Name of Participant :_____ **Index No :** ____ / ____
(Statutory Name)

Name of School : _____

Date Of Birth : _____ **(DD/MM/YY)**

Saturday, 7 June 2003 **0900 h — 1100 h**

The Chinese High School
Mathematics Learning And Research Centre

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Singapore Asia Pacific Mathematical Olympiad for Primary Schools 2003

First Round
2 hours
(150 marks)

Instructions to Participants

Attempt as many questions as you can.
Neither mathematical tables nor calculators may be used.
Write your answers in the answer boxes.
Working may be shown in the space below each question.
Marks are awarded for correct answers only.

This question paper consists of 16 printed pages (including this page)

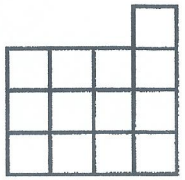
Number of correct answers for Q1 to Q10 : _____ Marks (4) : _____
Number of correct answers for Q11 to Q20 : _____ Marks (5) : _____
Number of correct answers for Q21 to Q30 : _____ Marks (6) : _____

Total Marks for **First Round** : _____

1. What is the greatest possible number of right angles formed by 4 straight lines in a plane ?

2. What is the next number in the following sequence : 123, 347, 7815, 151631?

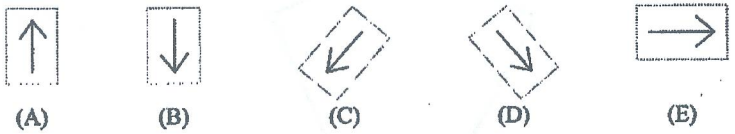
3. The following figure is made up of 13 squares. On the answer sheet provided, show two ways to draw a straight line to divide the figure into two parts of equal areas.



4. There are 30 children in a class.
   12 of them can play badminton.
   8 of them can play table-tennis.
   Find the greatest possible number of children that can play neither of the games.

5. Find the value of $\frac{1}{2}+\frac{1}{3}+\frac{2}{3}+\frac{1}{4}+\frac{2}{4}+\frac{3}{4}+.....+\frac{1}{100}+\frac{2}{100}+\frac{3}{100}+.....+\frac{99}{100}$.

6. A card, with the starting position ↑, is first rotated clockwise through an angle of 3000°. It is then rotated anti-clockwise through an angle of 2745° and finally rotated clockwise through an angle of 1320°. Which of the following indicates the final position ?



(A) (B) (C) (D) (E)

Fill in the answer sheet as A, B, C, D or E.

7. What fraction of the following figure is shaded ?

8. There are three closed boxes that contain a red ball, a green ball and a yellow ball respectively. However, they are all labeled incorrectly. David opens the box labeled red andfinds a green ball in it. What is the colour of the ball in the box labeled green ?

9. A four-digit number 7a4b is a multiple of 18. Find the digits a and b if the four-digit number is to be as small as possible.

10. Given that

$2^1 = 2,$

$2^2 = 2 \times 2,$

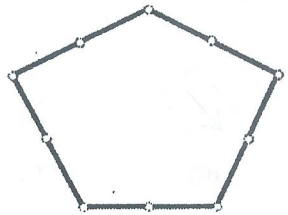
$2^3 = 2 \times 2 \times 2,$

$2^4 = 2 \times 2 \times 2 \times 2,$ .....

find the remainder when 2^{2003} is divided by 3.

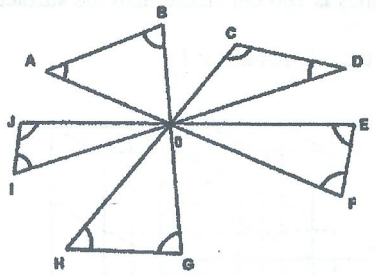
11. A water plant grew very fast such that it doubled the area of the water surface that it covered every minute.
It was brought to a 100 m by 50 m pond at 11.00 am.
At 12 noon it managed to cover the entire pond.
Find the time when it covered a quarter of the pond.

12. There are 10 points on the 5 sides of a pentagon as shown.
How many triangles can be drawn with any three of the points as vertices ?

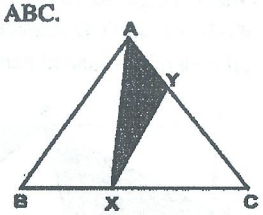


13. Each big bus has a capacity of 39 seats and charges $100 in rental cost.
Each small bus has a capacity of 30 seats and charges $80 in rental cost.
267 men need to travel by bus.
Given that every man should have a seat and that no seat is left empty, what is the total rental cost ?

14. AF, BG, CH, DI and EJ are straight lines. What is the sum of the angles A, B, C, D, E, F, G, H, I and J ?

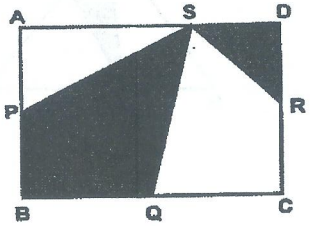


15. In triangle ABC, CX = 2BX and CY = 3AY. The area of triangle AXY is 20 m^2.
Find the area of triangle ABC.



16. There are 20 questions in a mathematics test.
7 marks are awarded for each question answered correctly.
4 marks are deducted for each question answered incorrectly.
No mark is given for each question left unanswered.
If a pupil scores 100 marks, what is the number of questions he left unanswered ?

