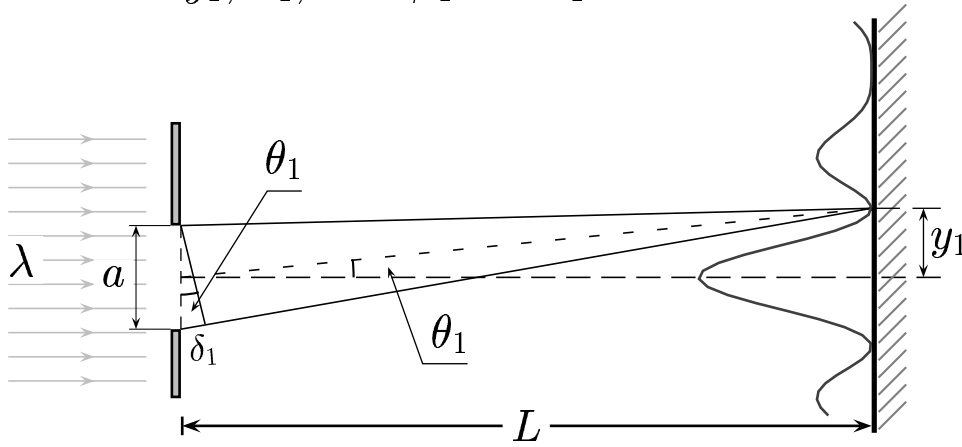


Consider a single slit experiment. At first minimum the quantities shown in the sketch are y_1 , δ_1 , and $\beta_1 = k \delta_1$.



Find β at $y = \frac{y_1}{6}$.

- A) $\beta = \frac{\pi}{6}$.
- B) $\beta = \frac{\pi}{5}$.
- C) $\beta = \frac{\pi}{4}$.
- D) $\beta = \frac{\pi}{3}$.

$\beta = k \delta$. Assume small angle approximation: $\theta \approx \frac{\delta}{a} \approx \frac{y}{L}$. $\beta = k \delta = k \frac{a y}{L} = \frac{k a y_1}{6 L}$. At the first minimum: $\beta_1 = 2 \pi = \frac{k a y_1}{L}$. So $\beta = \frac{\beta_1}{6} = \frac{\pi}{3}$.

Answer **D**.