A disk rotates in a clockwise sense with a constant rate of ω about a ==vertical shaft== that passes through the center O of the disk. A particle is moving radially inward toward the shaft O. On which surface of the slot does the particle make contact?
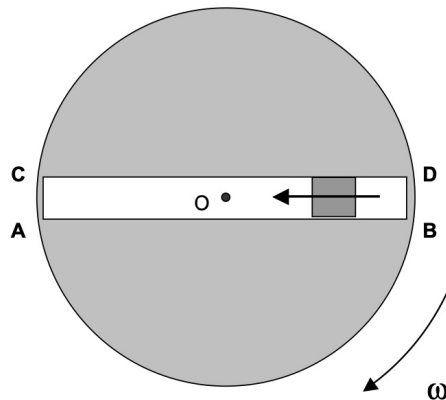
⌐ *gravity is not a factor*

(a) Surface AB.

(b) Surface CD.

(c) Neither surface.

(d) More information is needed to answer this question.

Provide a justification for your answer.

HINT: Use the **Newton's 2nd Law**
1. Draw an FBD of the block.
2. Write down Newton's second law in terms of POLAR coordinates.
3. Write down the acceleration in terms of POLAR coordinates.
4. Solve for the normal force, *N*, acting on the particle by the slot.

$$\Sigma F_\theta = N = ma_\theta = m(r\ddot{\theta} + 2\dot{r}\dot{\theta})$$

$$\hookrightarrow N = 2m\dot{r}\dot{\theta}$$

Since: $\left.\begin{array}{c} \dot{\theta} > 0 \\ \dot{r} < 0 \end{array}\right\} \Rightarrow N < 0$

(contacts AB)