
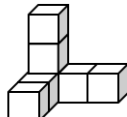











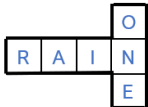




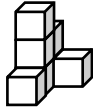


Playing with Blocks

Kinder & First Grade: solve at least 3 problems.
Second & Third Grade: solve at least 7 problems.
Fourth Grade and above: solve at least 12 problems.

Answer

1.	 <p>Vedah is playing with blocks. She stacks them as shown in the picture. How many blocks did she use? Bottom layer has 3 blocks and top layer has 2 blocks. Total blocks is $3 + 2 = 5$.</p>	5 [blocks]
2.	<p>Ronald would like to stack blocks to make a tower like in the picture on the right. He has only 4 blocks. How many more blocks does he need? The tower is made out of 7 blocks. Ronald needs $7 - 4 = 3$ more blocks.</p>	 <p>3 [blocks]</p>
3.	<p>Tom arranges blocks to form a pattern:</p> <p>  (1)  (3)  (5)  (7) ? (9) </p> <p>Figure 1 Figure 2 Figure 3 Figure 4 Figure 5</p> <p>How many blocks will Tom use in the next figure? Examine the pattern. Each time you add two more blocks. Thus, on a figure 5, you will have 9 blocks.</p>	9 [blocks]
4.	<p>The tower needs $4 \times 6 = 24$ blocks. If she has already 18 blocks, she needs $24 - 18 = 6$ blocks to complete the tower.</p>	6 [blocks]
5.	<p>a.  (3)  (6)  (9) ? (12) Figure 1 Figure 2 Figure 3 Figure 4</p> <p>b.  (2)  (4)  (8)  (16) ? (32) Figure 1 Figure 2 Figure 3 Figure 4 Figure 5</p>	<p>a. 12</p> <p>b. 32</p>
6.	<p>1, 4, 8, 13, ? Notice that she uses 3 more blocks, 4 more blocks, then 5 more blocks. The next tower will have 6 more blocks: $13 + 6 = 19$ blocks.</p>	19 [blocks]
7.	<p>a. One face of each cube is hidden where they touch. One face of the bottom cube where it touches the table also is not visible. So, there are $12 - 2 - 1 = 9$ faces that are visible.</p> <p>b. Four faces are hidden (two between the first and second cubes, and two between the second and third cubes). Three faces that touch the table are also hidden, so there are $18 - 4 - 3 = 11$ faces.</p>	<p>a. 9 [faces]</p> <p>b. 11 [faces]</p>
8.	<p>The best way to solve this kind of questions is to cut out a real-life version of the cube pattern and fold it yourself. Once you fold the cut-out, you will see that the opposite to the letter N is letter A.</p>	 <p>A</p>
9.	<p>The number of cubes needed for an 8-layer well: $8 \times 8 = 64$ cubes</p>	64 [cubes]

10.		4 faces are not painted as they are glued. Therefore, $6 \times 3 - 4 = 14$ square faces.	14 [squares]
11.		A large cube measuring 4 by 4 by 4 cubes has a total of $4 \times 4 \times 4 = 64$ cubes. There are 10 cubes already, so we need $64 - 10 = 54$ cubes.	54 [cubes]
12.		Looking down from the top, we see 4 faces, and from the bottom also 4 faces. From the front we see 4 faces, from the left side we see 6 faces, from the right side 6 faces, and from the back 4 faces. Total square faces with paint on them: $4+4+4+6+6+4 = 28$.	28 [square faces]
13.		To form a rectangular prism using 12 cubes, the dimensions (L,W,H) must be factors of 12. The total number of cubes is given by: $L \times W \times H = 12$ $12 = 1 \times 1 \times 12$ $12 = 1 \times 2 \times 6$ $12 = 1 \times 3 \times 4$ $12 = 2 \times 2 \times 3$ There are 4 unique rectangular prisms .	4
14.		The total number of cubes in the large $4 \times 4 \times 4$ cube is: 64. The number of cubes from the inner layer that are removed: $2 \times 2 \times 2 = 8$ cubes. Remaining cubes: $64 - 8 = 56$.	56 [cubes]
15.		a. The number of smaller cubes along one edge is $12/3 = 4$ smaller cubes. The total of smaller cubes: $4 \times 4 \times 4 = 64$ cubes. b. Cubes with paint on 2 faces are those on the edges but not at the corners. Each edge of the large cube has $4 - 2 = 2$ such cubes and there are 12 edges in total. So, there are $12 \times 2 = 24$ cubes with paint on 2 faces.	a. 64 [cubes] b. 24 [cubes]
16.		Surface area of a single cube: $6 \times 5^2 = 6 \times 25 = 150 \text{ cm}^2$. The surface area of the combined shape: $150 + 150 - 50 = 250 \text{ cm}^2$.	250 [cm ²]
17.		The surface area of the prism: $A = 2 \times (L \times W + W \times H + H \times L) = 2 \times (8 \times 5 + 5 \times 3 + 3 \times 8) = 2 \times (40 + 15 + 24) = 158 \text{ cm}^2$. Paint required: $0.5 \text{ ml} \times 158 = 79 \text{ ml}$.	79 [ml]
18.		The volume of the box is $24 \times 18 \times 12 = 5184 \text{ cm}^3$ The volume of a smaller cube is $3 \times 3 \times 3 = 27 \text{ cm}^3$ The number of cubes that fit in the box is: $5184 \div 27 = 192$ cubes. Or think how many cubes fit in a layer 24 by 18. $24 \div 3 = 8$ cubes, $18 \div 3 = 6$ cubes. And we will have $12 \div 3 = 4$ layers like that. Therefore, $8 \times 6 \times 4 = 192$ cubes.	192 [cubes]

Solution is available on February 21, 2025
www.mathinaction.org