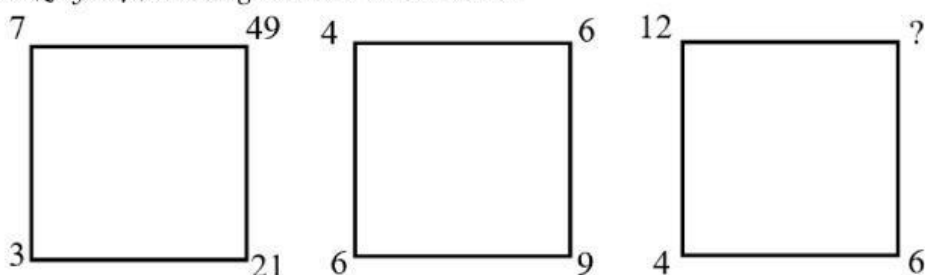## ĐỀ SỐ 1: Đề thi Vòng quốc gia năm học 2020 – 2021

Logical Thinking / *Tư duy lô-gic*

1. A stationary store had a box of pencils. One half but 7 more pencils were sold on the first day. One half of the remaining part and 5 fewer pencils were sold on the second day. Finally, 28 pencils are left. How many pencil(s) did the box contain originally?
    One half: Một nửa; More: Nhiều hơn; Remaining part: Phần còn lại; Fewer: Ít hơn; Left: Còn lại; Originally: Ban đầu.

2. According to the pattern shown below, what is the missing number?
    Pattern: Quy luật; Missing number: Số còn thiếu.

3. It requires 6 people to take 10 days to complete a task. How many day(s) is / are needed for 4 people to finish the same task?
    Require: Yêu cầu; The same: Giống nhau.

4. There are some chickens and rabbits. The number of chickens is 24 more than the number of rabbits. If there are 348 legs in total, how many rabbit(s) is / are there?
    More than: Nhiều hơn; In total: Tổng số.

5. There are 24 blue balls, 26 red balls and 28 green balls in a bag. At least how many balls should be picked up at random to ensure there are 8 balls for each colour?
    At least: Ít nhất; At random: Ngẫu nhiên; Ensure: Chắc chắn; Each colour: Mỗi màu.

Arithmetic / *Số học*

6. Find the value of $12 + 18 + 24 + 30 + \ldots + 96 + 102 + 108 + 114$.
    Value: Giá trị.

7. Find the value of the simplest form of $\dfrac{1}{3 \times 7} + \dfrac{1}{7 \times 11} + \dfrac{1}{11 \times 15} + \ldots + \dfrac{1}{31 \times 35} + \dfrac{1}{35 \times 39}$.
    Value: Giá trị.; Simplest form: Dạng tối giản.

8. Find the value of the simplest form of $\left(\dfrac{7}{3} + \dfrac{7}{9} + \dfrac{7}{27} + \dfrac{7}{81} \right) \div \left(\dfrac{9}{5} + \dfrac{9}{15} + \dfrac{9}{45} + \dfrac{9}{135} \right)$.
    Value: Giá trị.; Simplest form: Dạng tối giản

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9. Find the value of $\dfrac{1}{243} + \dfrac{1}{81} + \ldots + \dfrac{1}{9} + \dfrac{1}{3} + 1 + 3 + 9 + \ldots + 81 + 243$.

    (Write the answer as a mixed fraction.)
    Value: Giá trị.; Mixed fraction: Hỗn số.

10. Find the value of the simplest form of $\dfrac{1}{5 - \dfrac{2}{4 + \dfrac{3}{3 + \dfrac{4}{5}}}}$.
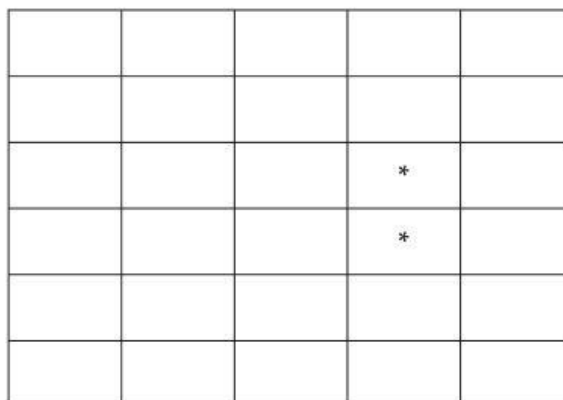
    Value: Giá trị.; Simplest form: Dạng tối giản.

Number Theory / *Lý thuyết số*

11. If a 9-digit number $\overline{20201B16A}$ is divisible by 24, find the maximum value of $A + B$.
    9-digit number: Số có 9 chữ số; Divisible: Chia hết; Maximum Value: Giá trị lớn nhất.

