CHRISTMAS MATHEMATICS COMPETITION – 07.12.2006
4 grade

Time limit: 120 minutes

1. Compute (**A**.(**C**-2.**B**)+21.9):4, where **A** is the greatest one-digit integer, **B** is the smallest two-digit integer that is not divisible by 2, and **C** is the smallest 3-digit odd number.
a) 312   b) 23456   c) 225   d) other

2. The pupil number 1 worked out two toys for the Christmas tree, the pupil number 2 worked out three toys, number 3 worked out 5 toys, number 4 – eight toys, number 5 – twelve toys, number 6 – seventeen toys and so on. When you look at the numbers of toys that everybody worked out you are going to see a pattern. How many toys did number 8 work out?
a) 40   b) 30   c) 29   d) other

3. Ivo, Asen and Ilia travel with different vehicles. Ivo traveled 480 km for 2 hours; Asen was 2 times slower than Ivo. Ilia traveled 8 hours and the distance he covered was 160 km shorter than Ivo's. Who of them might be traveling by a bicycle?
a) Ilia   b) Asen   c) Ilia and Ivo d) other

4. On the diagram you see the roads between the crossroads A, B, C, D, E, F, G, H. All tetragons on the figures are rectangular. Viktor traveled on all possible roads that represent a perimeter of a rectangular and discovered that he traveled a distance of 32 km. Find the distance of the longest road if the distance between two neighboring crossroads are equal.

a) 32   b) 10   c) 8   d) other

5. Two schoolboys have had problems with the spelling of several words. вама ученика се затруднявали с правописа на няколко думи. To train himself the first schoolboy wrote down each word 13 times, and the second did the some but wrote down each word 5 times. At the end the first schoolboy wrote down 936 more words than the second. The spelling of how many words did not the schoolboys know?
a) 234   b) 52   c) 117   d) other

6. The sum of two numbers is 474. The last digit of the first number is 1. If we cross it out we shall get the second number. What are the numbers?
a) 341 and 43   b) 341 and 34   c) 412 and 42   d) other

7. In Santa Claus's plant 12 gifts are produced per each 3 minutes and six of the already produced gifts are packaged per each 2 minutes. One morning just before the start of the work there were nothing else than thirty unpackaged gifts. The work started at 9.00. How many gifts (packaged and unpackaged) were there at 9.30?
a) 70   b) 30   c) 60   d) other

8. The persons in the favorite Vasko's computer game talk "Sikono" language. Vasko wants to make a vocabulary of this language. Here you can see a part of his vocabulary: they sing –> LAK_IT, problem –> MON, solve –> ZEN_IT, I sing –> LAK, books –> RID_IT, book —> RID. Ho do you translate "I solve the problems" in "Sikono"?
a) ZEN_IT MON   b) ZEN_IT MON_IT   c) ZEN MON_IT   d) other

9. The distance in km between A and B is equal to greatest two-digit odd number. A car started to travel from the town A at 7:15. After getting the town B the cardriver took some time to rest. The duration of this time in minutes is equal to the smallest two-digit even number. After that he went back to the town A. At what time did the driver get back to A if he travels 66 km per hour.
a)10:25   b) 10:15   c) 8 : 45   d) other
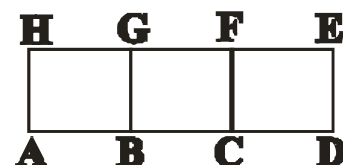
10. During a week each day after the school the 4th – graders of IVa carried out rehearsals for the Christmas party. Each rehearsal was 1 hours and 30 minutes long. The six-graders of VIb made rehearsals too but theirs were 105 minutes long and they omitted Thursday. Then the number of the rehearsals of the IVc was two times smaller than the number of those of VIb and the duration of each rehearsal was 12 900s. What class had the longest time of rehearsal during the week?

Answers: 1c); 2б); 3a); 4c); 5c); 6d) 431 и 43; 7c); 8c); 9a);

Short Solutions

1. A=9, B=11, C=101, and (9(101 – 2*11) + 21*9)/4 is equal to 255.
2. For the pupils with numbers 2, 3, 4, 5, 6, … the number of the worked out toys is produced by adding consecutively the numbers 1, 2, 3, 4, 5, 6, 7, 8 to the number of worked out toys by pupil with previous number. Using this logic the pupil numbered 7 will work out 23 toys and the pupil numbered 8 will work out 30 toys.
3. Ivo's speed is 480/2 = 240km/h, Asen's speed is 240/2 = 120km/h, the distance traveled by Ilia is 480-160 = 320 km, Ilia's speed is 320/8 = 40km/h. Ilia's speed only is reachable by a bicycle.
4. Let x be the length of one side of a rectangle. Therefore there are three rectangles with a side of length x, two rectangles with sides of length x and 2x, and one rectangle with sides x and 3x. The length of all rectangular routs is 32x. Since 32x=32 then x=1. The length of the longest rout is 8.
5. If the number of words is x, then the first student wrote 13x words, and the second 5x words. Therefore 18x – 5x = 936 and x = 117.
6. If the numbers are AB1 and AB, then AB1 + AB = 474. So A=4, B=3, and the numbers are 431 and 43.
7. Since every three minutes 12 are presents produced, then for 30 minutes 120 presents are produced. Every two minutes 6 presents are packaged, therefore for 30 minutes 90 presents are packaged. From the produced 120 presents there are 30 that have not been packaged yet. In the Santa Claus's plant there were 30 unpackaged presents from before the start of the work, therefore at 9:30 the unpackaged presents were 60.
8. Since they **sing –> LAK_IT,** they **solve –> ZEN_IT, books –> RID_IT,** then **IT** is used for producing plural. From **problem –> MON** and the above conclusion it follows that **problems** is translated as **MON_IT,** and from they **solve –> ZEN _IT** it follows that the singular of the verb is **ZEN**. The final translations is **ZEN MON_IT.**
9. 99km for 1 hour and 30 minutes. He has been traveling for 3 hours, resting for 10 minutes, and they arrived at A at10:25.
10. IVa -> 5*90 = 450min rehearsals for the week, IVb ->4*105 = 420min rehearsals for the week, IVc ->12900/60 = 215min rehearsals per day and 2*215 = 430min rehearsals for the week.