

# KÄNGURU DER MATHEMATIK 2016 17. 03. 2016

Level: Kadett, Grade: 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 question left unanswered 0 Points  
Each incorrect Answer:  $\frac{1}{4}$  of the points for the question are subtracted

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

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>

# Känguru der Mathematik 2016

## Level Kadett (Grade 7 and 8)

### Österreich – 17. 03. 2016



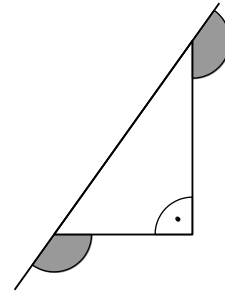
#### – 3 Points Questions –

1. How many natural numbers are there between 3.17 and 20.16?  
 (A) 15      (B) 16      (C) 17      (D) 18      (E) 19

2. Which of the road signs has the most axes of symmetry?

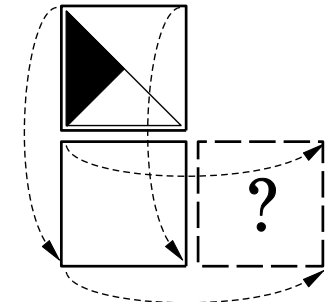
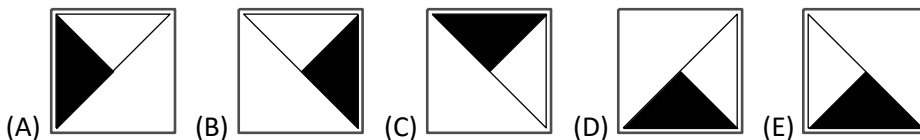


3. What is the sum of the two marked angles?  
 (A)  $150^\circ$       (B)  $180^\circ$       (C)  $270^\circ$       (D)  $320^\circ$       (E)  $360^\circ$



4. Jim should have added 26 to a certain number. Instead he subtracted 26 and obtained  $-14$ .  
 What is the result he would have obtained had he added 26?  
 (A) 28      (B) 32      (C) 36      (D) 38      (E) 42

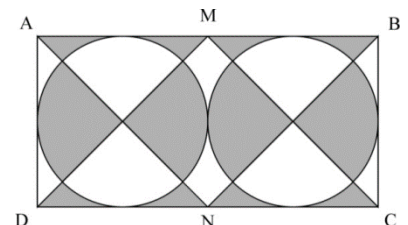
5. A card has a diagram printed on one side and the other side is plain white. The card is first flipped over downwards and then to the right (see diagram).  
 Which picture is obtained?



6. 45 teachers at Anna's school, that's 60% of all teachers, come to school by bike. Only 12% of the teachers come to school by car. How many teachers from Anna's school come to school by car?  
 (A) 4      (B) 6      (C) 9      (D) 10      (E) 12

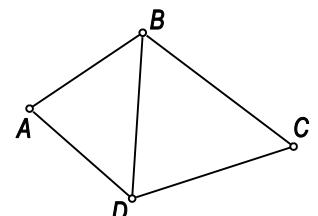
7. Renate puts 555 little piles of 9 stones each together on one big pile. Then she splits this big pile into little groups of 5 stones each. How many such groups does Renate obtain?  
 (A) 999      (B) 900      (C) 555      (D) 111      (E) 45

8. In the rectangle ABCD the side AD is 10 cm long. M and N are the midpoints of the sides AB and CD respectively. How big is the grey area?  
 (A)  $50 \text{ cm}^2$       (B)  $80 \text{ cm}^2$       (C)  $100 \text{ cm}^2$       (D)  $120 \text{ cm}^2$       (E)  $150 \text{ cm}^2$



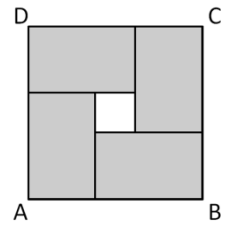
9. Alex has a 1 m long and a 2 m long rope. He cuts up both ropes so that all pieces are of equal length. Which of the following number of pieces can he not obtain in this way?  
 (A) 6      (B) 8      (C) 9      (D) 12      (E) 15