12. How many 3-digit number(s) either divisible by 7 or divisible by 11 is / are there?
    3-digit number: Số có 3 chữ số; Divisible by: Chia hết cho.

13. Define the operation symbol $a \otimes b = 2 \times a \times b - (a + 1) \times (b - 1)$. Find $4 \otimes (3 \otimes 2)$.
    Operation symbol: Kí hiệu phép toán.

14. The sum of 13 consecutive numbers is 1222. Find the value of the largest number.
    Sum: Tổng; Consecutive: Liên tiếp; Largest number: Số lớn nhất.

15. A teacher gives some candies to students. If everyone gets 7 candies, 18 candies will be left.
    If everyone gets 5 candies, 34 candies will be left. How many candies does the teacher have?
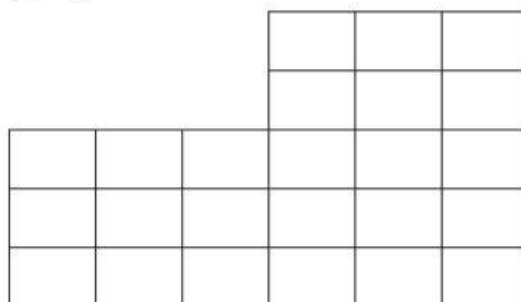   *Give: Cho; Left: Còn lại.*

Geometry / *Hình học*

16. How many rectangles with 2 "*" are there in the figure below?
    Rectangle: Hình chữ nhật; Figure: Hình vẽ.

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17. How many rectangles are there in the figure below?

Rectangle: Hình chữ nhật; Figure: Hình vẽ.

18. The area of a rectangle is 1260. If sides of the rectangle are integers, find the minimum value of the perimeter of the rectangle.
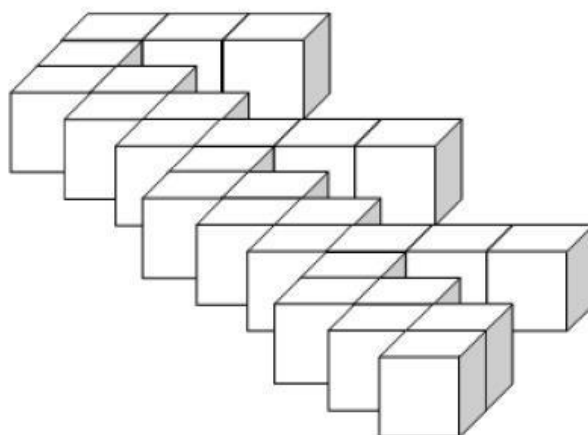
Area: Diện tích; Rectangle: Hình chữ nhật; Side: Cạnh; Integer: Số nguyên; Minimum Value: Giá trị. nhỏ nhất; Perimeter: Chu vi.

19. How many times is the interior angle of a regular 20-sided polygon as the exterior angle?

How many times: Gấp bao nhiêu lần; Interior angle: Góc trong; Regular 20-sided polygon: Đa giác đều 20 cạnh; Exterior angle: Góc ngoài.

20. 27 small cubes with side length 1 are combined. According to the pattern shown below, find the surface area.

Cube: Khối lập phương; Side length: Độ dài cạnh; Pattern: Quy luật; Surface area: Diện tích toàn phần.

Combinatorics / *Tổ hợp*

21. 15 students join a competition. Only top 5 students can be promoted to next round. How many different ways of promotion advance are there?

Different way: Cách khác nhau.

22. It is known that there are 8 classes of grade 5 in a primary school. At least how many students are there in grade 5 to ensure there exist 41 students in the same class?

At least: Ít nhất; Ensure: Chắc chắn; Exist: Tồn tại.

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23. Choose 3 digits from 1, 2, 3, 4, 6, 8 and 0 to form 3-digit numbers. How many even numbers greater than 300 are there? (The repetition of digits is not allowed)
Digit: Chữ số; 3-digit number: Số có 3 chữ số; Even number: Số chẵn; Greater than: Lớn hơn; Repetition of digits is not allowed: Các chữ số không được lặp lại.

24. A flight of stairs has 10 steps. Peter can go up for 1 step, 2 steps or 3 steps each time. How many ways are there for Peter to go up the stairs?
Step: Bước; Way: Cách.

25. Numbers are drawn from 80 integers 20 to 99. At least how many numbers are drawn at random to ensure that there are two numbers whose sum is 85?
Integer: Số nguyên; At least: Ít nhất; Random: Ngẫu nhiên; Ensure: Chắc chắn; Sum: Tổng.

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