Math 364 - Chapter 3 HW
Fall 2008

29. (Problem 3.2) Suppose that m, n, q, and r are integers satisfying the identity $n = mq + r$. Then $gcd(m, n) = gcd(m, r)$.

30. (Problem 3.3) Prove and extend *or* disprove and salvage: Given natural numbers m and n, there exists a unique pair of integers q and r such that $n = mq + r$ and $0 \leq r < m$.

31. (Problem 3.6) Use the Euclidean algorithm to compute the $gcd(3913, 23177)$ by hand.

32. (Problem 3.7) Use the identities found in the previous problem to find integers x and y that satisfy the linear equation $3913x + 23177y = 301$. Show all steps - guessing and checking is not allowed!

33. (Problem 3.8) Prove and extend *or* disprove and salvage (with another "if and only if" statement): Given integers m, n, and g the integer g equals the $gcd(m, n)$ if and only if there exist integers x and y satisfying the linear Diophantine equation $mx + ny = g$.

34. (Problem 3.9) Prove and extend *or* disprove and salvage (with another "if and only if" statement): Given integers m and n are relatively prime if and only if there exist integers x and y satisfying the linear Diophantine equation $mx + ny = 1$.

35. (Problem 3.10a) Prove and extend *or* disprove and salvage: Let k, m, and n be integers. If $k \mid mn$ but $k \nmid m$ then $k \mid n$.

36. (Problem 3.10b) Prove and extend *or* disprove and salvage: Let a, b, and m be integers. If a and b are relatively prime and $a \mid m$ and $b \mid m$, then $ab \mid m$.