10. During a cycle race starting at D and finishing at B every connecting road (between the towns A, B, C and D) that is shown in the diagram will be ridden along exactly once. How many possible routes are there for the race?  
 (A) 10      (B) 8      (C) 6      (D) 4      (E) 2



– 4 Points Questions –

11. Within the square ABCD there are four identical rectangles (see diagram). The perimeter of each rectangle is 16 cm. What is the perimeter of this square?  
 (A) 16 cm      (B) 20 cm      (C) 24 cm      (D) 28 cm      (E) 32 cm



12. Petra has 49 blue and one red pearl. How many of the blue pearls does Petra have to take away so that 90 % of the pearls are blue?  
 (A) 4      (B) 10      (C) 29      (D) 39      (E) 40

13. Which of the following fractions is closest to  $\frac{1}{2}$ ?  
 (A)  $\frac{25}{79}$       (B)  $\frac{27}{59}$       (C)  $\frac{29}{57}$       (D)  $\frac{52}{79}$       (E)  $\frac{57}{92}$

14. Igor writes down all results of the quarter finals, the semi finals and the final of a tennis tournament. The results are listed in random order.

Bert beats Anton,  
Carl beats Bert,

Carl beats Damien,  
Edon beats Fred,

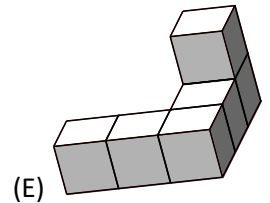
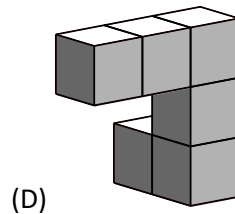
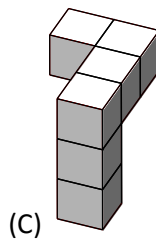
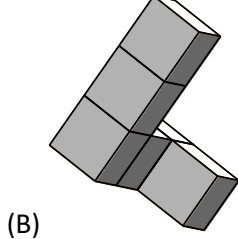
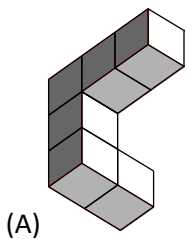
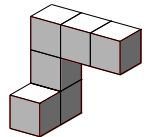
Glen beats Henry,  
Glen beats Edon.

Glen beats Carl,

Who is playing the final?

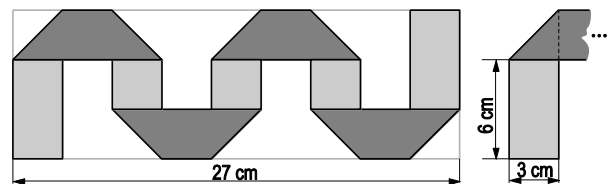
- (A) Glen and Henry      (B) Glen and Carl      (C) Carl and Bert      (D) Glen and Edon      (E) Carl and Damien

15. Anne has glued together some cubes and has obtained the solid shown on the right. She turns it around to check it out from different sides. Which view can she not obtain?



16. Tim, Tom and Jim are triplets. Their twin brothers John and James are 3 years younger. All five are having their birthdays today. Which of the following numbers could be the sum of the ages of the five brothers?  
 (A) 92      (B) 89      (C) 76      (D) 53      (E) 36

17. A 3 cm wide strip of paper is dark on one side and light on the other. The folded strip of paper lies exactly within a rectangle with length 27 cm and width 9 cm (see diagram). How long is the strip of paper?

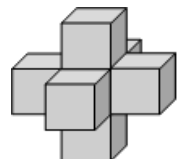


- (A) 36 cm      (B) 48 cm      (C) 54 cm      (D) 57 cm      (E) 81 cm

18. The two kangaroos Jump and Hop both jump at the same time from the same starting line in the same direction. Both of them jump exactly once per second. Jump always jumps 6 m . Hop first jumps 1 m, then 2 m, then 3 m etc. After how many jumps does Hop catch up with Jump?

- (A) 10      (B) 11      (C) 12      (D) 13      (E) 14

19. Seven identical dice (each with 1, 2, 3, 4, 5 and 6 points on their faces) are glued together to form the solid shown. Faces that are glued together each have the same number of points. How many points can be seen on the surface of the solid?



