23. Eleven points are marked from left to right on a straight line. The sum of all the distances between the first point and the other points is 2018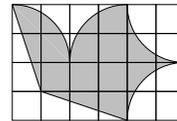. The sum of all the distances between the second point and the other points, including the first one, is 2000. What is the distance between the first and second points?
A) 1   B) 2   C) 3   D) 4   E) 5

24. Simon and Ian decide to have a race. Simon runs around the perimeter of the pool shown in the diagram while Ian swims lengths of the pool. Simon runs three times faster than Ian swims. Ian swam six lengths of the pool in the same time Simon ran around the pool five times. How wide is the pool?
A) 25 m   B) 40 m   C) 50 m   D) 80 m   E) 180 m
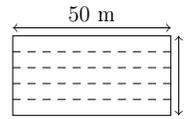
25. A hotel on an island in the Caribbean advertises using the slogan "350 days of sun every year!". According to the advert, what is the smallest number of days Willi Burn has to stay at the hotel in 2018 to be certain of having two consecutive days of sun?
A) 17   B) 18   C) 31   D) 32   E) 35

26. Freda's flying club designed a flag of a flying dove on a square grid as shown. The area of the dove is 192 cm². All parts of the perimeter of the dove are either quarters of a circle or straight lines. What are the dimensions of the flag?
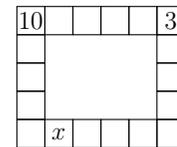A) 15 cm × 10 cm   B) 18 cm × 12 cm   C) 20 cm × 12 cm
D) 24 cm × 16 cm   E) 27 cm × 18 cm

27. Points N, M, L lie on the sides of the equilateral triangle ABC, such that $NM \perp BC$, $ML \perp AB$ and $LN \perp AC$ as shown in the diagram. The area of triangle ABC is 36. What is the area of triangle LMN?
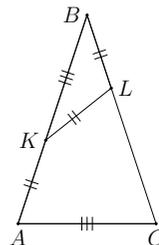A) 9   B) 12   C) 15   D) 16   E) 18
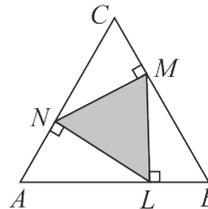
28. Ria wants to write a number in every cell on the border of a 5×6 table. In each cell, the number she writes is equal to the sum of the two numbers in the cells with which this cell shares an edge. Two of the numbers are given in the diagram. What number will she write in the cell marked x?
A) 7   B) 10   C) 13   D) −13   E) −3

29. Viola is practising the long jump. The average distance she has jumped so far today is 3.80 m. On her next jump, she jumped 3.99 m and her average increased to 3.81 m. What distance must she jump with her next jump to increase her average to 3.82 m?
A) 3.97 m   B) 4.00 m   C) 4.01 m   D) 4.03 m   E) 4.04 m

30. In isosceles triangle ABC, points K and L are marked on sides AB and BC respectively so that $AK = KL = LB$ and $KB = AC$ (see pic.). What is the size of angle ABC?
A) 30°   B) 35°   C) 36°   D) 40°   E) 44°

KANGAROO 2018   C

Time allowed: 75 minutes
Calculators are not permitted

Cadet
7–8 grades

Questions for 3 points

1. $(20 + 18 + 20 + 18) : (20 - 18 + 20 - 18) =$
A) 18   B) 19   C) 20   D) 34   E) 36

2. When the letters of the word MAMA are written vertically above one another, the word has a vertical line of symmetry. Which of these words also has a vertical line of symmetry when written in the same way?
A) TETA   B) DAMA   C) BAMBA   D) NOSIS   E) ATOMAI

3. A rectangle has sides of length 8 and 12. A square has the same perimeter. What is the length of each side of the square?
A) 4   B) 5   C) 6   D) 8   E) 10

4. Which number should replace ⋆ in the equation $2 \cdot 18 \cdot 14 = 6 \cdot \star \cdot 7$ to make it correct?
A) 8   B) 9   C) 10   D) 12   E) 15

5. Bertie the Builder is assembling stairs which are 15 cm tall and 15 cm deep. How many stairs does he need to reach the second floor of a building 3 m above the first floor?
A) 8   B) 10   C) 15   D) 20   E) 25
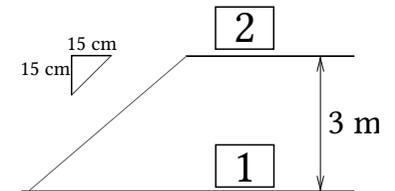
6. The picture shows the calendar of a certain month of the year. Unfortunately some ink fell on the calendar and most of it cannot be seen. Which day of the week was the 27th of that month?
A) Monday   B) Wednesday   C) Thursday
D) Saturday   E) Sunday
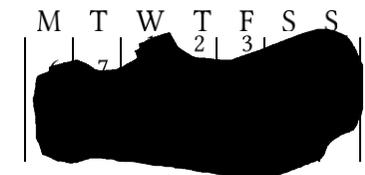
7. A large rectangle is made up of nine identical rectangles whose longest sides are 10 units long. What is the perimeter of the large rectangle?
A) 40   B) 48   C) 76   D) 81   E) 90
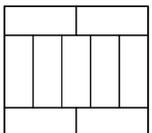
8. Thor has seven stones and a hammer. Every time he hits a stone with the hammer it breaks into exactly five smaller stones. He does this several times. Which of the following numbers could be the number of stones he may end with?
A) 17   **B)** 20   **C)** 21   **D)** 23   **E)** 25

