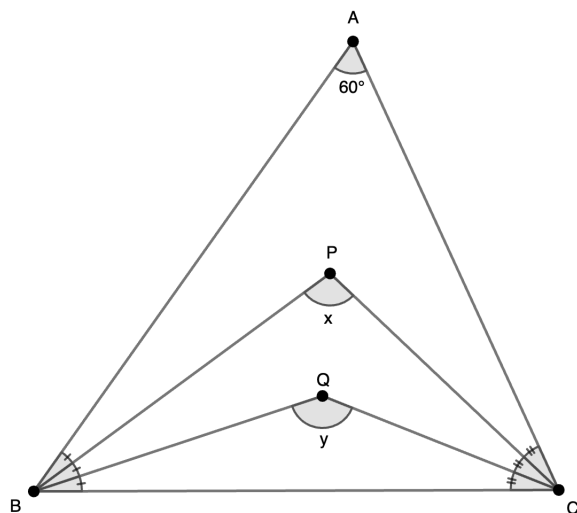


As shown in the figure below, $\angle A = 60^\circ$. Segments BP , BQ , CP , and CQ are trisectors of $\angle B$ and $\angle C$. If $\angle BPC = x^\circ$ and $\angle BQC = y^\circ$, find the values of x and y .¹



¹Sundai Kofu High School, Yamanashi

Solution

Answer : $x = 100, y = 140$

Proof: $\angle BPC = 60^\circ + \angle ABP + \angle ACP = 60^\circ + \frac{1}{3}(\angle ABC + \angle ACB) = 60^\circ + \frac{1}{3}(180^\circ - 60^\circ) = 100^\circ$.

Therefore, $\mathbf{x} = \angle \mathbf{BPC} = \mathbf{100}$.

$\angle BQC = 60^\circ + \angle ABQ + \angle ACQ = 60^\circ + \frac{2}{3}(\angle ABC + \angle ACB) = 60^\circ + \frac{2}{3} \times 120^\circ = 140^\circ$. Therefore, $\mathbf{y} = \angle \mathbf{BQC} = \mathbf{140}$.