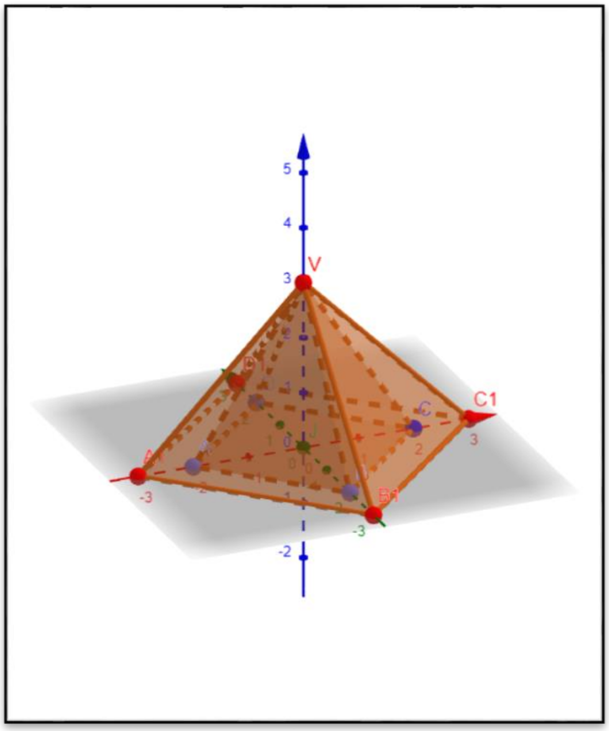
No space restrictions:

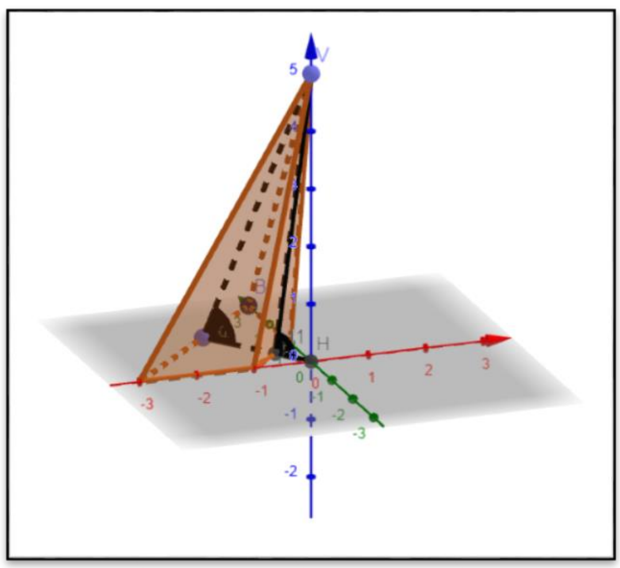
Figure 1:



1. Our light body is a regular quadrangular pyramid (A1, B1, C1, D1, V) -> the base is a square. Therefore, the center lies at the intersection of the diagonals. Let it be J. Then VJ is the height of the pyramid. (Figure 1)

The blend (A, B, C, D) through which the light comes out is square and centered with respect to the base, therefore J is the intersection of the diagonals of the blend which lie on those based on the pyramid. Then, if we connect the top of the pyramid with the blend peaks, we will again get the correct quadrangular pyramid that is entered in the given (if the side of the blend is as much as the main edge of the body they will match). Then the points defining the illuminated floor space will lie on the rays VA, VB, VC and VD.

2. Z coordinates of these points will be as high as the room height because they are located on the floor and the entire floor with respect to the Oz axis is located at a distance from the height of the center of the coordinate system.



3. Knowing the size of the main edge and the fact that it is equal to the surrounding we can find the height of the pyramid (VJ).

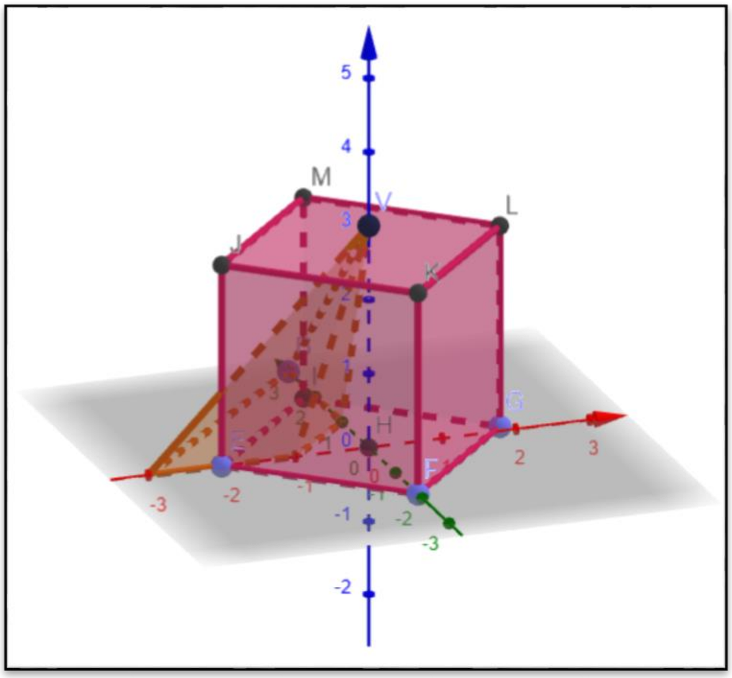
4. Let ϕ denote the angle between the height of the pyramid and the asymptote of the pyramid with base – the blend.

