1. Prove the following

   Theorem. Suppose $\gcd(c, m) = 1$ and $ac \equiv bc \mod m$. Then $a \equiv b \mod m$.

2. Can you apply the above theorem to solve the following equations for $x \in \mathbb{Z}_{12}$?

   (a) $5x \equiv 10 \mod 12$

   (b) $6x \equiv 6 \mod 12$

   In the case when the theorem of cancellation applies, find x. In the case when it does not apply find an example where there is congruence before cancellation, but not after.

   Caution: DO NOT express the solution to a linear congruence $ax \equiv b \mod m$ as $x = \frac{b}{a}$ as you would the solution to the linear equation $ax = b$.