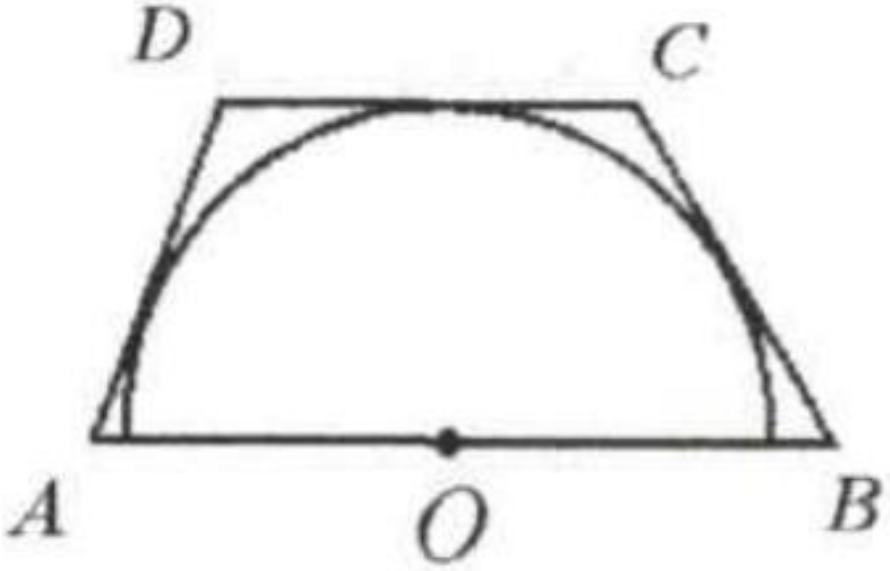
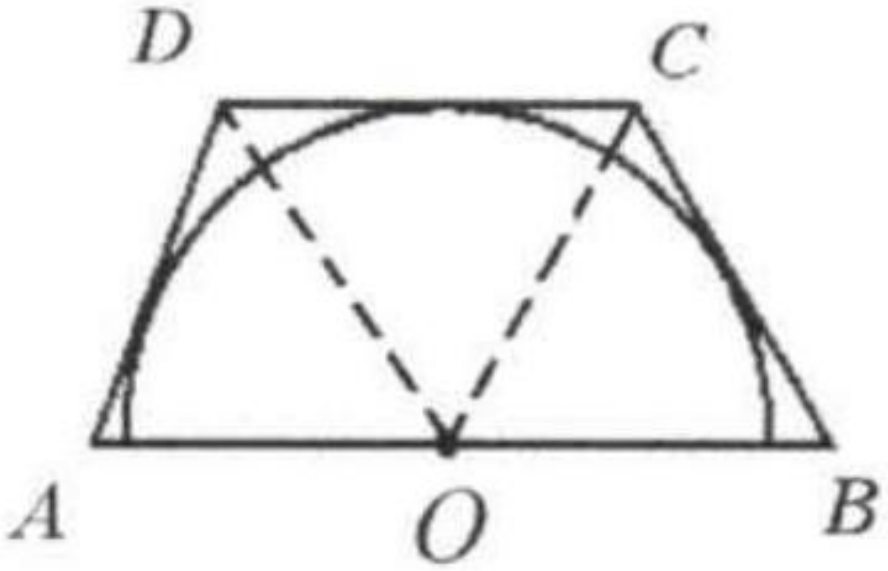
Problem

As shown in the figure, $ABCD$ is a trapezoid. Half circle O is inscribed into $ABCD$. Find AB if $BC = 2$ and $DA = 3$.



Solution

5. Connect OC, OD.
Let the radius of the semicircle be r.
In $\triangle AOD$, the height on AO and the height on AD have the same value of r.
So $AO = AD$.
Similarly we get $BO = BC$.



Thus $AB = BC + DA = 5$.