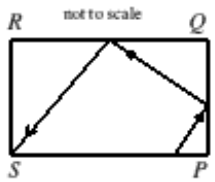
21. A toy pool table is 6 feet long and 3 feet wide. It has pockets at each of the four corners $P$, $Q$, $R$ and $S$. When a ball hits a side of the table, it bounces off the side at the same angle as it hit that side. A ball, initially 1 foot to the left of pocket $P$, is hit from the side $SP$ towards the side $PQ$ as shown.




How many feet from $P$ does the ball hit side $PQ$ if it lands in pocket $S$ after two bounces?

A 1 B $\frac{6}{7}$ C $\frac{3}{4}$ D $\frac{2}{3}$ E $\frac{3}{5}$





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**21.** **B** The route of the ball is $A \to B \to C \to S$. The diagram also shows point $D$, the reflection of point $A$ in $PQ$, and point $E$, the reflection of point $S$ in $QR$. As the ball bounces off a side at the same angle at which it hits that side, points $D$, $B$, $C$, $E$ lie in a straight line. Triangles $DPB$ and $DSE$ are similar since both are right-angled and they have a common angle at $D$. So $\frac{BP}{PD} = \frac{ES}{SD} = \frac{6}{7}$. Hence $BP = \frac{6}{7}$.