CS 311: Discrete Structures
Spring 2004

Homework 8. Due Tuesday April 1

1) Compute the gcd of 231 and 1820 using Euclid’s algorithm. Show all your work.
2) Prove or disprove:
   a) If $a|(b - c)$ then $a|b$ and $a|c$.
   b) If $a|b$ and $a|c$ then $a|(b - c)$.
3) Using 4-bit 2’s complement representations, solve the following problems and check them by converting to base-10:
   (a) 0101 + 0001
   (b) 1101 + 1110
4) True or false. Explain why and give an example. Let $a$ and $b$ be positive integers and let $a = q \cdot b + r$ where $r$ is the remainder when $a$ is divided by $b$ and $q$ is the quotient.
   (a) If $r = 0$ then $a = b$.
   (b) If $a < b$ then $r = a$.
   (c) If $b = 1$ then $q = a$.
   (d) It is never the case that $r \geq b$.
5) When does a positive integer $n$ have exactly:
   (a) two positive divisors?
   (b) three positive divisors?
   (c) four positive divisors?