Problem 6 (due Monday, April 22)

Let \$ABCD\$ be a convex quadrilateral whose diagonals \$AC\$ and \$BD\$ intersect at a point P. Let \$M,N\$ be the midpoints of the sides \$AB\$ and \$CD\$ respectively. Prove that the area of the triangle \$PMN\$ is equal to the quarter of the absolute value of the difference between the area of the triangle \$DAP\$ and the area of the triangle \$BCP\$: \[ \text{area}(\triangle MNP)=\frac{1}{4}\left|\text{area}(\triangle DAP)-\text{area}(\triangle BCP)\right |.\]

We received only one solution, from Sasha Aksenchuk. Sasha's solution uses analytic geometry and is similar to one of our in-house solutions. For a complete solution see the following link Solution.

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