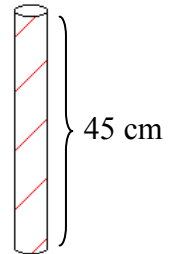# 3rd International Young Mathematicians' Convention (IYMC)
2008 Individual Contest –Junior level

Problem 1.
A cylinder 45 cm high has a circumference of 15 cm. A string makes exactly 4 complete turns round the cylinder while its two ends touch the cylinder's top and bottom. How long is the string in cm?
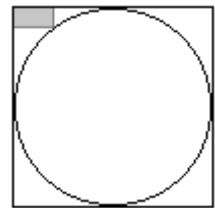
45 cm

Problem 2.
What is the sum of all integers between 500 and 1500 which are divisible neither by 2 nor by 5?

Problem 3.
The symbol $n!$ is used to represent the product $n \times (n-1) \times (n-2) \times \cdots \times 3 \times 2 \times 1$. For example, $4! = 4 \times 3 \times 2 \times 1$. Find n satisfying $n! = 2^{17} \times 3^9 \times 5^4 \times 7^3 \times 11 \times 13 \times 17 \times 19$.

Problem 4.
In the figure, the rectangle at the corner measures 3 cm by 6 cm. What is the radius of the circle in cm?

Problem 5.
Divide 2008 marbles into a number of bags so that I can ask for any number of marbles from 1 to 2008, and you can give me the proper amount by giving me a certain number of these bags without opening them. What is the minimum number of bags you will require?

Problem 6.
Let a be a real number such that $3a - \dfrac{3}{a} + 1 = 0$. What is the value of $a^3 - \dfrac{1}{a^3} + 3$?

Problem 7.
In an office, there are 14 desks of four types: one-drawer, two-drawer, three-drawer and four-drawer respectively. There are 33 drawers altogether in those desks. How many one-drawer desks are there, if it is known that there are as many of them as the two-drawer and three-drawer desks altogether?

Problem 8.
In a circumference a right triangle ΔABC with hypotenuse AB is inscribed. On the longer leg BC is chosen a point D so that $AC = BD$. Find the angle DEC, if E is the midpoint of the arc ACB.