

Instructions

- Introduce yourselves! Despite popular belief, math is in fact a team sport!
- Find some blackboard space, a piece of chalk, and decide who will be your first scribe.
- Do the problems below, having a different person be the scribe for each one.
- Try to work out the problems as a group, but feel free to flag me down if you run into a wall.

The Euclidean Algorithm

1. Find the gcd of each of the following pairs of numbers and write it as $sa + tb$ for some integers s, t

(a) 21, 55

(b) 123, 323

2. Compute $13^{53} \pmod{7}$.

3. (a) Suppose you 2 containers that are 14 gallons and 25 gallons. Show that given an infinitely large “holding tank” you can measure exactly 1 gallon of water.

(b) Prove that you cannot measure 1 gallon using just 12 gallon and 21 gallon containers.

4. Prove that if $ac \equiv bc \pmod{mc}$ then $a \equiv b \pmod{m}$