



CALCULATE THE TOTAL SURFACE AREA OF THE POLYHEDRON.

Eshbekov Raykhonbek

Assistant of the Faculty of Mathematics, Samarkand State University,

Erkaboyeva Zavra

Mathematics teacher of the 34-school of Kushrabad district,

Turdiqulova Ruxsora

1st year student of the Faculty of Mathematics of Samarkand State University.

Annotation.

This article provides general rules for calculating the total surface area of the polyhedron of different shapes and for calculating the total surface area of the polyhedron of this type.

As you know, the concepts we learn in the stereometry are encountered every day in our daily lives. Determining the types of objects in the space \mathbb{R}^3 that surrounds us and calculating their total surface area plays an important role in the practical application of mathematics.

The type and total surface of the object will be a polyhedron we are looking for give us a lot of convenience in making calculations. Otherwise, we can find the object by dividing it into polyhedrons and depicting the total surface of the body as the sum of the faces of the polyhedrons.

Definition. A polyhedron is a object bounded by flat polygons.

If the polyhedron lies on one side of the plane in which the arbitrary oil is lying, such a polyhedron is called a convex polyhedron, otherwise a non-convex bubble.

We know the formulas and methods for calculating the total surface area of "standard" polyhedrons, such as a cube, a rectangular parallelepiped, a prism, a pyramid. However, it is clear that the polyhedrons around us do not always look like this. Here are some tips to help you find the full surface area of this type of polyhedrons:

Problem 1. If $KI = a = 10$, $IJ = b = 3$, $GJ = c = 6$, $AB = d = 4$, $ML = e = 3$, $AL = AD = f = 3$ for the given polyhedron in the diagram, then calculate the total surface of polyhedron .

Solution.

To calculate the surface of this bubble, we move point A to point L,

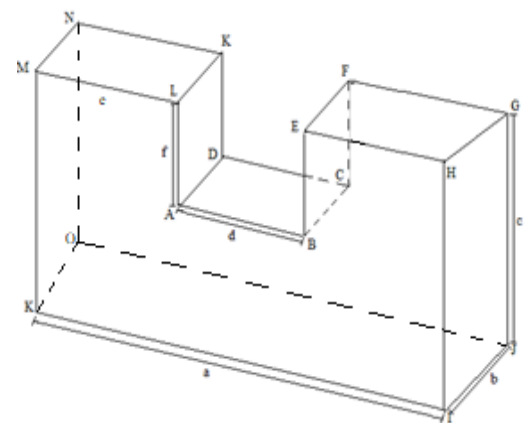
point B to point E, point C to point F, and point D to point K.

As a result, the rectangle ABCD "moves" to the equivalent rectangle LEFK.

As a result of the transfer, a right-angled parallelepiped KMNOIHGJ is formed. Hence, the total surface area of a given polyhedron is equal to the sum of the square faces of ALKD and BEFC, which are equal to the total surface area and faces of the rectangular parallelepiped. That is

$$S_{\text{ko'pyoq}} = S_{\text{KMNOIHGJ}} + 2S_{\text{ALKD}} = 2(ab + bc + ac) + 2f^2 = \\ = 2(10 \cdot 3 + 3 \cdot 6 + 10 \cdot 6) + 2 \cdot 3^2 = 234.$$

So the total surface of the polyhedron given in the diagram is 10.



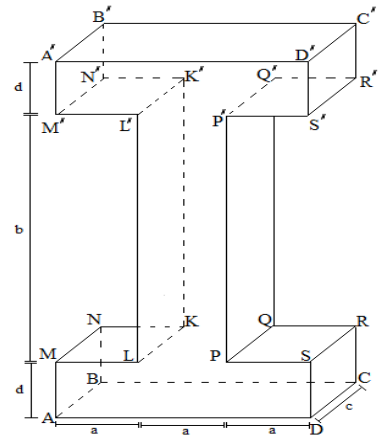


Problem 2. Calculate the total surface of the polyhedron according to the diagram below.

Solution.

To calculate the total surface of the polyhedron in the form of the letter 'I'. Firstly, we move point L to point M, point L' to point M', point K to point N, and point K' to point N'. As a result, the rectangle LL'KK' moves to the rectangle MM'NN'. Similarly, we move the rectangle PP'QQ' to the rectangle SS'RR'. We have ABCDA'B'C'D' parallelepiped with sides $b + 2d$, $3a$ and e . It is known that the total surface of this parallelepiped is equal to the total surface of a given polyhedron, i.e.

$$S_{\text{total polyhedron}} = S_{\text{ABCD A'B'C'D'}} = 2(b + 2d + 3a + e).$$



In general, to calculate the faces of the complete surfaces of polyhedron of this type, by "moving" the points, by the method of "filling" the polyhedrons, which have formulas for finding the surface of the total surface of the polyhedron. Finding using is a much easier and simpler method.

References:

1. M.A.Mirzaahmedov, Sh.N.Ismailov, A.Q.Amanov. 11-sinf matematika darsligi. II qism. 1-nashr. Toshkent, 2018.
2. Sh.K.Murodov va boshqalar. Chizma geometriya. Toshkent, "Iqtisod-moliya", 2006.
3. R.X.Xorunov, A.Akbarov. Chizma geometriyadan masalalar va ularni yechish usullari. Toshkent, "O'qituvchi", 1995.