KÄNGURU DER MATHEMATIK 2024
21. 3. 2024
Level: Kadett, Grades 7 and 8

Name:	
School:	
Class:	

Time: 75 min.
30 starting points

each correct answer to questions	1. – 10.:	3 points
each correct answer to questions	11. – 20.:	4 points
each correct answer to questions	21. – 30.:	5 points
each questions left unanswered:		0 points

each incorrect answer: minus ¼ of the points for the question

Please write the letter (A, B, C, D, E) of the correct answer in the square under the question number (1 bis 30). Write clearly and carefully!

ONB
OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

21	22	23	24	25	26	27	28	29	30

pwc

Information über den Känguruwettbewerb: www.kaenguru.at

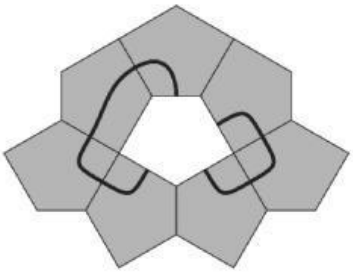
NXP

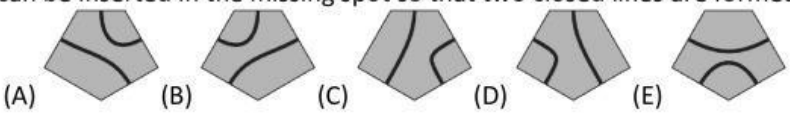
LIVEWORKSHEETS

Känguru der Mathematik 2024 – Level Kadett (Schulstufe 7 and 8)
Austria – 21.03.2024

- 3 Point Examples -

1. The diagram on the right is made up of five-sided tiles of equal size. Which tile can be inserted in the missing spot so that two closed lines are formed?

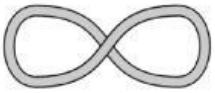


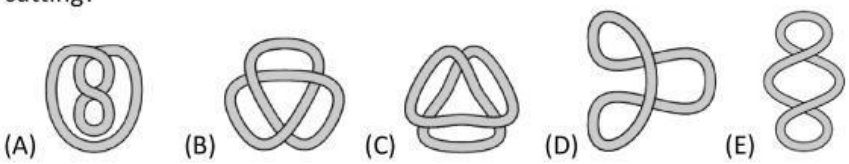


2. What is the value of $\frac{20 \times 24}{2\times0 + 2\times4}$?

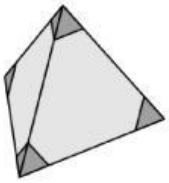
(A) 12 (B) 30 (C) 48 (D) 60 (E) 120

3. Which figure shown below **cannot** be formed from the rope shown on the right without cutting?



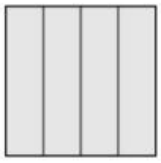


4. Julio cuts off four corners of a regular tetrahedron.
How many corners does the object now have?



(A) 8 (B) 9 (C) 11 (D) 12 (E) 15

5. A square has a perimeter of 32 cm. The square is cut into 4 equal strips (see diagram). What is the perimeter of once such strip?

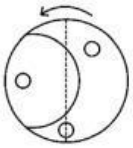


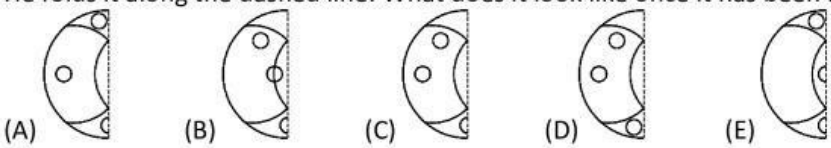
(A) 16 cm (B) 20 cm (C) 22 cm (D) 24 cm (E) 26 cm

6. Ria has three cards with the numbers 1, 5 and 11. She wants to place the cards next to each other to form a 4-digit number. How many different 4-digit numbers can she form?

(A) 3 (B) 4 (C) 6 (D) 8 (E) 9

7. Manuel has a round transparent piece of paper with some circles (see diagram on the right). He folds it along the dashed line. What does it look like once it has been folded?





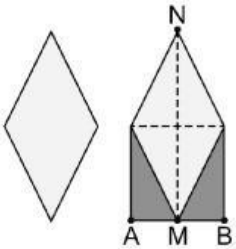
8. There are five different kinds of fruit in a bowl: apples, grapes, cherries, strawberries and bananas.
Anna likes apples, cherries, strawberries and bananas.
Berta likes apples.
Conny likes grapes, cherries, strawberries and bananas.
Doris likes apples, grapes and cherries.
Eva likes apples and cherries.
The fruits are shared out so that each person gets a different kind of fruit but everybody gets a kind of fruit that they like. Who gets the cherries?