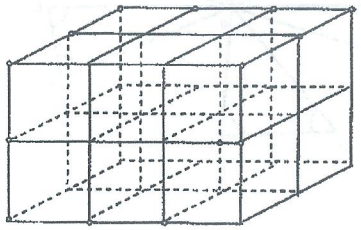
17. In the figure below, the area of the rectangle ABCD is 36 cm^2.
P, Q and R are the mid-points of AB, BC and CD respectively.
S is a point on AD. Find the total area of the shaded parts.



18. Mrs Lim was carrying a basket of eggs to the market when a passer-by bumped into her. She dropped the basket and all the eggs broke.
The passer-by, wishing to pay for the loss, asked : "How many eggs were there in your basket ?"
"I don't remember exactly," Mrs Lim replied, "but I know that when I count by 3s, there were 2 eggs left over; when I count by 5s, there were 3 eggs left over; and when I count by 7s, there were 4 eggs left over."
At least how many eggs were there in Mrs Lim's basket at first ?

19. In calculating the product of two 2-digit numbers, Sam miswrote the ones digit in one of the two numbers as 0 instead of 8 and his answer was 190. June miswrote the ones digit in the same number as 6 and her answer was 304. Find the correct answer of the product.

20. A rectangular block is cut into 12 identical cubes (as shown). The total surface area of the 12 individual cubes is 160 cm^2 more than the surface area of the original block.
What is the volume of the original block ?



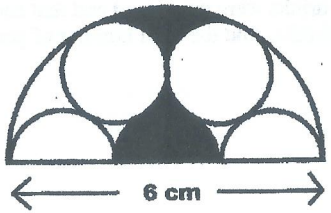
21. Machine A can produce 12,000 cakes in 2 hours. Machine B can produce 12,000 cakes in 3 hours. Working together without changing their rates of production, how many hours will it take for the two machines to produce 24,000 cakes ?

22. Find the value of $\left(1+\frac{19}{39}\times 1\right)+\left(1+\frac{19}{39}\times 2\right)+\ldots\ldots\ldots+\left(1+\frac{19}{39}\times 12\right)$.

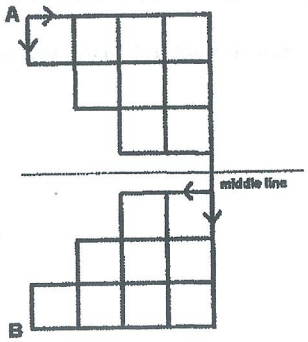
23. In a party, three types of bottled drinks, mineral water, cola and fresh orange juice, were served.
A bottle of mineral water is to be shared by 2 people.
A bottle of cola drink is to be shared by 3 people.
A bottle of fresh orange juice is to be shared by 4 people.
Given that 91 bottles of drinks were consumed and that each person had consumed 1 share of each type of drinks, find the total number of people present at the party.

24. There are two containers P and Q, containing different amounts of oil at first.
60% of the oil in P is poured into Q.
Then 50 % of the oil in Q is poured into P.
After these two pourings, the ratio of the amount of oil in P to the amount of oil in Q is 11:7.
What is the ratio of the amount of oil in P to the amount of oil in Q at first ?

25. The diagram shows a semi-circle with diameter 6 cm. Find the area of the shaded region.
Leave your answer in terms of π.



26. Given that for the upper half of the figure, only downward and rightward movements are allowed, and that for the lower half of the figure, only downward and leftward movements are allowed, how many possible routes are there from A to B?



27. Find the value of 1–2+3+4–5+6+7–8+9+10–...–2000+2001+2002-2003.

28. Study the following picture sequence. On the answer sheet provided, sketch Figure 4 that follows.

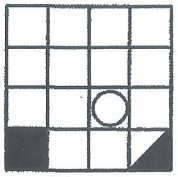


Figure 1

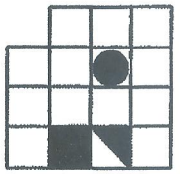


Figure 2

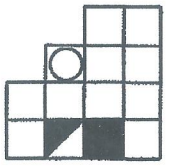
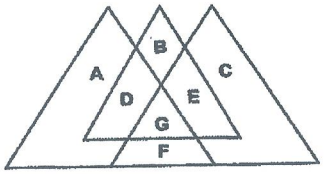


Figure 3

29. Three married couples meet at a party.
They are Mr Xu, Mr Yue, Mr Zhang, Mdm Amy, Mdm Bernice and Mdm Claire.
Mr Xu's wife and Mdm Claire's husband do not know each other.
Mdm Bernice's husband and Mdm Amy do not know each other.
Mr Zhang knows everybody.
Who is Mr Xu's wife ?

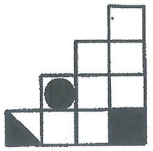
30. In the diagram, there are three triangles each containing 4 letters.
The letters A to G represent different numbers from 1 to 7.
Given that the sum of the 4 letters in each triangle is 19, what is the value of G ?



THE END

Singapore- Asia Pacific Mathematical Olympiad for Primary Schools 2003

First Round – Answers Key

1	16	16	1
2	313263	17	18 cm^2
3	*See detail solutions*	18	53
4	18	19	342
5	2475	20	96 cm^3
6	D	21	2.4 hours
7	5/8	22	50
8	Yellow	23	84
9	a = 1 b = 6	24	5:4 or 10:8
10	2	25	5/6 π cm^2
11	11.58 am	26	784
12	115	27	667666
13	$700	28	 Figure 4
14	720°		
15	120 m^2		
		29	Mdm Bernice
		30	G = 7