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Worksheet - Oct. 19

MAT 3501

Fall 2017

1. If  $z_A, z_B, z_C$  are the complex numbers corresponding to three non-collinear points in the plane  $A, B, C$ , respectively, and  $G$  is the centroid of  $\triangle ABC$ , find a formula for  $z_G$  in terms of  $z_A, z_B, z_C$ .
2. Use complex numbers to prove the following theorem attributed to Napoleon Buonaparte: If three equilateral triangles are erected outwards on the sides of an arbitrary triangle, show that the centers of these equilateral triangles form another equilateral triangle. (Note: This is called the outer Napoleon triangle.)
3. Show the theorem in problem 2 remains true if “outwards” is replaced by “inwards”. (Thus, there is also an inner Napoleon triangle.)