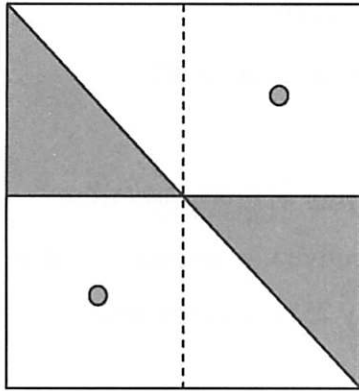


1. B) 8

There are 8 different letters: MM, AA, TT, H, E, I, C, S, and so 8 colors are needed.

2. D)



Each grey dot has a smaller area than each grey triangle.

One grey triangle has the area equal to  $\frac{1}{2}$  of the quarter of the outer square, so one grey triangle has an area equal to  $\frac{1}{8}$  Square. Hence, the four grey pieces cover less than  $4 * \frac{1}{8} \text{ Square} = \frac{1}{2} \text{ Square}$  and so the grey area is smaller than the white area.

3. C) 10

4 pegs are needed for 3 towels. The next towel will use one peg of the adjacent towel and one new peg for the other end, so 5 pegs are needed for 4 towels.

Any new towel will use one old peg for one end and one new peg for the other end, so 10 pegs are needed for 9 towels.

4. C)

Each label from the list is put in the square it describes.

	A	B	C	D
1		B1		
2	A2	B2		
3		B3	C3	D3
4		B4		D4

Thus, the correct coloring is (C).

5. A) 3

Originally,  $13 - 1 = 12$  children were hiding.  $12 - 9 = 3$  are still hiding.

6. E) 4

Mike's points are  $25 + 35 + 7 = 67$ . Jake's points are  $15 + 45 + 3 = 63$ .

Mike won; he scored 4 points more than Jake.

7. B) 8

Below “G” is used for a gray tile and “S” for a striped tile.

G	S	G	S	G	S	G	S
S	G	S	X		X		G
G	S	X		X		X	S
S	X		X		X		G
G	S	G	S	G	S	G	S

“X” is used for a gray tile that has fallen off.

There are 8 tiles marked “X”,

so 8 gray tiles have fallen off.

Of course, 7 striped tiles have fallen off.


8. D) on February 24

There are 15 days from March 1 to March 15. We need **6** [not 5] more days from February. Let’s check. Below the distance between consecutive x’s represents 1 day (24 hours). “x” between 24 (February 24) and 25 (February 25) marks the time the ducklings hatched from their eggs on February 24.

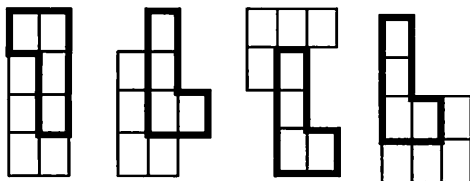
24 x 25 x 26 x 27 x 28 x 29 x 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 x 9 x 10 x 11 x 12 x 13 x 14 x 15 x

On the **second** x the ducklings were 1 day old, so – just count – on March 15 x they are 20 days old.

9. E) ALL

The given shape  may be shown in different configurations.

The construction of all 4 shapes (one piece with bold edges, the other regular) is shown below:



10. B) 6

3 balloons – 1 balloon = 2 balloons. These 2 balloons cost 12 cents, so one balloon costs

$$\frac{12}{2} = 6 \text{ cents.}$$

11. E) 10

After she decorated 15 cakes with raisins, there are still 5 plain cakes left. To get the smallest number of cakes decorated by both raisins and nuts, she has to decorate the 5 plain cakes with nuts. That forces her to decorate 10 more cakes already decorated with raisins, so 10 is the smallest number of cakes decorated both with raisins and nuts.

12. C) 3

Let's evaluate the expressions as they appear in the sudoku square.

1		3	
4	3		1
3	4	1	
2	1		

In the 2<sup>nd</sup> row the missing number is 2. Write it and look at the new square.

1		3	
4	3	2	1
3	4	1	
2	1		

Now in the 3<sup>rd</sup> column the missing number is 4. Write it and look at the last row.

1		3	
4	3	2	1
3	4	1	
2	1	4	

The missing number in the lower right corner is 3.

1	2	3	4
4	3	2	1
3	4	1	2
2	1	4	3

The complete solution is shown to the left.

13. D) 25

All Nikolay's classmates can be split into groups with 2 girls and 1 boy in each group. Each group consists of 3 of Nikolay's classmates, so the number of all children in this class is 1 (Nikolay) + a multiple of 3. Thus, any possible answer must be in the form 1 + a multiple of 3.

$$30 = 0 + 10 \cdot 3; \quad 20 = 2 + 6 \cdot 3; \quad 24 = 0 + 8 \cdot 3; \quad 25 = 1 + 8 \cdot 3; \quad \text{and} \quad 29 = 2 + 9 \cdot 3,$$

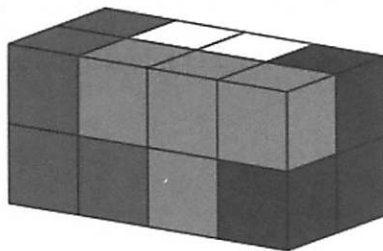
so from that list only  $25 = 1 + 8 \cdot 3$  is in the correct form. D) is the correct answer.

