



Till läraren

Välkommen till Kängurutävlingen – Matematikens hopp 2021 *Benjamin, för elever i årskurs 5–7*

- Tävlningen genomförs under perioden 18 mars – 15 maj. *Uppgifterna får inte användas tidigare.*
- När du redovisar antalet deltagare får du tillgång till facit och ett kalkylblad där du matar in elevernas svar. Du får då en sammanställning av klassens resultat. Sista dag för redovisning av antalet deltagare är den *15 maj*.
- Redovisa resultatet senast *20 maj*.
- *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 20 maj, 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 eller Peter Nyström:

Ulrica.Dahlberg@ncm.gu.se

Peter.Nystrom@ncm.gu.se



Svarsblankett

Markera ditt svar i rätt ruta

Uppgift	A	B	C	D	E	Poäng
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
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14						
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SUMMA						

Namn:.....

Klass:.....

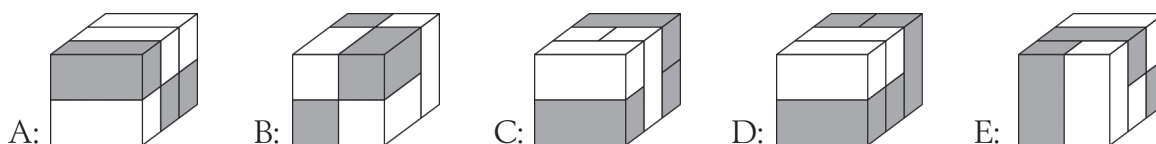
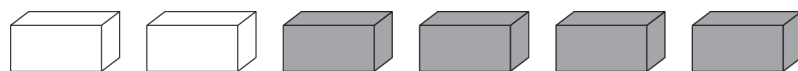
Kängurutävlingen – Matematikens hopp 2021

Benjamin



Three points problems

- 1 Which of the following constructions can be made with these 6 bricks?



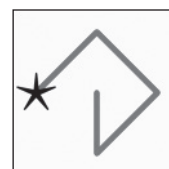
- 2 In how many places in the picture are two children holding each other with their left hands?



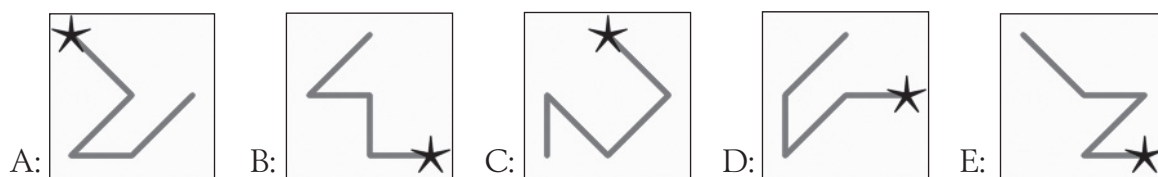
A: 1 B: 2 C: 3 D: 4 E: 5

- 3 In the square you can see the digits from 1 to 9.
A number is created by starting at the star, following the line and writing down the digits along the line while passing. This picture represents the number 42685.

1	2	3
4	5	6
7	8	9

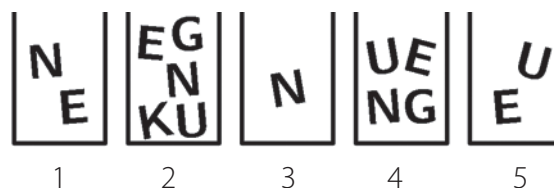


Which of the following lines represents the greatest number?



- 4 Sofie wants to write the word KENGU by using letters from the boxes. She can only take one letter from each box.

What letter must Sofie take from box 4?

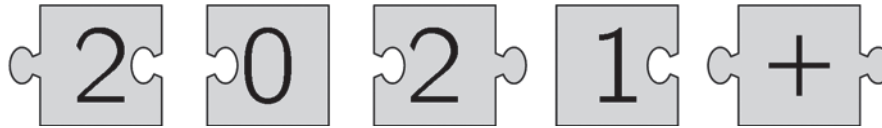


A: K B: E C: N D: G E: U



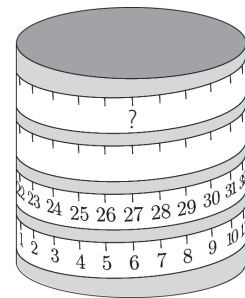
- 5 When you put the five puzzle pieces correctly together they form a rectangle with an addition of two numbers.

What is the sum of this addition?



