

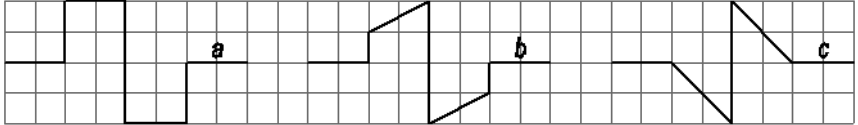
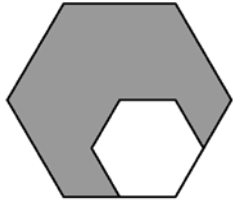

# Mathematical Kangaroo 2014

## Group Junior (Grades 9. und 10. )

### Austria - 20.3.2014



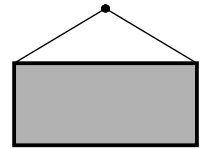
#### - 3 Point Questions -

1. The Kangaroo competition takes place each year on the third Thursday of March. Which day is the earliest possible date for the competition?  
 (A) 14/3.            (B) 15/3            (C) 20/3            (D) 21/3            (E) 22/3.
  
  2. The container ship MSC Fabiola carries 12500 identically long containers. When put next to each other in a row they make a 75km long container line. Roughly, how long is one container?  
 (A) 6 m            (B) 16 m            (C) 60 m            (D) 160 m            (E) 600 m
  
  3.  $a$ ,  $b$  and  $c$  show the lengths of the different pieces of wire pictured. Which of the following inequalities is correct?  
 (A)  $a < b < c$             (B)  $a < c < b$             (C)  $b < a < c$   
 (D)  $b < c < a$             (E)  $c < b < a$
- 
4. Which number is an equal distance from  $\frac{2}{3}$  and  $\frac{4}{5}$  on the number line?  
 (A)  $\frac{11}{15}$             (B)  $\frac{7}{8}$             (C)  $\frac{3}{4}$             (D)  $\frac{6}{15}$             (E)  $\frac{5}{8}$
  
  5. In the year number 2014, the last digit is bigger than the sum of the three other digits. How many years ago did this last happen?  
 (A) 1            (B) 3            (C) 5            (D) 7            (E) 11
  
  6. The side lengths of the large regular hexagon are twice the length of those of the small regular hexagon. What is the area of the large hexagon if the small hexagon has an area of  $4 \text{ cm}^2$ ?  
 (A)  $16 \text{ cm}^2$             (B)  $14 \text{ cm}^2$             (C)  $12 \text{ cm}^2$             (D)  $10 \text{ cm}^2$             (E)  $8 \text{ cm}^2$
- 
7. Which statement is definitely correct if the following statement is false: „Everybody has solved more than 20 problems.“  
 (A) Nobody has solved more than 20 problems.            (B) Somebody has solved less than 21 problems.  
 (C) Everybody has solved less than 21 problems.            (D) Somebody has solved exactly 20 problems.  
 (E) Somebody has solved more than 20 problems.
  
  8. Tom draws a square on the co-ordinate plane. One diagonal sits on the x-axis. Its endpoints are  $(-1,0)$  and  $(5,0)$ . Which of the following points is also a corner point of the square?  
 (A)  $(2,0)$             (B)  $(2,3)$             (C)  $(2,-6)$             (D)  $(3,5)$             (E)  $(3,-1)$
  
  9. In Kangaroo city there are  $m$  men,  $f$  women and  $k$  children. It is true that  $m : f = 2 : 3$  and  $f : k = 8 : 1$ . In what ratio is the number of adults (men and women) to the number of children?  
 (A)  $5 : 1$             (B)  $10 : 3$             (C)  $13 : 1$             (D)  $12 : 1$             (E)  $40 : 3$
  
