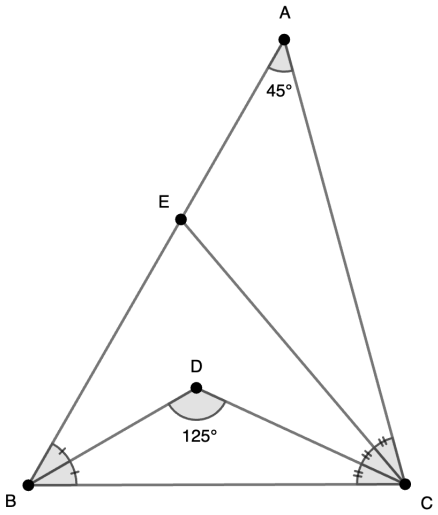
In triangle ABC, segments CE and CD are trisectors of $\angle C$. Point D is the intersection of the bisector of $\angle B$ and the southernmost trisector of $\angle C$. Point E lies on segment AB. If $\angle BAC = 45°$ and $\angle BDC = 125°$, find the measure of $\angle ACB$.[1]
Hint: Set $\angle DBC = x°$ *and* $\angle DCB = y°$.



[1]Sundai Kofu High School, Yamanashi

Solution

Answer : $\angle ACB = 75^\circ$

Proof: When $\angle DBC = \angle x, \angle DCB = \angle y$, we can create two equalities: $45^\circ + \angle x + 2\angle y = 125^\circ$ (1), and $125^\circ + \angle x + \angle y = 180^\circ$ (2). Solving for x and y, we get: $x = 30^\circ, y = 25^\circ$. $\angle \mathbf{ACB} = \mathbf{3}\angle \mathbf{y} = \mathbf{75}^\circ$.