

Math 2001: Homework P5

Due: September 30, 2009

1. From the book do problems:

- (a) 3.1.6, 3.1.10, 3.1.20 (Hint: Use induction and the fact that $13^{k+1} = 13(13^k - 1 + 1)$.)
- (b) 3.2.4, 3.2.7

2. Consider the set

$$A = \{4n + 1 \in \mathbb{Z} \mid n \in \mathbb{Z}, n \geq 0\}.$$

- (a) Describe the set A in words.
 - (b) Show that the product of any two elements in A is another element in A .
3. Consider two pairs of integers $(1597, 987)$ and $(1590, 997)$.
- Find $\gcd(1597, 987)$ and $\gcd(1590, 997)$ using the Euclidean algorithm.
 - Which pair takes more steps in the Euclidean algorithm? Give an explanation for why this might be?
 - For the faster pair (m, n) , find $k, l \in \mathbb{Z}$ so that $\gcd(m, n) = km + ln$.