# Class Discussion: 12 October 2017

**Part I:**

1. State the well-ordering principle.
2. Using the WOP, prove the division algorithm.

**Part II:**

1. Let a, b be integers. Then a$a≡b \left(mod 6\right) if and only if a≡b \left(mod 2\right) and a≡b (mod 3)$
2. Prove by contradiction that $\sqrt{3} is irrational.$
3. Prove by contradiction that if x is irrational then so is x1/2.
4. Prove by contradiction that 21/3 is irrational.
5. Suppose n ∈ Z. Prove that n is odd if and only if n2 is odd.
6. Prove by contradiction that if 0 ≤ t ≤ /2 then cos t + sin t ≥ 1.
7. Let a and b be integers. If a2 + b2 = c2, then a or b is even.



23. Proof or counter-example: if a $ac≡bc \left(mod n\right) then a≡b (mod n)$





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