Primary 4

Time allowed: 120 minutes

Question Paper

Instructions to Contestants:

1. Each contestant should have ONE Question-Answer Book which CANNOT be taken away.

2. There are 5 exam areas and 6 questions in each exam area. There are a total of 30 questions in this Question-Answer Book. Each question carries 5 marks. Total score is 150 marks. No points are deducted for incorrect answers.

3. All answers should be written on ANSWER SHEET.

4. NO calculators can be used during the contest.

5. All figures in the paper are not necessarily drawn to scale.

6. Write down the answer in the simplest form. If the calculation result is a fraction, please write down the answer as a proper or mixed fraction, decimal figure is also accepted. Marks will NOT be given for incorrect unit.

7. This Question-Answer Book will be collected at the end of the contest.

DO NOT turn over this Question-Answer Book without approval of the examiner.

Otherwise, contestant may be DISQUALIFIED.

All answers should be written on the ANSWER SHEET.

Open-Ended Questions (1st ~30th) (5 points for correct answer, no penalty point for wrong answer)

Logical Thinking

1. There are a total of 41 chickens and rabbits in a farm. The animals have a total of 96 legs. How many chicken(s) is / are there?

2. Edward is now playing "Clapping Game". When he needs to call any multiples of 6, he has to clap hands once instead of calling them out. Now the game starts from 20 in an ascending order. After clapping 37 times, what will the next number be?

3. In class 4B, all students queue up to form a rectangle. On Eric's right-hand side and left-hand side, there are 8 and 5 students respectively. There are 6 students in front of Eric and 5 students behind Eric respectively. How many student(s) is / are in class 4B?

4. 25th March 2021 is Thursday. Which day of the week is 24th November this year?

5. According to the pattern shown below, find the value of $B-A$.

3	4	5	6	7	8	9	10	11
12	15	18	21	24	27	30		
45	54	63	A	81				
162	189	B						
567								

6. Peter's uncle's age this year minuses 29, then divided by 6, adds 16 and multiplies by 8. The result will be 152 years old. How old is Peter's uncle this year?

Arithmetic

7. Find the value of $\dfrac{1}{2+\dfrac{8}{9+\dfrac{4}{7}}}$.

8. If A and B are both 1-digit numbers, what is the value of $A+B$ if the equation with carrying is correct?

$$
\begin{array}{r}
A\ \ A \\
\times\quad 1\ \ B\ \ A \\
\hline
5\ \ 7\ \ 0\ \ 9
\end{array}
$$

Question 8

9. Find the value of $9 \times 11 \times 13 \times 15$.

10. Find the value of $208 + 222 + 236 + 250 + \ldots + 530 + 544$.

11. Find the value of $592 \div 23 - 12 \div 23 + 97 \div 23 + 174 \div 23$.

12. Using method $S = 2S - S$, find the value of $S = 7 + 14 + 28 + \ldots + 1792 + 3584$.

Number Theory

13. If a 10-digit number $\overline{202A89293B}$ is divisible by 28 and $B > A > 0$, find the value of A.

14. The sum of 9 consecutive even numbers is 1494. Find the largest number.

15. The product of positive numbers A and B is 1014. A is 6 times of B. Find the value of A.

16. Define the operation symbol $a \otimes b = (b - a) \times (a + b) - (a + a - b)$, find the value of $(6 \otimes 8) \otimes 29$.

17. Find the unit digit of A if $A = \underbrace{3 \times 3 \times 3 \times \ldots \times 3}_{2021's} \times \underbrace{4 \times 4 \times 4 \times \ldots \times 4}_{2021's} \times \underbrace{7 \times 7 \times 7 \times \ldots \times 7}_{2021's}$.

18. What is the largest 3-digit number that can be divisible by 21 and 45?

Geometry

19. How many rectangle(s) is / are there in the figure below?
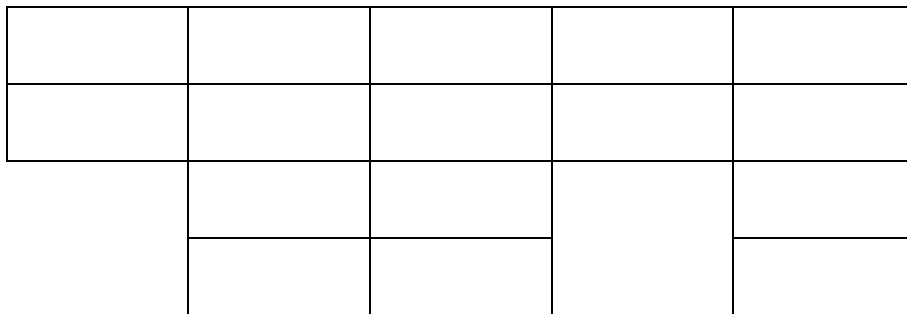
Question 19

20. It is given that the area of a rectangle is 336. The width and length are integers. Find the minimum value of the perimeter.

21. The figure on the left is a small right-angled triangle with side length 8 and hypotenuse 10. The large triangle on the right is formed by 4 identical small right-angled triangles. Find the area of the large triangle on the right.
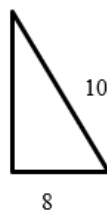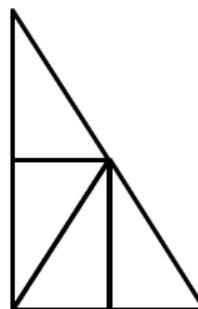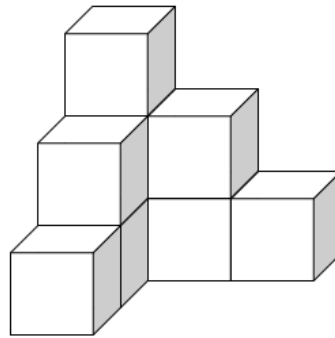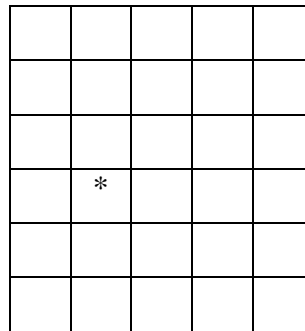
10

8

Figure 1

Figure 2

Question 21

3

22. There are 3 levels in the figure below and it consists of 9 cubes. According to the following pattern, how many cube(s) will be needed to build 12 levels?

Question 22

23. How many rectangle(s) with "*" is / are there in the figure below?

Question 23

24. The perimeter of a square is 20. Now Peter combines 25 squares to a new rectangle. The side lengths of the new rectangle are integers. What is the maximum value of the perimeter of the rectangle?

Combinatorics

25. Now there are infinitely many boxes. If 2800 candies are needed to separate into these boxes evenly, how many way(s) is / are there?

26. Numbers are drawn from 85 integers 46 to 130. At least how many number(s) is / are drawn at random to ensure that there are two numbers whose difference is 17?

27. A flight of stairs has 11 steps. Andy can go up for 1 step or 2 steps each time. The 6th step cannot be stepped on as it is destroyed. How many way(s) is / are there for Andy to go up the stairs?

28. Find the smallest difference by using 2, 2, 3, 4, 4, 7, 7, 7, 9, 9 to form two 5-digit numbers.

29. 83 biscuits are either in box A, B, C, D or E. No boxes have more biscuits than box A. At least how many biscuit(s) is / are there in the box A?

30. It is known that the most-right digit smaller than any other digit(s) in a number is called "special number". For example, 831 and 554. How many 3-digit "special number" is / are there?

~ End of Paper ~