5. For the location of the points on the floor of significance is the blend pyramid.
At an angle of rotation (other than 0) we get an isosceles trapezoid.

6. We find the angles α and β between the asymptotes on both sides of the pyramid, which are at the foundations of AB and CD of the trapezoid.

7. The triangles AVB and CVD are isosceles. Then the asymptote is height. We find the x coordinates of the points (the center of the projection is symmetrical - the heights of the asymptotes have the x coordinate 0).
8. The Y coordinate is the distance from the end of the height of the inclined prism to the corresponding asymptote.

<u>In room (cube):</u>

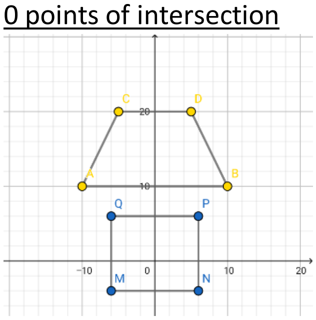


Using the user-defined area, we find the coordinates of the floor, then we look for intersection points between the illuminated space and the edges of the floor.

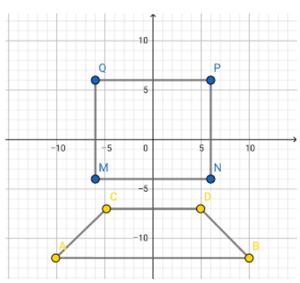
We transform the trapezoid (the base of the illuminated space into an unlimited plane) and the square (the base of the room) so that we can represent them in the form of the graphics below.

There are three options. We can present the cases in the following 2D graphics:

1. <u>0 points of intersection</u>

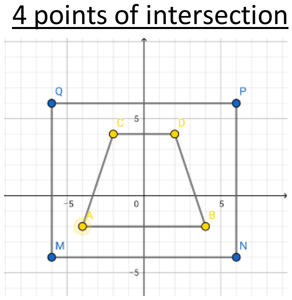


I graphic

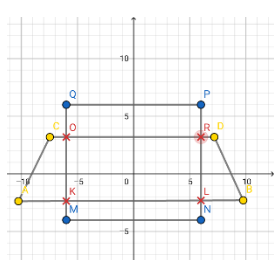


II graphic

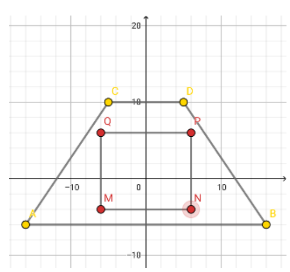
2. <u>4 points of intersection</u>



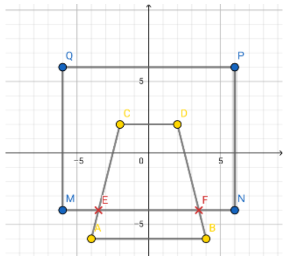
III graphic



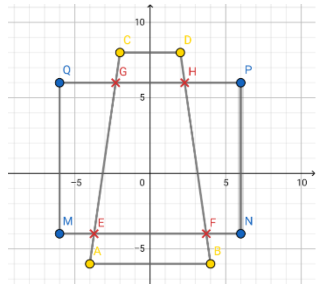
IV graphic



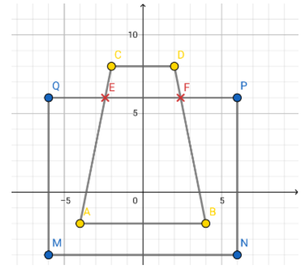
V graphic



VI graphic

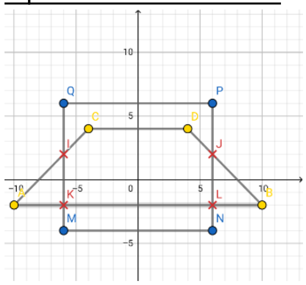


VII graphic

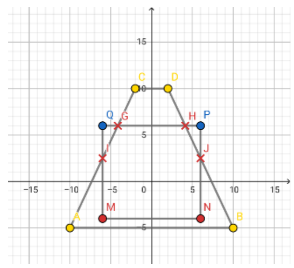


VIII graphic

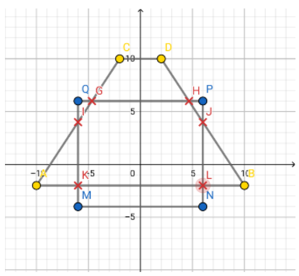
3. <u>6 points of intersection</u>



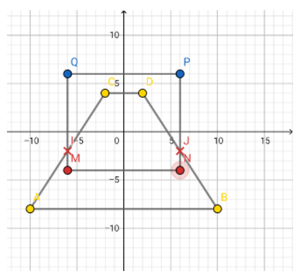
IX graphic



X graphic



XI graphic



XII graphic

Using the dependencies shown in the graphics, we implement the algorithm.