Name: —————————————————— **Panther ID:** ——————————

Worksheet - Oct. 25 MAT 3501 Fall 2018

1. Compute $\sqrt{-i}$ and $\sqrt[4]{1+i}$. Leave your answer in polar form for the second one.

2. Find all solutions of $x^5 + 1 = 0$ (polar form ok) and plot them in the complex plane.

3. Given complex numbers $z_1 = 1 + 2i$ and $z_2 = 2 - i$, find a third complex number point z_3 so that $\triangle z_1 z_2 z_3$ is an equilateral triangle.

4. Use complex numbers to prove the following theorem attributed to Napoléon Bonaparte: 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 Napoléon triangle.)

5. Show the theorem in problem 2 remains true if "outwards" is replaced by "inwards". (Thus, there is also an inner Napoléon triangle.)