Problem 1 (due Monday, September 8)

A point P inside a convex quadrilateral $ABCD$ is such that the triangles ABP, BCP, CDP, ADP have all the same area. Prove that one of the diagonals halves the area of the quadrilateral.

We received solutions from Raisha Chowdhury, Gerald Marchesi, Josiah Moltz, and Mathew Wolak. The solution submitted by Gerald Marchesi is particularly simple assuming familiarity with the concept of cross product of vectors in $\mathbb R^3$. For details and other solutions see the following link Solution.