

THEORY OF NUMBERS, Math 115 A
Homework 1 Due Wednesday October 2

1. Use the well-ordering property to show that $\sqrt{3}$ is irrational.
2. Find a formula for $\sum_{k=1}^n k^3$.
3. Find and prove a simple formula for the sum of the first n Fibonacci numbers with odd indices when n is a positive integer, i.e. find a formula for $f_1 + f_3 + \dots + f_{2n-1}$
4. Find the quotient and remainder in the division algorithm, with divisor 17 and dividend
a) 100, b) -44, c) 289
5. Show that if a is an integer, then 3 divides $a^3 - a$.
6. Show that the n -th Fibonacci number f_n is divisible by 4 if and only if n is divisible by 6.