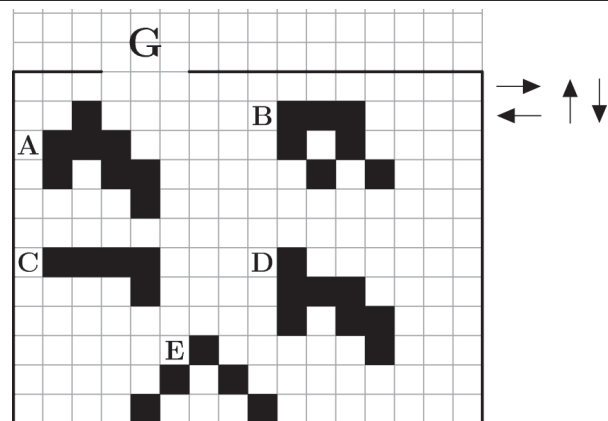
- A: 22 B: 32 C: 41 D: 122 E: 203

- 6 A measuring tape is wound around a cylinder.
What is the number at the question mark?



- A: 53 B: 60 C: 69 D: 77 E: 81

- 7 The 5 figures on the grid can only move in the directions indicated by the black arrows. They can not be turned.
Only one of the figures can leave through gate G, which one?



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

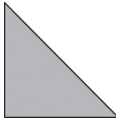
- 8 Carin is going to paint the walls in her room green. The green paint is too dark so she mixes it with white paint. She tries different mixtures.

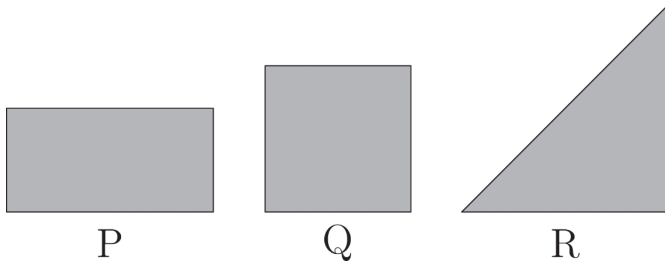
Which of the following mixtures will have the darkest colour green?

- A: 1 part green + 3 parts white B: 2 parts green + 6 parts white
 C: 3 parts green + 9 parts white D: 4 parts green + 12 parts white
 E: They will all be equally dark



Four points problems

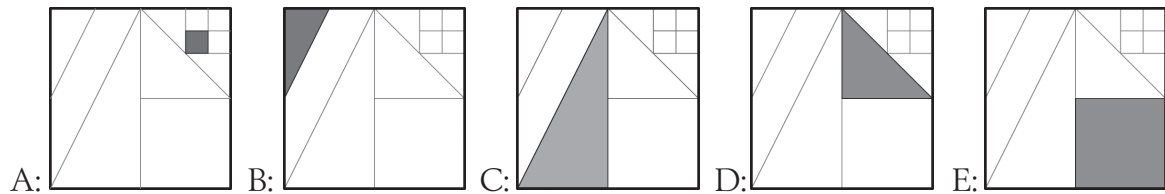
- 9 Mary had a piece of paper. She folded it in half, the two pieces exactly matching. Then she folded it again in half. She got this shape.
- 
- Which of the shapes P, Q, R could be the original piece of paper?



- A: only P B: only Q C: only R D: either P or Q E: any of P, Q, R

- 10 In a square divided by line segments into smaller parts, $\frac{1}{8}$ of the square is coloured. Which one of the pictures shows our colouring?

The line segments are drawn either from the vertices or the midpoints of other line segments.

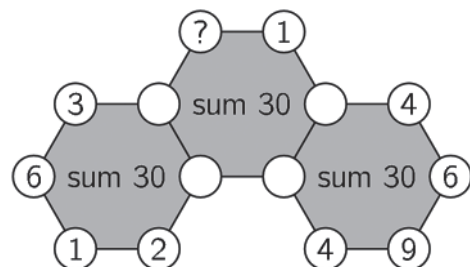


- 11 The number 5021972970 is written on a sheet of paper. Julian cuts the sheet twice so he gets three numbers.

What is the smallest sum he can get by adding these three numbers?

- A: 3244 B: 3444 C: 5172 D: 5217 E: 5444

- 12 The diagram shows three hexagons with numbers at their vertices, but some numbers are invisible. The sum of the six numbers of each hexagon is 30. What is the number on the vertex marked with a question mark?

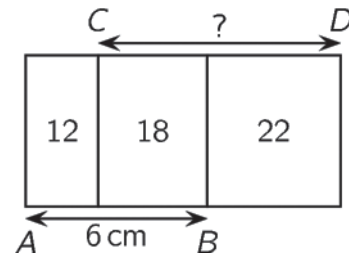


- A: 3 B: 4 C: 5 D: 6 E: 7



- 13 Three rectangles of the same height are positioned as shown. The numbers within the rectangles indicate their areas in cm^2 .

