

# G-GPE A Midpoint Miracle

## Task

Draw a quadrilateral  $ABCD$ . Try to draw your quadrilateral so that no two sides are congruent, no two angles are congruent, and no two sides are parallel.

- Let  $P$ ,  $Q$ ,  $R$ , and  $S$  be the midpoints of sides  $AB$ ,  $BC$ ,  $CD$ , and  $DA$ , respectively. Use a ruler to locate these points as precisely as you can, and join them to form a new quadrilateral  $PQRS$ . What do you notice about the quadrilateral  $PQRS$ ?
- Suppose your quadrilateral  $ABCD$  lies in the coordinate plane. Let  $(x_1, y_1)$  be the coordinates of vertex  $A$ ,  $(x_2, y_2)$  the coordinates of  $B$ ,  $(x_3, y_3)$  the coordinates of  $C$ , and  $(x_4, y_4)$  the coordinates of  $D$ . Use coordinates to prove the observation you made in part (a).



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