

Math 3012, Homework 4, part 2

October 2, 2009

1. Use Knuth's algorithm (from class) to find integers x and y satisfying

$$53x + 142y = 1.$$

2. Prove that the following numbers are coprime to $\Delta := 2 \cdot 3 \cdot 5 \cdot 7$:

- a. $\Delta x + 1$, where $x = 1, 2, 3, \dots$
- b. $\Delta + x$, where x is a prime number bigger than 7.

3. Alice and Bob each have coin collections, and each specialize in collecting a particular type of coin. Alice collects type A, and Bob collects type B. In today's dollars, type A are each worth \$55, while type B are each worth \$101. Suppose that Alice has at most 100 type A coins, while Bob has at most 54 type B coins; further, suppose that the total value of Alice's coins is \$1 less than the value of Bob's coins. How many type A coins does Alice have?