Last name _____

First name _____

LARSON—MATH 350—CLASSROOM WORKSHEET 24 Number Theory and Combinatorics

Review

• We are given n natural numbers: $a_1, a_2, ..., a_n$. Show that we can choose a (nonempty) subset of these numbers whose sum is divisible by n.

 \mathbf{New}

1. What does it mean for integers a and b to be *relatively prime*?

2. We are given n numbers from the set $\{1, 2, ..., 2n - 1\}$. Prove that we can always find two numbers among these n numbers that are relatively prime to each other.

3. How many numbers are there up to 1200 that are relatively prime to 1200?

- 4. What does it mean for a figure to be *convex*?
- 5. Draw a convex quadrilateral. How many points of intersection do the diagonals have (inside the figure)?

6. Draw a convex pentagon. How many points of intersection do the diagonals have (inside the figure)?

7. Draw a convex hexagon. How many points of intersection do the diagonals have (inside the figure, assuming no 3 diagonals meet in the same point)?