Intermediate Math Circles
February 29, 2012
Problem Set: Linear Diophantine Equations I

1. a) Find an integer solution to the Diophantine equation $4389x + 2919y = 21$.

   b) Find an integer solution to the Diophantine equation $4389x + 2919y = 231$.

2. Find an integer solution to the Diophantine equation $212x - 37y = 1$.

3. Find an integer solution to the Diophantine equation $12x + 57y = 423$.

4. Can 1000 be expressed as the sum of two integers, one of which is divisible by 11 and the other by 17? If so, determine one such way.

5. Can 1000 be expressed as the sum of two integers, one of which is divisible by 9 and the other by 12? If so, determine one such way.

6. Here's a little puzzle: start with the number 0, and at every step, you may add or subtract either the number 5 or the number 17 (that's four possible moves in total). Is it possible to eventually get to the number 1? If so, describe how.

$$0 \xrightarrow{+17} 17 \xrightarrow{-5} 12 \longrightarrow \dots$$