(A) Anna (B) Berta (C) Conny (D) Doris (E) Eva

9. 50 children are sitting in a circle. They throw a ball. Each child that gets the ball, throws the ball to the child sitting six places to their left. Frida gets the ball 100 times during the game.
How many children never get the ball during this time?

(A) 0 (B) 8 (C) 10 (D) 25 (E) 40

10. The diagram shows a rhombus. The area of the rhombus is increased by adding two right-angled triangles (see diagram). We know that $\measuredangle NMA = \measuredangle BMN = 90°$. By which percentage does this increase the area?



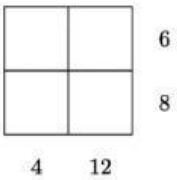
(A) 20 % (B) 25 % (C) 30 % (D) 40 % (E) 50 %

LIVEWORKSHEETS

- 4 Point Examples –

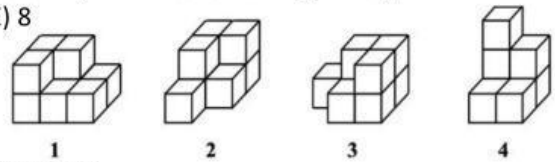
11. Carina has baked a cake and cut it into 10 equal pieces. She ate one piece of cake and rearranged the remaining pieces evenly (see diagram).
How big is the angle between two neighbouring pieces?
(A) 5° (B) 4° (C) 3° (D) 2° (E) 1°

12. Four **different** positive whole numbers are written into the grid and are then covered up. The products of the two numbers in each row or column, respectively, are stated next to or below the grid.
What is the sum of the four covered numbers?
(A) 11 (B) 12 (C) 13 (D) 14 (E) 15

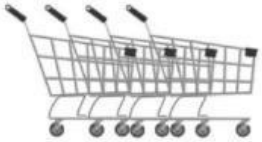


13. Uli can buy exactly 12 packages of jelly babies or exactly 20 chocolate bars with her pocket money. Uli buys 9 packages of jelly babies. How many chocolate bars can she buy with the remaining money?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 8

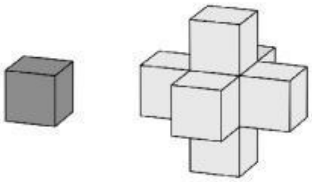
14. Which of the shapes shown on the right can you put together to form a cuboid?
(A) 1 and 2 (B) 2 and 3 (C) 3 and 4 (D) 1 and 3 (E) 2 and 4



15. All trolleys in a shop are the same. Four trolleys slid together have a total length of 108 cm (see diagram). Ten trolleys slid together have a total length of 168 cm.
How long is one trolley?
(A) 60 cm (B) 68 cm (C) 78 cm (D) 88 cm (E) 90 cm



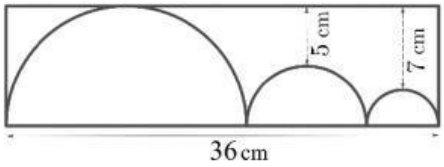
16. Johann has several light and dark cubes. He used them to form the solid shown on the right. He made it by gluing a light cube on each side of a dark cube.
Now he wants to glue on dark cubes so that no light areas can be seen from the outside.
What is the minimum number of dark cubes that he will need?
(A) 18 (B) 16 (C) 14 (D) 12 (E) 10



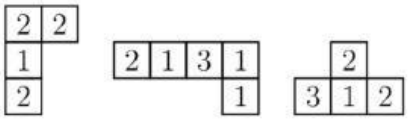
17. The digits 0 - 9 can be drawn using horizontal and vertical lines as shown.

Greg chooses two digits. Together, his digits have 1 horizontal line and 5 vertical lines.
What is the sum of his two digits?
(A) 5 (B) 6 (C) 8 (D) 10 (E) 11

18. The diagram shows three semi-circles inside a rectangle. The semi-circle in the middle touches the other two semi-circles, which each touch a short side of the rectangle. The biggest semi-circle also touches the upper long side of the rectangle.
The shortest distances from that side of the rectangle to the two other semi-circles are 5 cm and 7 cm, respectively (see diagram).
How big is the perimeter of the rectangle in cm?
(A) 82 (B) 92 (C) 96 (D) 108 (E) 120



19. Daniel forms a 4×4-square out of the three pieces shown on the right and another piece. The sum of the four numbers in each row and in each column is the same.
What does the fourth piece look like?



