

**Problem Set 4****Advanced Geometry****Due 3/22/19**

Each problem is worth 2 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor.

Let  $\square ABCD$  be a parallelogram in the Euclidean plane.

1. Show that if the diagonals divide the quadrilateral into congruent triangles, then the opposite sides are congruent.
2. Show that if the opposite sides are congruent, then the opposite angles are congruent.
3. Show that if the opposite angles are congruent, then the diagonals bisect each other.
4. Show that if the diagonals bisect each other, then the diagonals divide the quadrilateral into congruent triangles.
5. Prove Theorem 5.1.10

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