1. Lisa has 8 dice with the letters A, B, C and D, the same letter on all sides of each die. She builds a block with them. Two adjacent dice always have different letters. What letter is on the die that cannot be seen on the picture below?

![Image](image.png)

2. The positive integers have been colored red, blue or green: 1 is red, 2 is blue, 3 is green, 4 is red, 5 is blue, 6 is green, and so on. Renate calculates the sum of a red number and a blue number. What color can the resulting number be?

3. Fifteen numbers are arranged in a row so that the sum of any four consecutive numbers is 12. Three numbers are already given in the respective cells of the row. What number must be in the cell marked by the happy face?

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1  |  | 4 |  | 2
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4. Rectangle ABCD is cut into four smaller rectangles, as shown in the figure. The four smaller rectangles have the following properties:

(a) the perimeters of three of them are 11, 16 and 19;
(b) the perimeters of the fourth is neither the biggest nor the smallest of the four.

What is the perimeter of the original rectangle ABCD?

![Diagram](image.png)

5. Jack has a piano lesson twice a week and Hannah has a piano lesson every other week. In a given quarter, Jack has 15 more lessons than Hannah. How many weeks long is their quarter?

6. Each year, the date of the Kangaroo competition is the third Thursday of March. What is the latest possible date of the competition in any year?
7. A square-shaped piece of paper is folded twice as shown in the picture. The area of the original square is 64 cm$^2$. What is the total area of the shaded rectangles?

8. Ivor writes down the results of the quarter-finals, the semi-finals and the final of a direct-elimination tournament. The results are (not necessarily in this order):

- Bart beat Anthony
- Carl beat Damien
- Glen beat Henry
- Glen beat Carl
- Carl beat Bart
- Ed beat Fred
- Glen beat Ed

Who played in the final?

9. A craftsman is asked to manufacture three universal weights so that, using only these weights and a simple balancing scale, it will be possible to measure any mass of consecutive integer number of grams, starting from 1 gram, 2 grams, etc., up to a maximum possible mass of $N$ grams. It is allowed to place any of the three weights in any of the sides of the balancing scale, or to put any of them aside. What is the greatest possible mass, $N$ grams, that one can measure given these requirements?

10. How many quadrilaterals of any size are shown in the figure?


12. The product of two numbers is 36 and their sum is 37. What is their difference?

13. A bucket was half full. A cleaner added 2 liters to the bucket. The bucket was then three-quarters full. What is the volume of the bucket?

14. The area of rectangle $ABCD$ is 10. Points $M$ and $N$ are midpoints of sides $AD$ and $BC$. What is the area of quadrilateral $MBND$?
15. Wanda has several square pieces of paper with an area of 4. She cuts them into squares and right triangles in the manner shown in the first diagram. She takes some of the pieces and makes the bird shown in the second diagram. What is the area of the bird?

16. George built the shape shown using seven unit cubes. How many such cubes does he have to add to make a cube with edges with a length of 3?

17. The necklace in the picture contains dark grey beads and white beads

Arnold takes one bead after another from the necklace. He always takes a bead from one of the ends. He stops as soon as he has taken the fifth dark grey bead. What is the largest number of white beads that Arnold can take?

18. In the diagram, the area of each circle is 1 cm². The area common to two overlapping circles is $\frac{1}{8}$ cm². What is the area of the region covered by the five circles shown?
19. This year, a grandmother, her daughter, and her granddaughter noticed that the sum of their ages is 100 years. Each of their ages is a power of 2. How old is the granddaughter?

20. Five equal rectangles are placed inside a square with a side length of 24 cm, as shown in the diagram. What is the area of one rectangle?

21. The heart and the arrow are in the positions shown in the figure. The heart and the arrow start moving at the same time. The arrow moves three places clockwise and the heart moves four places counterclockwise, and then they both stop. They continue the same moves over and over again. After how many such moves will the heart and the arrow land in the same triangular region for the first time?

22. The diagram shows the triangle \(ABC\) in which \(BH\) is a perpendicular height and \(AD\) is the angle bisector at \(A\). The measure of the obtuse angle between \(BH\) and \(AD\) is four times the measure of angle \(DAB\). What is the measure of angle \(CAB\)?

23. Six boys share an apartment with two bathrooms which they use every morning beginning at 7:00. There is never more than one person in either bathroom at one time. They spend 8, 10, 12, 17, 21 and 22 minutes at a stretch in the bathroom respectively. What is the earliest time that they can finish using the bathrooms?

24. The Pirate Captain Sparrow and his pirate crew dug up some gold coins. They divided the coins among themselves so that each person got the same number of coins. If there had been four fewer pirates, then each person would have received 10 more coins. However, if there had been 50 coins fewer then each person would have received 5 coins fewer. How many coins did they dig up?
# Answer Key

1. B
2. Green
3. 5
4. 30
5. 10
6. March 21
7. 16 cm²
8. Glen and Carl
9. 13 grams
10. 4
11. 0
12. 35
13. 8
14. 5
15. 6
16. 20
17. 7
18. $\frac{9}{2}$ cm²
19. 4
20. 32 cm²
21. Never
22. 60°
23. 7:46 AM
24. 150