Introduction to Abstract Mathematics — Assignment 5.3
Fall 2013 — Due October 4

Exercise 1. For each pair (a, b), find $\gcd(a, b)$ as well as x and y so that $xa + yb = \gcd(a, b)$.

a. $(14, 23)$

b. $(130, 150)$

c. $(34, 144)$

Exercise 2. Let $a, b, c \in \mathbb{Z}$. Prove that if $a|c$, $b|c$ and $\gcd(a, b) = 1$, then $ab|c$.

Exercise 3. Recall the following statement from class:

Let p be a prime, $a, b \in \mathbb{Z}$. If $p|ab$, then $p|a$ or $p|b$.

a. Prove that if $p \nmid b$, then $gcd(p, b) = 1$. [*Suggestion:* What are the possible values for the gcd of any number with a prime?]

b. We showed in class that the statement above is equivalent to "If $p \nmid b$, then $p|ab$ implies $p|a$." Use part **a** to deduce this as a corollary of another fact we proved in class.