Problem Solving Session

Be prepared to discuss the following problems in class on Thursday, **October 3**.

1. Imagine an infinite chessboard that contains a positive integer in each square. If the value in each square is equal to the average of its four neighbours to the north, south, west, and east, prove the values in all the squares are equal.

2. Choose any $(n+1)$-element from $\{1, 2, 3, \ldots, 2n\}$. Show that this subset must contain two integers that are relatively prime.

3. Determine what is bigger: e^π or π^e.

4. A process begins with three positive integers. Every day, at midnight, each of the three numbers is replaced by the difference (larger minus smaller) of the two other numbers. Prove that eventually one of the numbers will become zero.