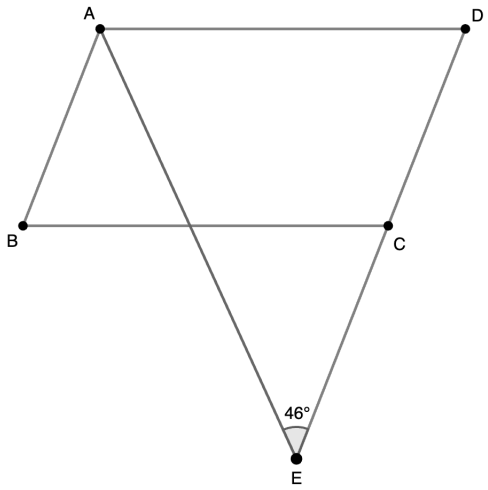
In the figure below, ABCD is a parallelogram. $\angle AED = 46°$, and $\angle BAE = \frac{2}{5} \times \angle BAD$. Find the measure of $\angle ADC$.[1]



[1] Johoku Senior High School, Tokyo

Solution

Answer : 65°

Proof: $AB//DE$, and alternate interior angles are congruent, so $\angle BAE = \angle AED = 46^\circ$. Therefore, $\angle BAE = \frac{2}{5}\angle BAD$. Solving for $\angle BAD$, we get: $\angle BAD = 115^\circ$. In a parallelogram, adjacent angles always sum to 180°, so $\angle \mathbf{ADC} = \mathbf{180}^\circ - \angle \mathbf{BAD} = \mathbf{180}^\circ - \mathbf{115}^\circ = \mathbf{65}^\circ$.