Homework 4 : Due Monday, September 6

Problem 1: Let $a, b, c \in \mathbb{Z}$. Suppose that $a \mid b$ and $a \nmid c$. Show that $a \nmid (b + c)$.

Problem 2: Use the Euclidean Algorithm to find the greatest common divisor of the following pairs of numbers a and b. Furthermore, once you find the greatest common divisor d, find $m, n \in \mathbb{Z}$ such that $am + bn = d$.

- $a = 234$ and $b = 165$
- $a = 562$ and $b = 471$

Problem 3: Find, with proof, all $n \in \mathbb{Z}$ such that $\gcd(n, n + 2) = 2$.

Problem 4: Let $a, b, c \in \mathbb{Z}$. Suppose that $a \mid c$, that $b \mid c$, and that $\gcd(a, b) = 1$. Show that $ab \mid c$. (Use only theory developed in class, so for example do not use any properties of prime factorizations.)