9. The diagram shows a rectangle of dimensions 7×11 containing two circles that each touch three of the sides of the rectangle. What is the distance between the centres of the two circles?
**A)** 1   **B)** 2   **C)** 3   **D)** 4   **E)** 5
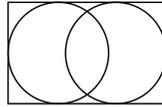
10. There are 65 balls in a box. 8 are white and the rest of the balls are black. In one move, at most 5 balls can be taken out of the box. It is not allowed to put any balls back in the box. What is the smallest number of moves needed to ensure that at least one white ball is taken out?
**A)** 13   **B)** 12   **C)** 11   **D)** 10   **E)** 9
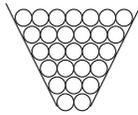
Questions for 4 points

11. A game consists of dropping a ball from the top of the board with interleaved rows of pins. The ball bounces to either the right or to the left each time it hits a pin. One possible route for the ball to take is shown on the right. How many different routes could the ball take to reach bin B?
**A)** 2   **B)** 3   **C)** 4   **D)** 5   **E)** 6
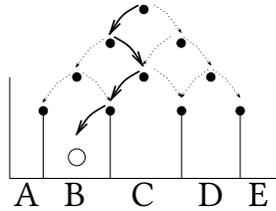
12. A rectangle is divided into 40 identical squares. The rectangle contains more than one row of squares. Andrew found the middle row of squares and coloured it in. How many squares did he not colour?
A) 20   **B)** 30   **C)** 32   **D)** 35   **E)** 39

13. Square $ABCD$ has sides of length 3. The points M and N lie on AD and AB so that CM and CN split the square into three pieces of the same area (see pic.). What is the length of segment DM?
A) $\frac{7}{4}$ **B)** $\frac{9}{4}$ **C)** $\frac{3}{2}$ **D)** $\frac{5}{2}$ **E)** 2
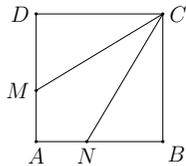
14. A lion is hidden in one of three rooms. A note on the door of room 1 reads "The lion is here". A note on the door of room 2 reads "The lion is not here". A note on the door of room 3 reads "$2 + 3 = 2 \times 3$". Only one of these sentences is true. In which room is the lion hidden?
A) In room 1   **B)** In room 2   **C)** In room 3   **D)** It may be in any room
**E)** It may be in either room 1 or room 2

15. Valeriu draws a zig-zag line inside a rectangle, creating angles of $10°$, $14°$, $33°$, and $26°$ as shown. What is the size of angle α?
A) $11°$ **B)** $12°$ **C)** $16°$ **D)** $17°$ **E)** $33°$
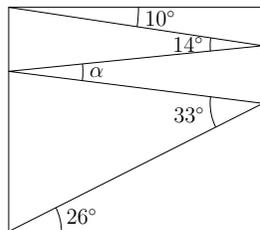
16. Alice wants to write down a list of prime numbers less than 100, using each of the digits $1, 2, 3, 4$ and 5 exactly once and no other digits. Which prime number must be in her list?
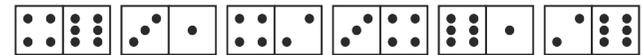**A)** 2   **B)** 5   **C)** 31   **D)** 41   **E)** 53

17. Martha multiplied two 2-digit numbers correctly on a piece of paper. Then she scribbled out three digits: $\blacksquare 3 \times 2\blacksquare = 3\blacksquare 2$. What is the sum of the three digits she scribbled out?
A) 6   **B)** 8   **C)** 9   **D)** 12   **E)** 14

18. The diagram shows a rectangle and a line t parallel to its base. Two points A and B lie on t (see pic.). The sum of the areas of the two shaded triangles is 10. What is the area of the rectangle?
A) 18   **B)** 20   **C)** 22   **D)** 24   **E)** It depends on the positions of A and B
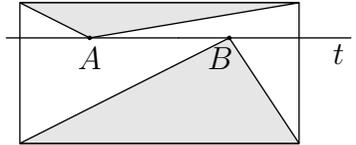
19. Azmi, Burhan and Choo went shopping. Burhan spent only 15% of what Choo spent. However, Azmi spent 60% more than Choo. Together they spent 55 EUR. How much did Azmi spend?
A) 3 EUR   **B)** 20 EUR   **C)** 25 EUR   **D)** 26 EUR   **E)** 32 EUR

20. Domino tiles are said to be arranged correctly if the number of spots at the ends that touch for any two adjacent dominoes are the same. Paulius laid six dominoes in a line as shown in the diagram. He can make a move by either swapping the position of any two dominoes (without rotating them) or by rotating one domino. What is the smallest number of moves he needs to make to arrange all the tiles correctly?
A) 1   **B)** 2   **C)** 3   **D)** 4   **E)** It is impossible to do

Questions for 5 points

21. James wrote a different integer from 1 to 9 in each cell of a 3×3 table. He calculated the sum of the integers in each of the rows and in each of the columns of the table. Five of his answers are 12, 13, 15, 16 and 17, in some order. What is his sixth answer?
A) 17   **B)** 16   **C)** 15   **D)** 14   **E)** 13

22. The diagram shows a net of an unfolded rectangular box. What is the volume of the box?
A) 43 cm^3 **B)** 70 cm^3 **C)** 80 cm^3
D) 100 cm^3 **E)** 1820 cm^3

10 cm

7 cm

26 cm