Classical Algebra

Written Assignment No. 1

due Tuesday, September 16, 2008

Directions

Written assignments must be typeset.

While it is neither necessary nor desirable to show small details of computation, you must indicate what you are doing, give major steps in computation, and explain any reasoning used.

Accuracy is important. With 5 problems in an assignment worth 10 points, there is limited room for partial credit on a problem.

Problems

1. Let d denote the greatest common divisor of the integers 6545 and 3003. Find integers x, y such that
$$6545x + 3003y = d \quad .$$

2. Find the least common multiple of 3003 and 6545.

3. Find the continued fraction expansion of the rational number 6545/3003.

4. Decompose 68815845 into prime factors.

5. Write a proof of the following:

   If a and b are positive integers and d the greatest common divisor of a and b, then every common divisor of a and b is a divisor of d.

   Note: Before undertaking this task, take careful note of the definitions of *common divisor* and *greatest common divisor* found in § 3A of the course text.