

## Hints for homework # 3, due Fri, Sep 24th.

1. Parametrization of Pythagorean triples.
2. Pigeonhole principle (perhaps several times).
3. Find the generating function for  $(a_n)$ .
4. Euler's theorem.
5. Switch to integration in the complex plane.
6. Long division also works for power series.
7. One part of this series is benign.
8. What happens to the sequence  $(A^n)$  if  $A$  has an eigenvalue whose absolute value is greater than 1?
9. Try inclusion-exclusion. Generating function approach also works.
10. If  $m$  is big enough, what about  $(A + B)^m$ ?
11. Fixed point theorem.
12. First solve an auxiliary problem: Given  $r \neq 0$ , find a polynomial  $p$  of degree at most  $n$  such that  $p(j) = r^j$ ,  $j = 0, \dots, n$ .