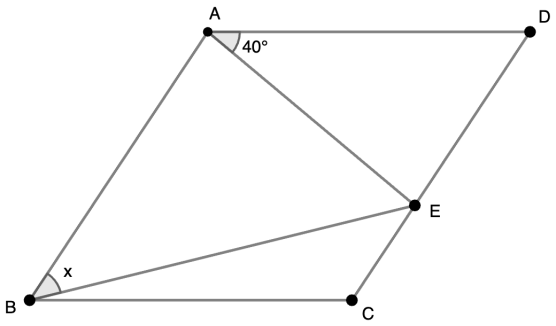
In the figure below, ABCD is a rhombus. Segments $AD = AE$, and point E lies on segment DC. If $\angle DAE = 40°$, find the measure of $\angle ABE$.[1]



[1] Aichi Prefecture

Solution

Answer : 55°

Proof: Since $AD = AE$, $\angle D = \angle AED = (180^\circ - 40^\circ) \div 2 = 70^\circ$. $AB//DC$, and alternate interior angles are congruent, so $\angle BAE = \angle AED = 70^\circ$. In a rhombus, all sides are the same length, so $AB = AD = AE$. Therefore, $\angle ABE = \angle AEB$, and $\angle \mathbf{ABE} = (\mathbf{180}^\circ - \angle \mathbf{BAE}) \div \mathbf{2} = \mathbf{55}^\circ$.