  10. The circumference of the large wheel measures  $4.2\text{m}$ , and that of the small wheel  $0.9\text{m}$ . To begin with the valves on both wheels are at the lowest point, and then the bicycle moves to the left. After a few metres both valves are again at the lowest point at the same time. After how many metres does this happen for the first time?  
 (A)  $4.2 \text{ m}$             (B)  $6.3 \text{ m}$             (C)  $12.6 \text{ m}$             (D)  $25.2 \text{ m}$             (E)  $37.8 \text{ m}$
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- 4 Point Questions -

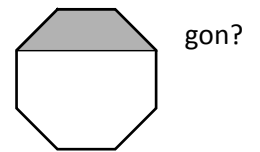
**11.** A Grandmother, her daughter and her Granddaughter each have their birthday in February. They can say that they are in total 100 years old and that each person's age is a power of 2. In which year was the granddaughter born?  
 (A) 1998      (B) 2006      (C) 2010      (D) 2012      (E) 2013

**12.** Paul hangs rectangular pictures on a wall. For each picture he hammers a nail into the wall 2.5m above the floor. He ties a 2m long string to the upper corners of each picture (see diagram). Which picture size (width in cm  $\times$  height in cm) has its lower edge nearest to the floor?  
 (A)  $60 \times 40$       (B)  $120 \times 50$       (C)  $120 \times 90$       (D)  $160 \times 60$       (E)  $160 \times 100$



**13.** In a shared apartment where six girls live there are 2 bathrooms. Each morning from 7:00 the girls use the bathrooms before breakfast whereby they are 9, 11, 13, 18, 22 and 23 minutes respectively, constantly alone in one of the two bathrooms. What is the earliest time that all six girls can have breakfast together?  
 (A) 7:48      (B) 7:49      (C) 7:50      (D) 7:51      (E) 8:03

**14.** The shaded part of the regular octagon has an area of  $3 \text{ cm}^2$ . How big is the area of the octagon?  
 (A)  $8 + 4\sqrt{2} \text{ cm}^2$       (B)  $9 \text{ cm}^2$       (C)  $8\sqrt{2} \text{ cm}^2$       (D)  $12 \text{ cm}^2$       (E)  $14 \text{ cm}^2$



**15.** The length of the tail of the biggest crocodile in a zoo is one third of the total length of the crocodile. The head is 93cm long and makes up one quarter of the length of the crocodile without its tail included. How long is the crocodile?  
 (A) 558 cm      (B) 496 cm      (C) 490 cm      (D) 372 cm      (E) 186 cm

**16.** If you add the numbers on opposite faces of this special die, you will get the same total three times. The numbers on the hidden faces of the die are prime numbers. Which number is on the face opposite to 14?  
 (A) 11      (B) 13      (C) 17      (D) 19      (E) 23



**17.** Anna walks a distance of 8 km at a speed of 4 km/h. Then she runs for a while at 8 km/h. How many minutes must she run for, so that she has been underway with an overall average speed 5 km/h?  
**18.** (A) 15 min      (B) 20 min      (C) 30 min      (D) 35 min      (E) 40 min

**19.** A chess player plays 40 matches and gains from these 25 points, whereby a win gives 1 point, a draw  $\frac{1}{2}$  point, and a loss 0 points. How many more matches does he win than he loses?  
 (A) 5      (B) 7      (C) 10      (D) 12      (E) 15

**20.** The triplets Meike, Monika and Zita each want to buy equally expensive hats. However, Meike's savings were  $\frac{1}{3}$ , Monika's  $\frac{1}{4}$  and those from Zita  $\frac{1}{5}$  smaller than the price of a hat. After these hats were reduced by €9.40, the triplets put their savings together and they each bought a hat. Not a single cent was left over. How much had a hat cost originally?  
 (A) 12 €      (B) 16 €      (C) 28 €      (D) 36 €      (E) 112 €

**21.**  $p$ ,  $q$  and  $r$  are positive whole numbers where  $p + \frac{1}{q + \frac{1}{r}} = \frac{25}{19}$ . The value of the product  $pqr$  is then equal to;  
 (A) 6      (B) 10      (C) 18      (D) 36      (E) 42