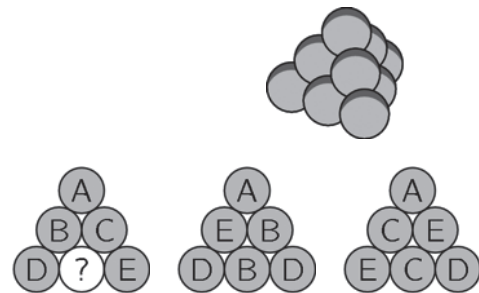
If $AB = 6 \text{ cm}$, how long is CD ?



A: 7 cm B: 7,5 cm C: 8 cm D: 8,2 cm E: 8,5 cm

- 14 With 10 identical balls we build a triangular pyramid, as shown. Each ball has one of the letters A, B, C, D and E on it. There are 2 balls for each letter. The pictures show three side views of the pyramid.

What is the letter on the ball with the question mark?



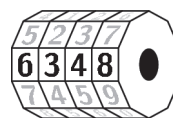
A: A B: B C: C D: D E: E

- 15 Ronja had four white tokens and Wanja had four black ones. Taking turns they were stacking their tokens and created two piles. Ronja starts. On each turn, they can choose to put a token on either of the piles.

Which pair of piles could *not* be a result of their play?



- 16 My little brother closed his 4-digit bike lock with digits from 0 to 9 and turned each digit in the same direction equally far. Now it shows the combination 6348.



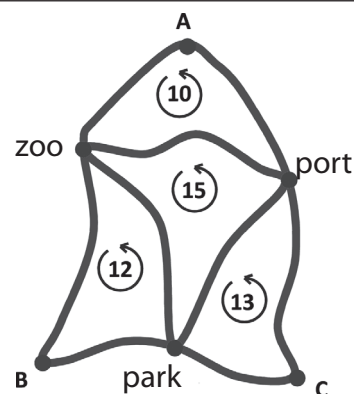
Which of the following *cannot* be the right code of my brother's lock?





Five points problems

- 17 The map shows three bus stations at points A, B and C.
A tour from station A to the zoo, the port and back to A is 10 km long.
There are other tours that are 12, 13 or 15 km long as shown in the picture.
How long is the tour from A, past the zoo, B, the park, C, the port and back to A along the outer route in the picture?



A: 18 km B: 20 km C: 25 km D: 35 km E: 50 km

- 18 There were 20 apples and 20 pears in the bowl.
Carl and Lucas both randomly take 20 fruits each from this bowl,
Only one of the following sentences is *always* true.

Which one?

- A: Carl gets at least one pear.
B: Carl gets as many apples as pears.
C: Carl gets as many apples as Lucas.
D: Carl gets as many pears as Lucas gets apples.
E: Carl gets as many pears as Lucas.

- 19 Ann, Bob, Carina, Dan and Eddy are sitting at a round table.
Ann is *not* next to Bob.
Dan is next to Eddy.
Bob is *not* next to Dan.

Who are sitting next to Carina?

- A: Anna and Bo B: Bo and Dan C: Dan and Eddy
D: Eddy and Anna E: it is not possible to know

- 20 Maurice asked the canteen chef for the recipe of his pancakes
Maurice has 6 eggs, 400 g flour, 500 ml milk and 200 g butter.

Recipe for 100 pancakes

25 eggs 4l milk
5 kg flour 1 kg butter

At most how many pancakes can he prepare using this recipe?

- A: 6 B: 8 C: 10 D: 12 E: 15



- 21 Three pirates were asked to write down how many gold coins and how many silver coins their friend captain Graybeard has. Each of the three pirates wrote one truth and one lie.

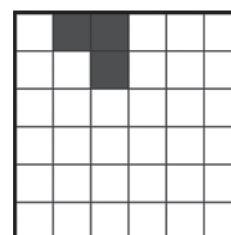
What is the total amount of gold and silver coins that captain Graybeard has?

Fabbe:	He has 8 gold coins and 6 silver coins
Krokben:	He has 7 gold coins and 4 silver coins
Jolly:	He has 7 gold coins and 7 silver coins

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

- 22 The big square is made up of 36 small squares. Three are coloured.

At least *how many more small squares* need to be coloured in the picture so that the marked shape in the big square has four axes of symmetry?



A: 1 B: 9 C: 12 D: 13 E: 21

- 23 Each shelf holds a total of 65 deciliters of apple juice.
The bottles have three different sizes: large, medium and small.

How many decilitres of apple juice does a medium bottle contain?



A: 5 B: 6 C: 8 D: 10 E: 15

- 24 An apple and an orange weigh as much together as a pear and a nectarine.
An apple and a pear weigh less than an orange and a nectarine.
A pear and an orange weigh less than an apple and a nectarine.

Which of the fruits is the heaviest?

A: apple B: orange C: nectarine D: pear E: it is impossible to determine