保良局
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TEL: 2277 8888 • FAX: 2576 4509

Po Leung Kuk

6th Primary Mathematics World Contest

Individual Contest

English Version

香港禮頓道六十六號 66 LEIGHTON ROAD, HONG KONG
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1. A number p yields a remainder of 3 when divided by 5, a remainder of 5 when divided by 8, and a remainder of 11 when divided by 13. If p is less than 1000, find the maximum value of p.

2. A five-digit perfect square in the form of 4abc9 has a thousands digit a, hundreds digit b, and tens digit c. If $a > b > c$, find the value of $a + b + c$.

3. Find the 2002nd decimal digit when $\frac{1}{14}$ is expressed in decimal form.

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4. Given a square of side 16 cm, a second square is drawn inside by joining the midpoints of its sides. A third square is drawn inside the second square in the same way. This process continues until the 10th square is drawn. Find the sum of the areas of the ten squares.

5. Two natural numbers differ by 3. The sum of their squares is 117. Find these numbers.

6. A six-digit number *ababab* is formed by repeating a two-digit number *ab* three times, e.g. 525252. If all such numbers are divisible by p, find the maximum value of p.

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7. Find the number of successive zeroes at the right end of the product of the natural numbers from 1 to 100.

8. Numbers such as 543 or 531 have their digits in strictly decreasing order because each digit is less than the digit to its left. The digits in 322 are not in strictly decreasing order. How many integers between 100 and 599 have their digits in strictly decreasing order?

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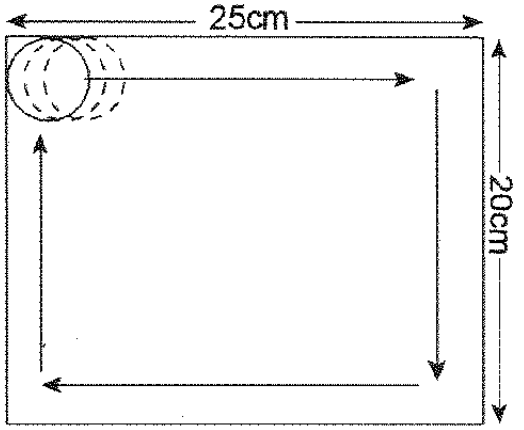
9. A circular disc with a radius of 3 cm is rolling along the four sides of a 20 cm by 25 cm rectangle as shown in the figure. What is the total area of the regions that the disc's movement cannot cover?

(Assume $\pi = 3.14$)



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10. A fruit company orders 4800 kg of oranges at $1.80 per kg. The shipping cost is $3000. Suppose 10% of the oranges are spoiled during shipping, and the remaining oranges are all sold, what should be the selling price per kg if the fruit company wants to make an 8% profit?

11. Find the last two digits of 6^{2002}.

Note: $6^{2002} = \underbrace{6\times6\times6\cdots\times6}_{2002\ factors}$.

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12. A pair of positive integers a and b is such that the greatest common divisor is 5 and the least common multiple is 1155. Find the smallest value of $a + b$.

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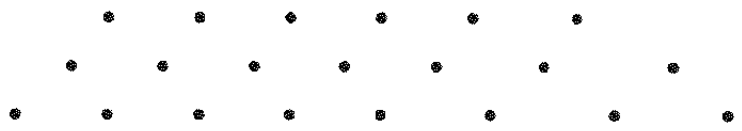
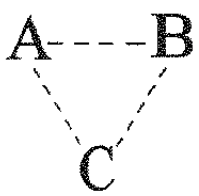
13. Given the number pattern:

1st Row: 1
2nd Row: 3 5
3rd Row: 7 9 11
4th Row: 13 15 17 19
5th Row: 21 23 25 27 29



A triangle of three numbers



is taken from the pattern above, such that A, B are two successive numbers in the i^{th} row and C is in the $(i+1)^{th}$ row just below A and B. If A + B + C = 2093, find the value of C.

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14. The surface area and the volume of a cube are n cm^2 and n cm^3, respectively. Find the value of n.

15. What is the largest integer between 1 and 100 with exactly 12 positive divisors (including itself and 1)?

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INDIVIDUAL CONTEST

Questions	Answer	Remark
1	973	
2	18	223^2=49729
3	4	
4	511.5	
5	6 , 9	
6	10101	
7	24	
8	20	
9	111.74cm^2	
10	2.91	
11	36	
12	160	
13	733	
14	216	
15	96	