INTERNATIONAL MATHEMATICS AND SCIENCE OLYMPIAD FOR PRIMARY SCHOOLS (IMSO) 2007

Mathematics Contest (Second Round) in Taiwan

Short Answer Problems

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

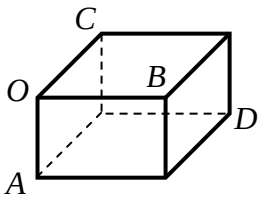
Short Answer: there are 20 questions, fill in the correct answers in the answer sheet. Each correct answer is worth 2 points. Time limit: 60 minutes.

1. Amongst the children in a family each boy has many sisters as brothers, but each girl has only half as many sisters as brothers. How many children are there in the family?

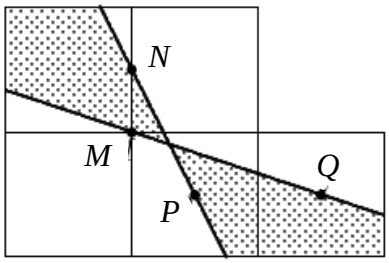
2. A litre of orange fruit juice drink contains 20% orange juice. How many milliliters of orange juice must be added to produce a mixture containing 50% orange juice?

3. The sum of seven consecutive odd numbers is 539. What is the smallest of the seven numbers?

4. The diagram represents a rectangular box in which the lengths of ages *OA*, *OB* and *OC* are respectively 3, 4 and 5 units. What is the length of *OD* in the same units?



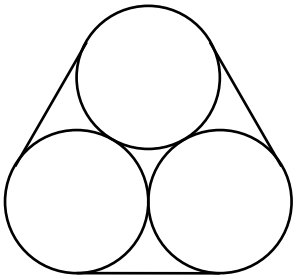
5. The diagram below shows five unit squares joined edge to edge. *M* is a corner, *N* is the midpoint of a side and *P* and *Q* are the centres (intersection point of the two diagonal of a square) of two squares. What is the non-negative difference in the areas of the two shaded regions between *PN* and *QM*?



6. What is the least positive integer by which 1512 should be multiplied so that the product is a perfect square?

7. In his latest game of bowling Tom scored 189 and this raised his average over a number of games from 178 to 179. To raise his average to 180 with the next game, how many points does he have to score?

8. Three pipes of diameter 2 m are held together by a taut metal band as shown. What is the length (in metres) of the metal band?



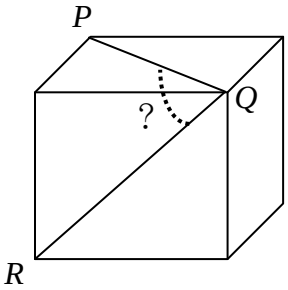
9. The 14 digits in a credit card number are to be written in the boxes below. If the sum of any three consecutive digit is 22, what is the value of x?

			9				x				7		

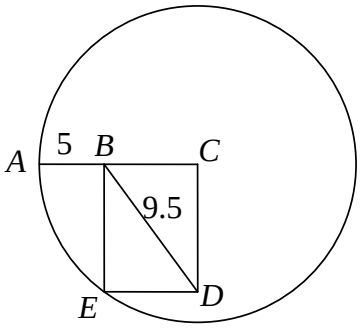
10. 1152 digits are used to number the pages of a book consecutively from page 1. How many pages are there in the book?

11. By placing a 3 at both ends of a number, its value is increased by 34215. What is the sum of the digits of the original number?

12. PQ and QR are diagonals on two faces of a cube, as shown. What is the angle formed by PQR, in degree?



13. Given this circle, with center C and the rectangle $BCDE$ so that AB=5 and BD=9.5, find the diameter of the circle.



14. An office manager figures out that 40 typists can type 25 complete books in two hours. If he has to cut his work force to two typists, how long would it take them to type ten books?

15. In an election for school captain, 1320 votes were cast for five candidates. The winner's margins over the other four candidates were 19, 33, 48 and 65. What was the lowest number of votes received by a candidate?

16. A teacher asked Garfield to calculate five 10-digit perfect square numbers. After a lot of arithmetic, Garfield turned in a list of the following five numbers (see below), but he made two

mistakes. First, he spilled milk on the paper so that the middle six digits of each number were impossible to read. Second, he made an error in calculating one of the five numbers and that number is not a perfect square. Don't cry over spilled milk, but determine which of these five 10-digit numbers is **NOT** a perfect square.

A. **315[illegible]84**

B. **23[illegible]41**

C. **487[illegible]46**

D. **51[illegible]36**

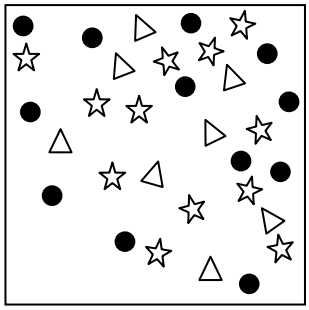
E. **89838[illegible]089**

17. What is the product of $1001\times\left(1-\frac{1}{1001^2}\right)\times\left(1-\frac{1}{1002^2}\right)\times\left(1-\frac{1}{1003^2}\right)\times\cdots\times\left(1-\frac{1}{2007^2}\right)\times 2007$

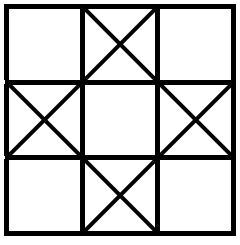
18. A multiplication magic square has the product of the numbers in each row, column and diagonal the same. If the diagram is filled with positive integers to form a multiplicative magic square, what is the value of X?

20		X
16		
	4	

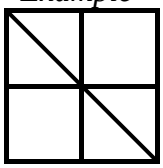
19. Divide the figure at right by drawing two straight lines so that there are three circles, three stars, and two triangles in each section.



20. How many squares and triangles can you count in the figure below? An example is given to show that squares and triangles can be counted more than one.



Example



Ans:
5 squares
6 triangles