- (A) 24      (B) 90      (C) 95      (D) 105      (E) 126

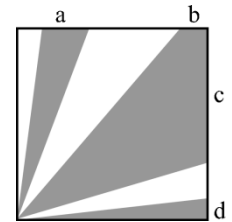
20. There are 20 girls and boys in total in a class. Always two students share a desk so that one third of the boys share a table with a girl and half the girls share a desk with a boy.

How many boys are in this class?

- (A) 9      (B) 12      (C) 15      (D) 16      (E) 18

– 5 Points Questions –

21. In a square with area 36 there are grey parts as shown in the diagram. The sum of the areas of all grey parts is 27.



How long are the distances  $a$ ,  $b$ ,  $c$  and  $d$  together?

- (A) 4      (B) 6      (C) 8      (D) 9      (E) 10

22. Theos watch runs 10 minutes slow but he thinks it runs 5 minutes fast.

Leos watch runs 5 minutes fast but he thinks it runs 10 minutes slow.

Both check their own watch at the same time. Theo thinks it is 12:00 o'clock. What time does Leo think it is?

- (A) 11:30      (B) 11:45      (C) 12:00      (D) 12:30      (E) 12:45

23. Twelve girls met up in a pastry shop. On average they ate 1.5 muffins. None of them ate more than two muffins and two ate nothing. How many girls ate two muffins?

- (A) 2      (B) 5      (C) 6      (D) 7      (E) 8

24. Little Red Riding Hood is taking waffles to three grandmothers. Initially her basket is completely full. Just before she reaches the houses of each grandmother, the wolf each time eats half of the waffles that are in the basket. When she leaves the house of the third grandmother, the basket is empty. Each grandmother gets the same amount of waffles.

The original amount of waffles can definitely be divided by which of the following numbers?

- (A) 4      (B) 5      (C) 6      (D) 7      (E) 9

25. A big cube is made up of 64 small cubes. Exactly one of these cubes is grey (see diagram).

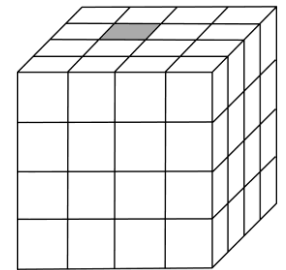
Two cubes are neighbours if they share a common face.

On day one the grey cube colours all its neighbouring cubes grey.

On day two all grey cubes again colour all their neighbouring cubes grey.

How many of the 64 little cubes are grey at the end of the second day?

- (A) 11      (B) 13      (C) 15      (D) 16      (E) 17



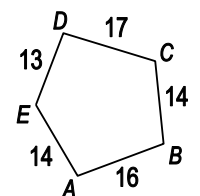
26. Natural numbers are written on a board, of which no two are the same. The product of the two smallest numbers is 16, the product of the two biggest is 225. What is the sum of all numbers written on the board?

- (A) 38      (B) 42      (C) 44      (D) 58      (E) 243

27. The diagram shows a pentagon and indicates the length of each side. Five circles are drawn with centres A, B, C, D and E. On each side of the pentagon the two circles that are drawn around the ends of that side touch each other.

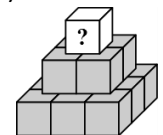
Which point is the centre of the biggest circle?

- (A) A      (B) B      (C) C      (D) D      (E) E



28. Susi writes a different positive whole number on each of the 14 cubes of the pyramid (see diagram). The sum of the numbers, which she writes on the nine cubes that lie on the bottom, is 50. The number on every remaining cube is equal to the sum of the numbers of the four cubes that are directly underneath. What is the biggest number that can be written on the topmost cube?

- (A) 112      (B) 110      (C) 50      (D) 120      (E) 118



29. In every one of the five carriages of a train there is at least one passenger. Two passengers are said to be *neighbouring* if they are either in the same carriage or in two successive carriages. Each passenger has either got exactly 5 or exactly 10 neighbours. How many passengers are on the train?

- (A) 13      (B) 15      (C) 17      (D) 20      (E) This situation is not possible.

30. A cube of side length 3 consists of 15 black and 12 white unit cubes. In the diagram five of the six faces of the big cube can be seen.



Which of the regions shown below is the 6th face of the big cube?

- (A)      (B)      (C)      (D)      (E)