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**INTERNATIONL MATHEMATICS AND SCIENCE OLYMPIAD
FOR PRIMARY SCHOOLS (IMSO) 2006**

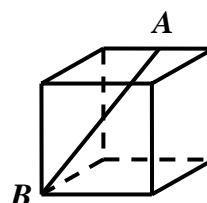
Mathematics Contest (Second Round) in Taiwan

Short Answer Problems

Name:_____ **School:**_____ **Grade:**_____ **ID number:**_____

Short Answer: there are 20 questions, fill in the correct answers in the answer sheet. Each correct answer is worth 2 points. Time limit: 60 minutes.

1. What is the difference between $1+2+4+8+16+32+64+128+256+512+1024$ and 2048?
2. Compute $1/2+(1/3+2/3)+(1/4+2/4+3/4)+\dots+(1/10+2/10+\dots+9/10)=?$
3. How many of the first twenty-five positive whole numbers can be expressed as the product of two different primes? (Note that 1 is not a prime.)
4. How many times does the digit 9 appear in the answer when 1010101 is subtracted from 1000000000000?
5. Andy and Jack each have a number of candies. Andy gives a half of his candies to Jack. After that, Jack gives one third of his candies to Andy. At last both of them have 20 candies. How many candies does Andy have at first?
6. A rectangle has its length 9 times its width. What is the ratio of its perimeter to the perimeter of the square of the same area?
7. In a triangle the length of one side is 3.8 cm and the length of another side is 0.6 cm. We know that the length of the third side, when expressed in centimeters, is an integer. Find the length.
8. A is a 5-digit natural number. B is the sum of digits of A . C is the sum of digits of B . What is the largest possible value of C ?
9. The diagram shows a cube with length 2 cm, in which A is the midpoint of one of the edges. Find the length of AB .
10. Every day at noon a steamboat departs from Havre for New York, at the same time another steamboat starts on its journey from New York to Havre. Each of the steamboats is on its way for exactly 6 days and they all always sail along the same route. How many steamboats will a steamboat sailing From Havre for New York meet (including they meet at harbor)?



11. A logging company decided to cut a forest but Green-Peace activists protested. The president of the company stated that 99% of the trees were pines, which were the only kind of tree being cut. After logging, he reassured the activities, the pines would still constitute 96% of the trees left. How many percent of the trees was the company going to cut?
12. What is the largest 8-digits number that is a multiple of 9, but which has no two digits the same?
13. A book is presented in such a bizarre way that it takes one 3 minutes to finish the first chapter and the time it takes to finish the $(n+1)$ -th chapter is twice the time it takes to finish the n -th chapter. The book consists of 9 chapters in total, numbered from 1 to 9. How many minutes does it take to finish the whole book?
14. Tom travels in Kakanian and the coins of Kakanian are available in just three denominations, where each denomination of Kakanian coin is no more than 10 c . Tom finds that it is possible to choose exactly three Kakanian coins to form the sums of 20 c , 23 c and 29 c . If Tom has exactly one coin for each kind of Kakanian coins, how many denominations does Tom have?
15. The number of female employees in a company is more than 60% and less than 65% of the total respectively. Determine the minimum number of employees overall.
16. When a two digit number is added to its reverse, the result is 143. The number is 3 less than the sum of the squares of its digits. Calculate this number.
17. Five teams played in a competition and every team played each of the four other teams once. Each team received three points for a match it won, one point for a match it drew and no points for a match it lost. At the end of the competition the points were:
 Yellows 10, Reds 9, Greens 4, Blues 3 and Oranges 1.
 How many matches did the Greens win against the other four teams?
18. a, b, c are three positive numbers such that $a + b + c = 21$, $a \times a + b \times b + c \times c = 147$ and $a \times a \times a + b \times b \times b + c \times c \times c = 1029$. What is $3a + 2b + c$?
19. On a twenty-four-hour digital clock whose display ranges from $\boxed{00:00}$ to $\boxed{23:59}$, how many times during one day does the display show a palindrome? (A palindrome is a number that is the same forwards as backwards, for example $\boxed{02:20}$, $\boxed{23:32}$)
20. Assuming that the earth is spherical. What is the fraction of the earth's circumference traveled by the shortest possible route from a point at $60^\circ\text{E } 40^\circ\text{S}$ to $120^\circ\text{W } 50^\circ\text{N}$?