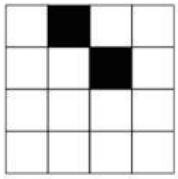
(A) 1 1 3 (B) 2 1 0 (C) 1 2 1 (D) 2 2 2 (E) 2 2 3

20. Every day, penguin Paula catches 12 fish for her two children. Every day she gives one of her children 7 fish and the other 5 fish. After several days, one of her children has received 44 fish.
How many fish did the other child receive?
(A) 34 (B) 40 (C) 46 (D) 52 (E) 58

LIVEWORKSHEETS

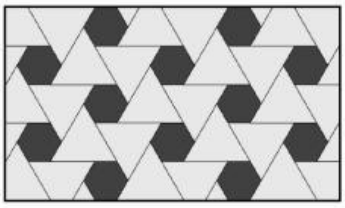
- 5 Point Examples -

21. A kangaroo jumps up a mountain and back down again on the same path. Upwards, it covers 1 metre per jump. Downwards, it covers 3 metres per jump. In total it jumped 2024 times.
How many metres did it cover in total?
(A) 506 (B) 1012 (C) 2024 (D) 3036 (E) 4048

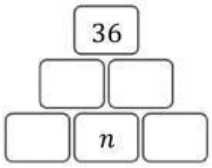


22. Tarek wants to colour two more cells of the 4×4-square in black so that the pattern made by white and black cells in the 4×4-square has exactly one axis of symmetry.
In how many ways can he do that?
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

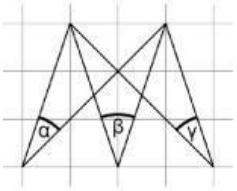
23. Fresh mushrooms consist of 80 percent water. In dried mushrooms, however, the amount of water is only 20 percent of its mass. By what percentage does the mass of a mushroom decrease during drying?
(A) 60 (B) 70 (C) 75 (D) 80 (E) 85



24. Tiler Teri wants to cover a square floor with a regular pattern (see diagram) using six-sided and three-sided tiles. She estimates that she will be needing approximately 3000 six-sided tiles for the entire floor.
Approximately, how many three-sided tiles will she be needing?
(A) 1000 (B) 1500 (C) 3000 (D) 6000 (E) 9000

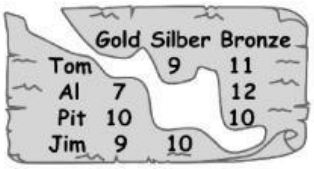


25. Dagobert wants to complete the diagram so that numbers in each box in the middle and top row are equal to the product of the values of the two boxes underneath. Each box should contain a positive whole number. He wants the top box to contain the number 36. How many different values can the number n have?
(A) 1 (B) 2 (C) 3 (D) 4 (E) 5



26. Three angles α, β and γ are drawn on squared paper (see diagram).
How big is $\alpha + \beta + \gamma$?
(A) 72° (B) 75° (C) 87.5° (D) 96° (E) another angle

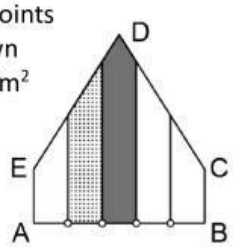
27. A farmer sells chicken eggs and duck eggs.
In different baskets he has 4, 6, 12, 13, 22 and 29, respectively, eggs of one kind in each.
Christoph buys all the eggs in one basket. The farmer then realises that he now was twice as many chicken eggs as duck eggs. How many eggs did Christoph buy?
(A) 4 (B) 12 (C) 13 (D) 22 (E) 29



28. Captain Flint asks four of his pirates to note down how many gold, silver and bronze coins there were in the treasure chest on a piece of paper. Their answers are shown in the diagram. Unfortunately, a part of the paper was damaged. Only one of the four pirates told the truth. The other three lied on every single one of their answers. The total number of coins was 30.
Who told the truth?
(A) Tom (B) Al (C) Pit (D) Jim (E) this cannot be determined for sure

29. Anne drives from point A to point B and then immediately back to A. Benni drives from point B to point A and then immediately back to B. They drive on the same road, start at the same time und both drive with constant speed. Anne's speed is three times as high as Benni's speed. They meet for the first time 15 minutes after they start.
How long after the start will they meet for the second time?
(A) 20 min (B) 25 min (C) 30 min (D) 35 min (E) 45 min

30. Consider the pentagon $ABCDE$ with $\measuredangle BAE = \measuredangle CBA = 90°, \overline{AE} = \overline{BC}$ and $\overline{ED} = \overline{DC}$. Four points are marked along AB, dividing AB into five pieces of equal length. Vertical lines are then drawn through these points as shown in the diagram. The dark part in the middle has an area of 13 cm^2 and the lightly shaded part to the left of it has an area of 10 cm^2.
What is the area of the entire pentagon in cm^2?
(A) 45 (B) 47 (C) 49 (D) 58 (E) 60



LIVEWORKSHEETS