Math 215 – Fall 2017

Theory Homework 4 – Assigned October 2nd, due October 9th

Note: Remember that you must show your work to get full credit for a problem.

1. Prove that $\forall a, b, c \in \mathbb{Z}$, $c \mid (a - b)$ if and only if both a and b have the same remainder when divided by c.

2. Prove that $\forall n \in \mathbb{N}$, $3 \mid n$ if and only if 3 divides the sum of the digits of n.

   Note: one way to set this up is let $k + 1$ be the number of digits in n, then

   $$n = \sum_{i=0}^{k} 10^i d_i,$$

   where d_i is an integer between 0 and 9 inclusive.