

MATH 290 NUMBER THEORY FOR TEACHERS

PROBLEM OF THE DAY # 1

DUE: JANUARY 15, 2014

1. Below is a proof that if  $a + b = a + c$ , then  $b = c$  for integers  $a$ ,  $b$  and  $c$ . State which axiom or principle justifies each step.

$$a + b = a + c$$

$$-a + (a + b) = -a + (a + c)$$

$$(-a + a) + b = (-a + a) + c$$

$$0 + b = 0 + c$$

$$b = c$$

2. Prove from the axioms that  $(-1) \cdot a = -a$  for any integer  $a$ . Hint: What does  $-a$  mean? It is the additive inverse of  $a$ , i.e. the number such that when added to  $a$  gives 0.