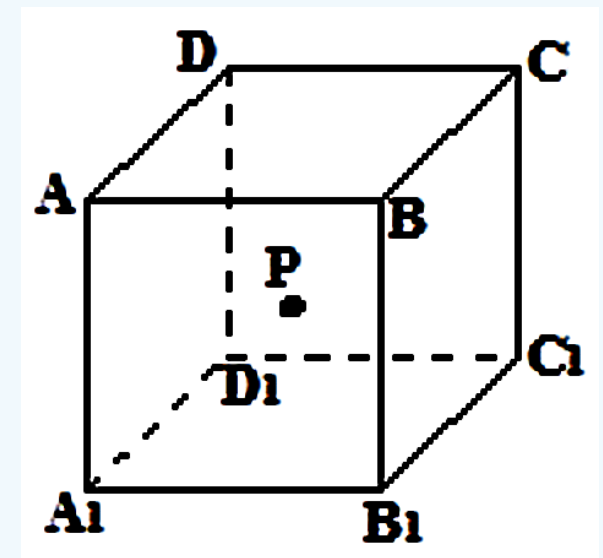
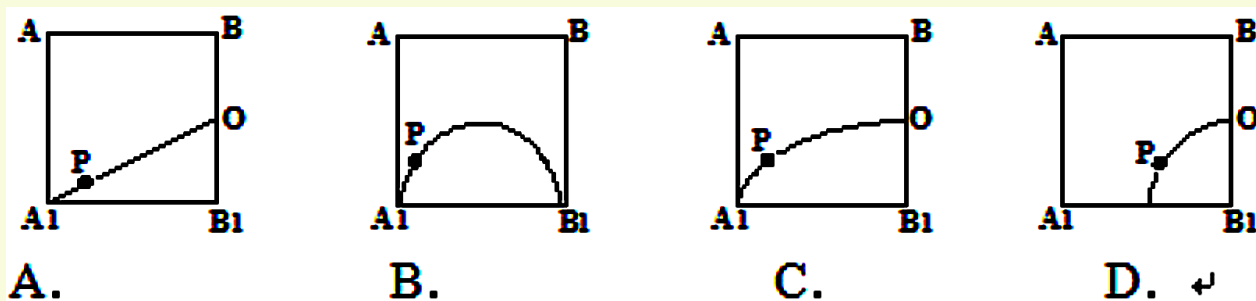




# Knowledge Error

## Question

As shown in the figure, within the side face  $AB_1$  of the cube  $ABCD-A_1B_1C_1D_1$ , there is a moving point  $P$  whose distance to line  $AB$  equals its distance to line  $B_1C_1$ . The shape of the curve on which the moving point  $P$  is located is ( )



Ground Truth

C

## Model's answer

In the cube  $ABCD-A_1B_1C_1D_1$ , we analyze the distance from the moving point  $P$  to the two lines  $AB$  and  $B_1C_1$ .

### Step 1: Understanding the problem: Point  $P$  is located on the side face  $AB_1$  of the cube. The distances from  $P$  to  $AB$  and  $B_1C_1$  are equal.

### Step 2: Geometric relationship analysis: Line  $AB$  is parallel to line  $B_1C_1$  and both are located in plane  $ABCD$ . Therefore, finding the perpendicular distance from  $P$  to these two lines is essentially solving for the intersection of a cylindrical surface with a plane.

### Step 3: Parabola definition: In space, **when a point's distance to a fixed point (focus) equals its distance to a fixed line (directrix), the trajectory is a parabola**. Therefore, here we can view  $AB$  and  $B_1C_1$  as fixed points, and  $P$ 's trajectory satisfies this condition.

### Step 4: Examining the graphical options: A. Parabola passing through the intersection of  $A_1B_1$  B. Parabola passing through the extension of  $B_1C_1$  C. The domain of the parabola doesn't match the cube structure D. Inverse proportional function form, doesn't correspond

### Conclusion: Based on the above analysis, the curve on which the moving point  $P$  is located should be a parabola. Therefore, the correct answer is **option A**.

## ORM's Feedback

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{
  "status": "WRONG",
  "error_step": "Step 3",
  "error_analysis": "The solution misapplied fundamental principles of 3D geometry when determining the locus of points equidistant from two lines."
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