14. C) 5

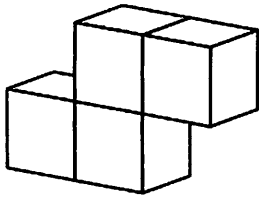
3 kittens have 12 legs, 4 ducklings have 8 legs, 2 baby geese have 4 legs. Together they have 24 legs, so the lambs have  $44 - 24 = 20$  legs, and each lamb has 4 legs.

Therefore, the number of lambs is  $\frac{20}{4} = 5$ .

15. D)



At least one face of each light grey cube is shown. The same is true about each dark grey cube. One black cube is hidden but it is together with the 3 black cubes shown. The only space for it is under the white cube which is adjacent to the black cube (see the top face of the prism). At this moment, there are only two cubic spaces available for the two hidden white cubes, one under the other white cube visible on the top face of the prism



and the other next to it under the dark grey corner cube (the dark grey cube of the top and the back faces of the prism), so (D), shown to the left, is the shape of the white piece.

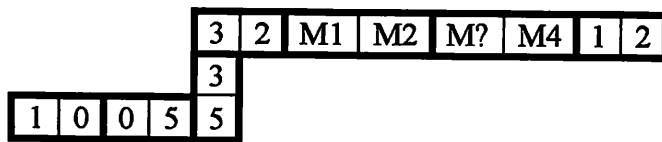
16. C) 57

There were 6 five-branched candlesticks and  $(15 - 6)$  three-branched candlesticks, so  $6 \cdot 5 + 9 \cdot 3 = 57$  is the answer.

17. D) 12

The grasshopper should move up as long as possible. After 7 jumps up, she is on the 21<sup>st</sup> step and must jump down landing on the 17<sup>th</sup> step. Now, she can jump up reaching the 20<sup>th</sup> step. The next jump must be down to the 16<sup>th</sup> step and from here two jumps up.  $3+3+3+3+3+3+3 + -4 + 3 + -4 + 3 + 3 = 22$  and  $10 + 2 = 12$  is the smallest number of jumps to take a rest on the 22<sup>nd</sup> step.

18. C) 4



On each tile the number of dots is displayed instead of the actual dots. Two M-tiles are missing.

According to the rule, M1 stands for 2 dots and M4 stands for 1 dot, and  $M2 = M?$ . Without M2 and M? the sum of the dots is  $25 = 1+0+0+5+5+3+3+2+2+1+1+2$ .

The total of all dots is 33, so  $M? = \frac{33-25}{2} = 4$ .

19. D) 1173

To create the largest sum, Gregor should use the largest digits (6 and 5) in the hundreds' place, the next largest digits (4 and 3) in the tens' place, and the smallest digits (2 and 1) in the ones' place. There are many ways to do this (such as  $632+541$ ), and all give the same sum of 1173.

20. B) 4

We look at permutations of L, I, V, K with K, L, I or I, L, K in order.

The options are: V, K, L, I; K, L, I, V;  
V, I, L, K; I, L, K, V.

21. E)

The clock is divided into 12 equal arcs starting at the top 12, so one arc represents 5 seconds. At hour:minute:30 the hand for seconds points to 6 since  $6 \times 5 \text{ sec} = 30 \text{ seconds}$ , so the shortest hand is for seconds.

At hour:55:30 the hand for minutes points to  $11 + \frac{1}{10}$  arc, so the longest hand is for minutes. The medium hand is for hours (almost at the end of the first arc).

At 8:11:00 the shortest hand points to 12 (0 arcs), the longest hand points at  $2 + \frac{1}{5}$  arc ( $2 \text{ arcs} = 10 \text{ minutes}$ ,  $1 \text{ minute} = \frac{1}{5} \text{ arc}$ ), and the medium hand points at  $8 + \text{a little bit}$ , so (E) is the answer.

22. D) 7

Let's reverse the process.

$$2012/4 = 503; \quad 503 - 3 = 500; \quad 500/10 = 50; \quad 50 - 1 = 49; \quad +\sqrt{49} = 7.$$

$$\text{Check:} \quad \{(7^2 + 1) \cdot 10\} + 3 \cdot 4 = \{[50 \cdot 10] + 3\} \cdot 4 = 503 \cdot 4 = 2012.$$

23. E) 12 mm

Rectangle	Shorter side	Longer side – shorter side
192×84	84	108
84×108	84	24
84×24	24	60
24×60	24	36
24×36	24	12
24×12	12	12
12×12	12	0 (END of calculation)

Once we get the first square, it is the smallest square we can get since the process must end at that point.

24. C) 10

The number of wins can't be 27 or more since  $27 \cdot 3 = 81 > 80$ .

If the number of wins is 26, then there are 2 draws since  $26 \cdot 3 + 2 = 80$ , and therefore  $38 - 26 - 2 = 10$  losses.

If the number of wins is 25, then there are 5 draws since  $25 \cdot 3 + 5 = 80$ , and therefore  $38 - 25 - 5 = 8$  losses.

As the number of wins decreases by one, the number of draws must increase by 3, meaning the number of losses must decrease by 2 to make a total of 38 games. This means that 10 is the greatest possible number of games lost.