 hours    E: 5,5 hours

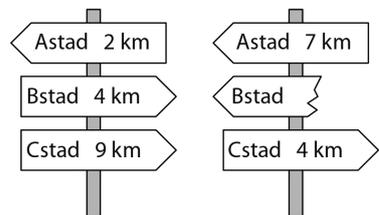
- 8 A number is written in each cell of a  $3 \times 3$  square. Unfortunately, the numbers are not visible because they are covered in ink. However, the sum of the numbers in each row and the sum of the numbers in two of the columns are all known, as shown by the arrows on the diagram.  
What is the sum of the numbers in the third column?



A: 41    B: 43    C: 44    D: 45    E: 47

Four points problems

- 9 The shortest path from Astad to Cstad runs through Bstad. The two signposts shown are set up along this path. What distance was written on the broken sign?

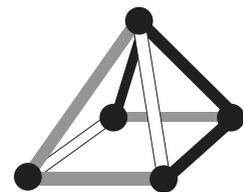
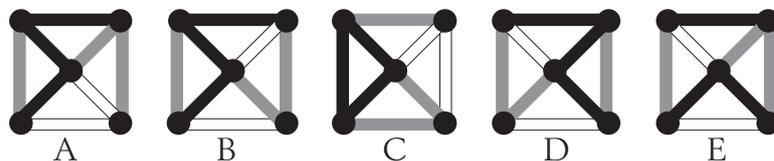


A: 1 km    B: 3 km    C: 4 km    D: 5 km    E: 9 km

- 10 Anna wants to walk 5 km on average each day in March. At bedtime on 16th March, she realised that she had walked 95 km so far. What distance does she need to walk on average for the remaining days of the month to achieve her target?

A: 5,4 km    B: 5 km    C: 4 km    D: 3,6 km    E: 3,1 km

- 11 Which of the following shows what you would see when the object in the diagram is viewed from above?

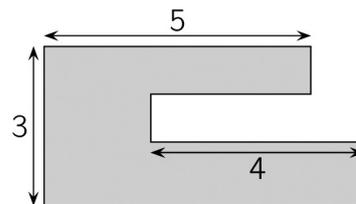


- 12 Every pupil in a class either swims or dances, or both. Three fifths of the class swim and three fifths dance. Five pupils both swim and dance. How many pupils are in the class?

A: 15    B: 20    C: 25    D: 30    E: 35

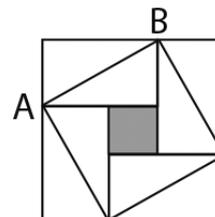


- 13 Sacha's garden has the shape shown. All the sides are either parallel or perpendicular to each other. Some of the dimensions are shown in the diagram. What is the perimeter of Sacha's garden?



A: 22      B: 23      C: 24      D: 25      E: 26

- 14 A large square consists of four identical rectangles and a small square in the middle. The area of the large square is  $49 \text{ cm}^2$  and the length of the diagonal AB of one of the rectangles is 5 cm. What is the area of the small square?

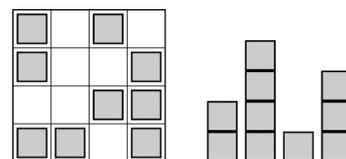


A:  $1 \text{ cm}^2$       B:  $4 \text{ cm}^2$       C:  $9 \text{ cm}^2$       D:  $16 \text{ cm}^2$       E:  $25 \text{ cm}^2$

- 15 Werner's salary is 20% of his boss's salary. By what percentage is his boss's salary larger than Werner's salary?

A: 80%      B: 120%      C: 180%      D: 400%      E: 520%

- 16 Irene made a construction with identical wooden cubes. The left figure shows the view from above and the right figure the view from one of the sides. However, it is not known from which side the side view was taken. What is the largest number of cubes that Irene could have used?



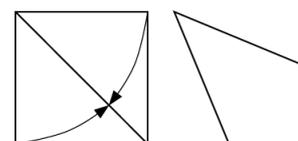
A: 25      B: 24      C: 23      D: 22      E: 21

Five points problems

- 17 Twelve coloured cubes are arranged in a row. There are three blue cubes, two yellow cubes, three red cubes and four green cubes but not in that order. There is a yellow cube at one end and a red cube at the other end. The red cubes are all touching. The green cubes are also all touching. The tenth cube from the left is blue. What colour is the cube sixth from the left?

A: green      B: yellow      C: blue      D: red      E: blue or red

- 18 Zaida took a square piece of paper and folded two of its sides to the diagonal, as shown, to obtain a quadrilateral. What is the size of the largest angle of the quadrilateral?



A:  $112,5^\circ$       B:  $120^\circ$       C:  $125^\circ$       D:  $135^\circ$       E:  $150^\circ$



- 19 How many four-digit numbers are there, such that half of the number is divisible by 2, its third is divisible by 3, and the fifth is divisible by 5?
- A: 1      B: 7      C: 9      D: 10      E: 11
- 
- 20 Sonja writes a positive integer on each edge of a square. She also writes at each vertex the product of the numbers on the two edges that meet at that vertex. The sum of the numbers at the vertices is 15. What is the sum of the numbers on the edges of the square?
- A: 6      B: 7      C: 8      D: 9      E: 15
- 
- 21 Oliva has 52 identical isosceles right-angled triangles. She wants to make a square using some of them. How many different sized squares can she make?
- A: 6      B: 7      C: 8      D: 9      E: 10
- 
- 22 Four children are in the four corners of a 10 m x 25 m pool. Their trainer is standing somewhere on one side of the pool. When he calls them, three children get out and walk as short a distance as possible round the pool to meet him. They walk 50 m in total. What is the shortest distance the trainer needs to walk to get to the fourth child?
- A: 10 m      B: 12 m      C: 15 m      D: 20 m      E: 25 m
- 
- 23 Anne, Boris and Carl ran a race. They started at the same time, and their speeds were constant. When Anne finished, Boris had 15 m to run and Carl had 35 m to run. When Boris finished, Carl had 22 m to run. What is the distance they ran?
- A: 135 m      B: 140 m      C: 150 m      D: 165 m      E: 175 m
- 
- 24 The statements below give clues to the identity of a four-digit number.
- |   |   |   |   |
|---|---|---|---|
| 4 | 1 | 3 | 2 |
|---|---|---|---|

 Two digits are correct but in wrong places.
- |   |   |   |   |
|---|---|---|---|
| 9 | 8 | 2 | 6 |
|---|---|---|---|

 One digit is correct and in the right place.
- |   |   |   |   |
|---|---|---|---|
| 5 | 0 | 7 | 9 |
|---|---|---|---|

 Two digits are correct with one of them being in the right place and the other one in the wrong place.
- |   |   |   |   |
|---|---|---|---|
| 2 | 7 | 4 | 1 |
|---|---|---|---|

 One digit is correct but in the wrong place.
- |   |   |   |   |
|---|---|---|---|
| 7 | 6 | 4 | 2 |
|---|---|---|---|

 None of the digits are correct.
- What is the last digit of the four-digit number?
- A: 0      B: 1      C: 3      D: 5      E: 9