2019 HMMT G1

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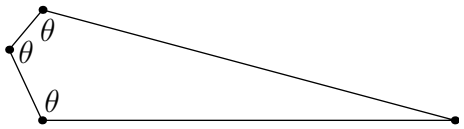
Let d be a real number such that every non-degenerate quadrilateral has at least two interior angles with measure less than d degrees. What is the minimum possible value for d?

I claim that $d = \boxed{120}$ is optimal. First, observe that for any angle measure $\theta < 120^\circ$, a quadrilateral with angles $\theta, \theta, \theta, 360^\circ - \theta$ exists so $d \geq 120$. Now if a non-degenerate quadrilateral had three interior angles with measure at least 120 degrees, then the measure of the fourth interior angle must be at most 0 degrees, contradiction. So $d \leq 120$ and thus $d = 120$ as desired.



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