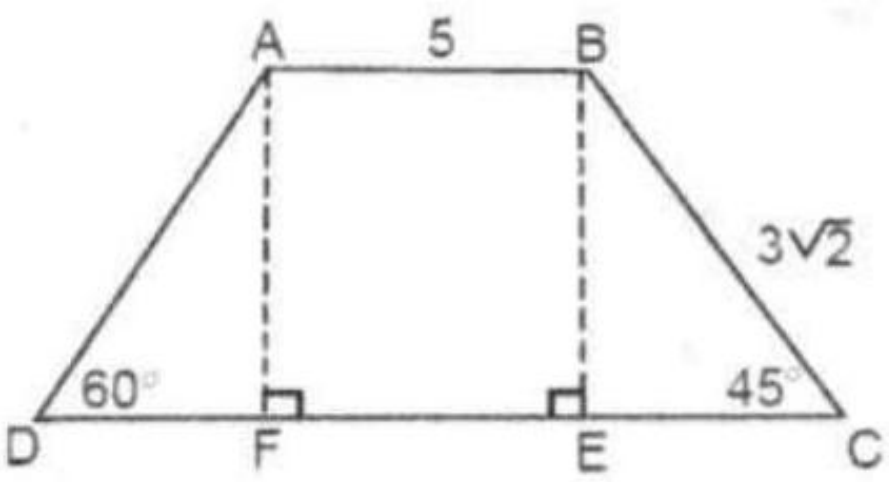
Example 3

(AMC) Figure $ABCD$ is a trapezoid with $AB//DC; AB = 5;$
$BC = 3\sqrt{2}, \angle BCD = 45°$ and $\angle CDA = 60°$. The length of DC is

Solution: (D).

Drop perpendiculars from A and B to DC, intersecting DC at F and E, respectively. $\triangle BEC$ is an isosceles right triangle, so $BE = EC = 3$. Since $ABEF$ is a rectangle, $FE = 5$ and $AF = 3.\triangle AFD$ is a $30 - 60 - 90$ triangle, so $DF = AF/\sqrt{3} = \sqrt{3}$.



$$DC = DF + FE + EC = \sqrt{3} + 5 + 3 = 8 + \sqrt{3}.$$