Math 103A Fall 2020
Homework 1
Name: _____
Section: _____
For all problems, you must elaborate your work mathematically

1. [1pt] Show that for $a, b, c \in \mathbb{Z}$

   (a) If $a + b = a + c$, then $b = c$

   (b) If $ab = ac$, then $b = c$.

2. [1pt] Use the Euclidean algorithm to compute $d =$ gcd$(456, 1234)$. Find $m, n \in \mathbb{Z}$ such that $d = 456m + 1234n$.

3. [1pt] Show that an interval $[13, 17] = \{t \in \mathbb{R} \mid 13 \leq t \leq 17\}$ is not well-ordered.

4. [1pt] Show that there is no finite ordered integral domain.

5. [1pt] Show that for $x \in \mathbb{Z}$, if $6 \mid x^2$ then $6 \mid x$.

optional Describe which integer n satisfies "$n \mid x^2$ implies $n \mid x$". (In other words, what integers satisfy this statement?)